Budget transparency and budget credibility: the case of local government units in Pannonian Croatia

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A scientific paper

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BUDGET TRANSPARENCY AND BUDGET CREDIBILITY: THE CASE OF LOCAL GOVERNMENT UNITS IN PANNONIAN CROATIA[1]

ABSTRACT

This paper analyses the influence of local government budget transparency (LBT) on budget credibility, i.e. on budget expenditures' deviations, in Pannonian Croatia's local government units (LGU). It investigates the differences between Pannonian Croatia and the remaining three NUTS 2 regions (Adriatic Croatia, City of Zagreb, and Northern Croatia) regarding LBT and budgetary deviations in current, capital, and total expenditures. Budgetary deviations are expressed by an LGU's share of the difference between planned and actual expenditures in planned expenditures. LBT, i.e., the online local budget transparency index (OLBI), annually measures the availability of key local budget documents on the official websites of all Croatian counties, cities, and municipalities. The paper conducts a cluster analysis of all 191 Pannonian Croatian LGUs (cities and municipalities) during 2017-2021. The results show that Pannonian Croatian LGUs with the lowest levels of LBT have the biggest budget deviations in current/capital/total expenditures, planning more than executing in the fiscal year.

Key words: *budget transparency, budget credibility, local government units, Pannonian Croatia, cluster analysis.*

1. Introduction

Credibility in economic relations is an important topic. Current measures in fiscal and monetary (Backus & Driffill, 1985; Ball, 1985; Cukierman, 1992; Erceg & Levine, 2003) policy are considered to be credible by economic agents if they believe that they are optimal in the given time period and able to achieve announced outcomes. If economic agents expect them to change, they are not credible.

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Since Pannonian Croatia is experiencing decoupling from the remaining Croatian NUTS 2 regions and consequently strong emigration trends, the aim of this paper is to analyse whether one of the explanations for these trends can be found in local budget policy. Are local budgets credible and is the budget credibility related to budget transparency (BT)? Unlike monetary policy, the local budget policy can adapt to local conditions thus making the question of its credibility both important and unfortunately still largely under-investigated.

"Transparency is generally defined as the principle of enabling the public to gain information about the operations and structures of a given entity" (Finel & Lord, 1999; 316; Heald, 2006; 26). Different authors use different definitions and there is no unique definition for BT. For example, OECD defines BT "as the full disclosure of all relevant fiscal information in a timely and systematic manner" (OECD, 2002; 7). Actually, BT and fiscal transparency are sometimes used as synonyms (e.g. IMF, 2018). However, in our view, fiscal transparency should be broader than BT, since BT is focused only on the transparency of the government's budgets, and fiscal transparency on transparency of all fiscal information. In this paper, BT is defined as "providing an insight into complete, accurate, timely and comprehensible information regarding the budget" (Bronić et al., 2022: 2-3).

BT is important for good governance, as a mechanism for improving the quality of governance on the national and local levels (Albassam, 2015; Bisogno & Cuadrado-Ballesteros, 2021; CoE, n.d.). Different authors show that BT can help to introduce more efficient and effective public policies leading to better quality public services. BT is essential for constructive participation, quality analyses, comments and corrections of the budget. Thus it enables citizens to participate and potentially impact the efficiency of the collection and spending of public funds, to demand more accountability from the central/local government authorities and, consequently, it reduces corruptive acts and inefficient spending (Bronić et al., 2022: 2-3). More transparent budgets also lead to greater responsibility on the part of the central/local government authorities, leading to increased citizen trust and better communication.

The term *budget credibility* refers to whether a central/local government meets its revenue and expenditure targets during the fiscal year. In this paper, if executed expenditures differ from planned expenditures in the enacted budget, it is said to be either overestimated (planned is higher than executed) or underestimated (planned is lower than executed). Budgets that are not executed as planned directly affect when and how public goods and services are delivered, which could have negative consequences regarding poverty, inequality, and migrations (IBP, n.d.).

Unfortunately, the Croatian Ministry of Finance has not issued any provision in the law or any other regulation regarding local budget credibility. It is only stipulated in the Budget Act (2022) (article 10) that LGU budget plan must be balanced so that total revenues and receipts cover total expenditures and expenditures. If the planed total revenues and receipts are not equal to the planed total expenditures and expenditures, the LGU budget must be balanced by transferring surplus or deficit from previous budget year. If during the budget year, due to extraordinary circumstances, expenses and expenses increase or revenues and receipts decrease, the budget must be amended and budget plan must be balanced with new revenues and receipts and/or a reduction of planned expenditures and expenses. Thus, LGUs normally plan balanced budgets but it often happens that at the end of the fiscal year there is deficit or surplus. If they have ended the fiscal year with the deficit/surplus, LGUs are obliged to include it in the next's years budget proposal and projections for the following two years and present how they plan to balance that deficit/surplus.

Since BT could serve as a fiscal discipline mechanism to control budget deviations and ensure budget credibility, this paper aims to check whether it actually works in LGUs in Pannonian Croatia. The first goal is to investigate the differences between Pannonian Croatia and the remaining three NUTS 2 Croatian regions (Adriatic Croatia, City of Zagreb and Northern Croatia) regarding LBT and budgetary deviations in current/capital/total expenditures. The second goal of this paper is to determine possible clusters within Pannonian Croatia LGUs. The working hypothesis of the paper is that there is a negative correlation between online LBT and budget credibility, which is empirically tested through cluster analysis. Results confirm that Pannonian Croatia's LGUs that exhibit the lowest level of BT exhibit the highest budget deviations in current, capital and total expenditures.

The following section presents a short literature review, the third describes the data and the research methodology, the fourth offers cluster analysis results, and the fifth concludes and summarises observations and recommendations.

2. Literature review

Two theories explain why central/local government politicians are not motivated to adopt the most transparent budgets. It is from the principal-agent theory that a lack of BT may create an advantage for policymakers in reaching their goals – politicians (agents) choose an information structure at the outset to maximise expected utility, taking account of subsequent reactions by the voters' (principal's) (Ferejohn, 1999) but do not always maximise the voters' welfare (Guillamón et al., 2011). Therefore, governments can manipulate budgets to reach their goals, affecting budget credibility. But with higher BT, politicians have less opportunity to manipulate budgets and budget credibility. According to Alt et al. (2002), BT decreases information asymmetries between politicians and voters. Another theory, fiscal illusion, refers to voters' inability to internalise the total cost of public goods and services. This theory argues that incumbents are motivated to hide taxes, overemphasise the benefits of expenditures and smooth over government liabilities, which will require future higher taxes, spending and debts (Alesina & Perotti, 1996a; 1996b). BT depends on the incentives of politicians to publish accurate, timely and complete information. When politicians choose not to be budget-transparent as they are required to be in the budget process, budget credibility can be impaired. Moreover, a lack of BT can increase voter confusion and reduce politicians' commitment to fiscal responsibility. Hence, politicians' common practice is to make over-optimistic or excessively pessimistic budget plans, leading to higher budget deviations (Mayper et al., 1991).

Budget deviations can be defined as inconsistencies between enacted budgets and budget outturns in revenues/expenditures during the fiscal year (Ríos et al., 2018). The collected budget revenues by a government often deviates from the planned revenues (Goeminne et al., 2008), as well as the level of actual budget spending often deviates from the planned expenditures in the enacted budget (Serritzlew, 2005).

Empirical studies researching budget deviations and fiscal/budget transparency are rare. Two papers focus on central governments' fiscal/budget transparency and budget credibility. Sarr (2015) used a sample of 73 developed and developing countries in 2012 and found that improved transparency is associated with higher budget execution rates in the health and education sector, and better projections of GDP growth and inflation. Elberry & Goeminne (2021) have recently shown that an improvement in the oversight of fiscal risks arising from

public sector entities significantly reduces deviations from budgetary forecasts in 57 developing countries for 2012.

Only Ríos et al. (2018) published empirical research about BT and budget deviations at the local level. They used a sample of the 100 largest Spanish municipalities for 2008, 2009, 2010, 2012 and 2014 and found that municipalities that exhibit higher BT underestimate their current expenditures. These municipalities may spend more than they planned since they collect more taxes than they budgeted. Furthermore, municipalities with lower BT tend to overestimate their current expenditures, and they have to spend less than they planned since they are aware of the overestimation of their expenditures.

Based on our literature review and previous studies, we formulate the following *hypothesis*: LGUs with lower levels of online BT have the highest budget deviations in expenditures, i.e. they overestimate their expenditures.

3. Data and Methodology

The first goal is to investigate the differences between Pannonian Croatia and the remaining three NUTS 2 Croatian regions (Adriatic Croatia, City of Zagreb and Northern Croatia) regarding LBT and budgetary deviations in current/capital/total expenditures. The paper uses the National Classification of Statistical Regions 2021 (HR NUTS), a statistical standard used for the collection, recording, processing, analysis and dissemination of regional statistics data according to the levels of the spatial division of the Republic of Croatia (CBS, 2019). The four regions of the Republic of Croatia, according to HR NUTS 2, are:

1. City of Zagreb;
2. Adriatic Croatia (Dubrovnik-Neretva, Istria, Lika-Senj, Primorje-Gorski Kotar, Split-Dalmatia, Šibenik-Knin and Zadar counties);
3. Pannonian Croatia (Bjelovar-Bilogora, Brod-Posavina, Karlovac, Osijek-Baranja, Požega-Slavonia, Sisak-Moslavina, Virovitica-Podravina and Vukovar-Srijem counties); and
4. Northern Croatia (Međimurje, Koprivnica-Križevci, Krapina-Zagorje, Varaždin and Zagreb counties).

This analysis is focused only on Croatian *cities* and *municipalities* while counties are not included. In their self-governing scope, *cities* and *municipalities* perform tasks of local importance that directly meet those needs of citizens that are not assigned to state bodies by the Constitution or law and are determined by the Law on Local and Regional Self-Government (2020). *Cities* and *municipalities* thus perform tasks related to: settlement planning and housing, spatial and urban planning, communal economy, child and social care, primary health care, education, culture, sports, consumer protection, fire and civil protection, improvement of the natural environment, traffic in their area and other tasks in accordance with special laws. *Large cities* (economic, financial, cultural, health, transport and scientific centres of development with more than 35,000 inhabitants) as well as *cities with county seats* perform some additional tasks.

Budget deviations are expressed as the LGU's share of the difference between planned and actual current/capital/total expenditures in planned current/capital/total expenditures and are represented by the following equation:

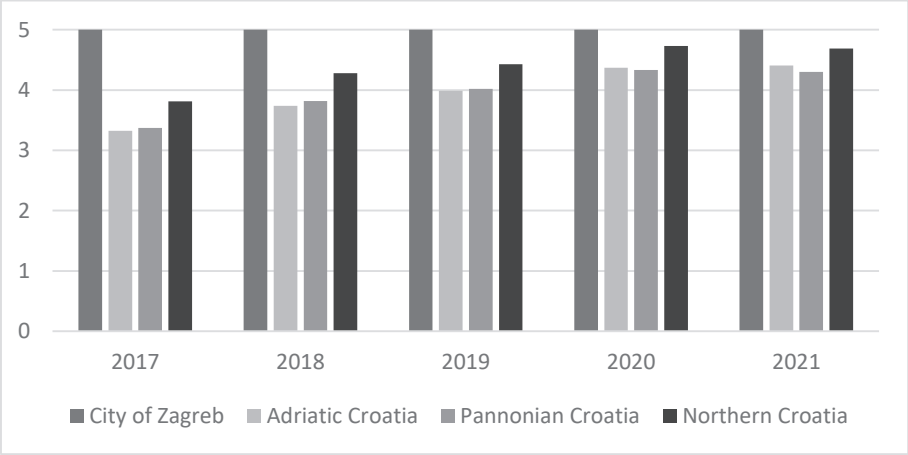
$$dev\_in\_exp_{it} = \frac{exp\_plan_{it} - exp\_actual_{it}}{exp\_plan_{it}} \cdot 100, i = 1, \dots, I, t = 1, \dots, T$$

Where exp_plan represents planned expenditures from the enacted budget; exp_actual represents actual and executed expenditures from the year-end report, i represents city/municipality (556 in total) and t is the year of observation for the 2017-2021 period.

If the planned expenditures are higher than the actual, LGUs are overestimating their expenditures (budget deviations are positive) and this is known as pessimistic budgeting (Mayper et al., 1991; Ríos et al., 2018). Conversely, if planned expenditures are lower than actual, then LGUs are underestimating their expenditures (budget deviations are negative), which is known as optimistic budgeting. Preferably, budget deviations in expenditures should be close to zero, i.e. planned expenditures are equal/similar to actual expenditures.

LBT, as represented by the online local budget transparency index (OLBI), has been annually measured from 2014 for all Croatian counties, cities and municipalities in terms of the availability of five key annual local budget documents on the official websites of LGUs. OLBI ranges from 0 to 5, depending on the number of available key budget documents at the time of research (Bronić et al., 2022). Key annual local budget documents are: budget proposal, enacted budget, citizens budget, mid-year and year-end reports.

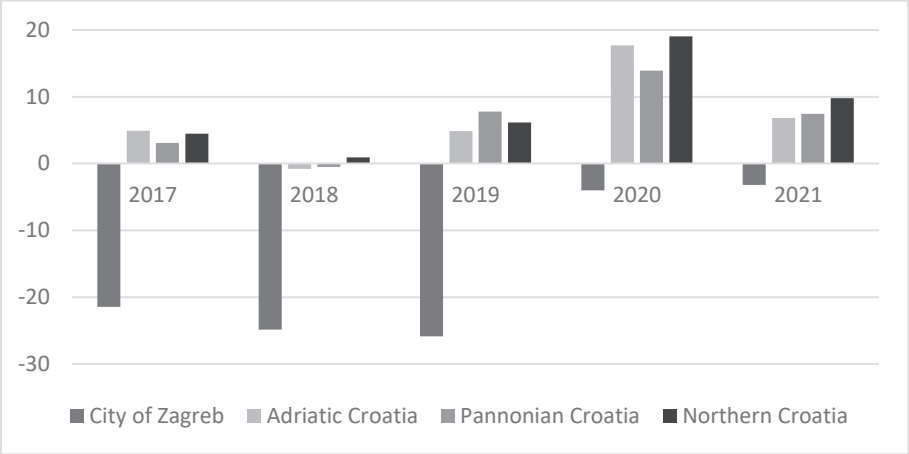
Figure 1: OLBI scores, Croatian regions (average values)



Source: Authors' calculations based on data from Bronić et al. (2022).

Data on OLBI for four Croatian regions in 2017-2021 (Graph 1) lead to three main conclusions. First, Adriatic Croatia LGUs, on average, were the worst performers in the 2017-2019 period, while Pannonian Croatia LGUs, on average, were the worst performers in the last two cycles. Second, the average values of OLBI for the other three regions show annual improvement during the observed period. Exceptionally, in 2021, LGUs of Pannonian and Northern Croatia were the only regions where average values of OLBI fell. Third, during this period, the City of Zagreb published all five key budget documents.

Figure 2: Deviations in current expenditures, Croatian regions (average values, in %)

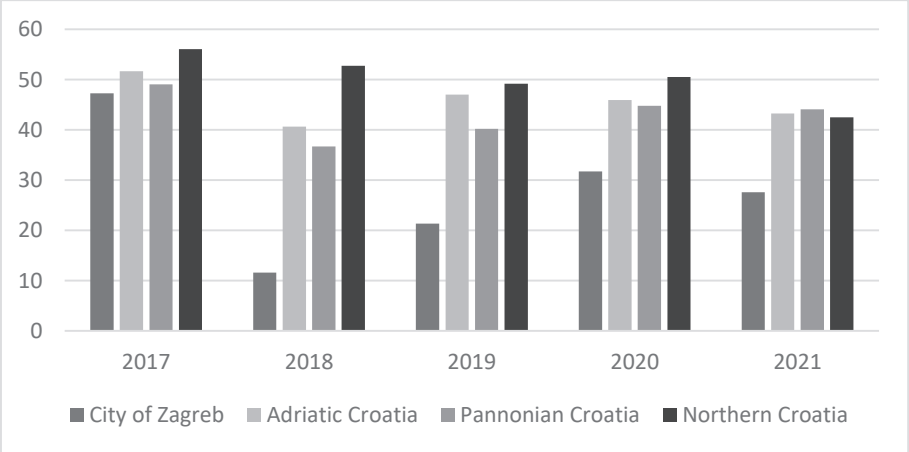


Note: Positive deviation means that the plan was higher than execution.
Negative deviation means that the plan was lower than execution.

Source: Authors

It can be seen that during 2017-2021 the City of Zagreb executed much higher current expenditures than planned, even though deviations in 2020 and 2021 are lower than in previous years (Graph 2). In contrast, on average, LGUs in the other three regions in the observed period planned higher current expenditures than they executed.

Figure 3: Deviations in capital expenditures, Croatian regions (average values, in %)

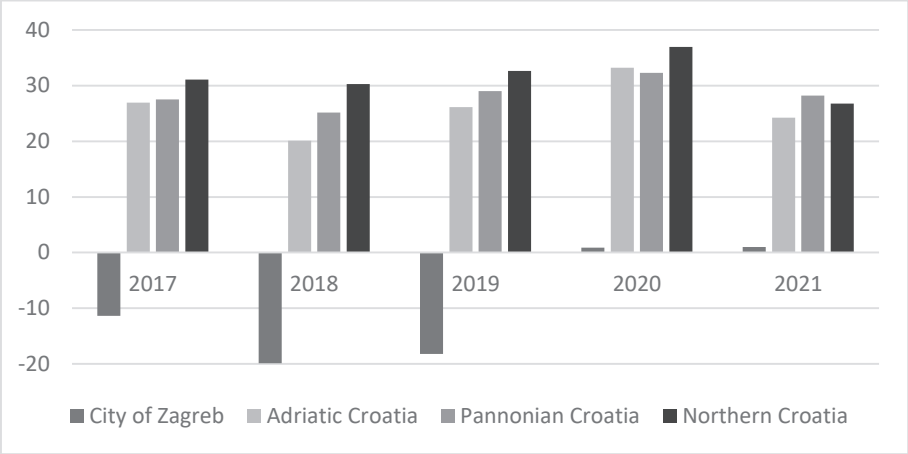


Note: Positive deviation means that the plan was higher than execution.

Source: Authors

In the analysed period, LGUs in all four regions planned significantly higher capital expenditures than they executed (Graph 3), on average more than 40% higher! LGUs in Northern Croatia, on average, had the highest deviations from planned values in the period from 2017 until 2020, while in 2021, Pannonian Croatia LGUs, on average, had the highest deviations from planned values. The lowest deviations were in the City of Zagreb.

Figure 4: Deviations in total expenditures, Croatian regions (average values, in %)



Note: Positive deviation means that the plan was higher than execution.
Negative deviation means that the plan was lower than execution.

Source: Authors

Total expenditures are the sum of current and capital expenditures. If we look at Graph 4, deviations in total expenditures show a similar pattern to current expenditures. The City of Zagreb underestimated their total expenditures during 2017-2019, but in 2020 and 2021, they slightly overestimated total expenditures. In contrast, on average, LGUs in the other three regions during the observed period plan much higher total expenditures than they actually spend (overestimation). In 2021 Pannonian Croatia LGUs, on average, have the highest positive budget deviation in total expenditures – the difference between planned and executed total expenditures is the highest (they overestimated total expenditures by around 30%).

The above comparative analysis of the four Croatian regions shows that Pannonian Croatia LGUs are among the lowest performers in 2017 to 2020, while in 2021 are far and away the lowest. They exhibit low/lowest BT and high/highest budget deviations in current/capital/total expenditures on average (planning much higher expenditures than they actually spend). The most significant budget deviations arise from planning much higher capital expenditures than are actually executed.

The second goal of this paper is to determine possible clusters within Pannonian Croatia LGUs. Cluster analysis is conducted for all 191 Pannonian Croatian LGUs (39 cities and 152 municipalities) during 2017-2021. In order to perform cluster analysis, eight additional variables are introduced: grants per capita (pc), budget balance pc, population, income pc, unemployment rate, fiscal capacity pc, Herfindahl index and women councillors (Table 1).

Table 1: Definitions of variables

Variable	Description	Source
Deviations in current expenditures (DCUREXP)	Budget deviations in current expenditures, calculated as (current expenditures plan – current expenditures actual)/current expenditures plan (in %).	Authors' calculations. Data on actual expenditures from the Ministry of Finance (MOF) and planned expenditures from Enacted budgets on the official websites of LGUs.
Deviations in capital	Budget deviations in expenditures for acquisition of nonfinancial assets (capital expenditures),	Authors' calculations. Data on actual expenditures from the

Variable	Description	Source
expenditures (DCAPEXP)	calculated as (expenditures plan – expenditures actual)/expenditures plan (in %).	MOF and planned expenditures from Enacted budgets on the official websites of LGUs.
Deviations in total expenditures (DTOTEXP)	Budget deviations in total expenditures, calculated as (total expenditures plan – total expenditures actual)/total expenditures plan (in %). Total expenditures are calculated as the sum of current expenditures and expenditures for the acquisition of nonfinancial assets.	Authors' calculations. Data on actual expenditures from the MOF and planned expenditures from Enacted budgets on the official websites of LGUs.
OLBI	BT is measured annually as the online availability of five key local budget documents (budget proposal, enacted budget, year-end report, mid-year report and citizens' guide), ranging from 0 to 5.	Bronić et al. (2022)
Grants pc (GRAN)	All revenues from grants are calculated pc. Values in the HRK.	MOF (2022)
Budget balance pc (BBAL)	The budget balance is defined as total revenues minus total expenditures, calculated pc. If the budget balance is positive, it is called a surplus; if it is negative, it is called a deficit. Values in the HRK.	MOF (2022)
Population (POP)	The number of inhabitants in the LGU. The estimate of the number of inhabitants from 2017-2020. The number of inhabitants from the Census of the population 2021.	Croatian Bureau of Statistics - CBS (2022)
Income pc (INC)	Total average annual resident income for each LGU, calculated pc. The total amount of income earned during one tax period (calendar year) by taxpayers, natural persons with residence or habitual residence in LGU, including tradesmen's profits. Values in HRK.	Ministry of Regional Development and EU Funds (2022)
Unemployment rate (UNEMP)	The average unemployment rate of LGUs is calculated as the ratio of the number of unemployed to the sum of all employed persons in LGUs (in %).	Ministry of Regional Development and EU Funds (2022)
Fiscal capacity pc (FISCAP)	Fiscal capacity, i.e. LGUs' own revenues, calculated as operating revenues minus all grants, calculated pc. Values in the HRK.	MOF (2022)
Herfindahl index (HERF)	The measure of fragmentation of the city/municipality councils is calculated using the following equation: $\sum_{i=1}^{n} \frac{S_i^2}{S^2}$, S_i is the number of party councillors in the city/municipality council, S is the total number of seats in the city/municipality council. Values ranging from 0 to 1 (all council members belong to the mayor's party).	Authors' calculations. Data from State Electoral Commission (2022)
Women councillors (WOMEN)	Share of females in city/municipality councils; local elections 2017 and 2021 (in %).	State Electoral Commission (2022)

Note: All variables refer to average values for the 2017-2021 period.

4. Cluster Analysis of Pannonian Croatia

Before performing cluster analysis, it is necessary to obtain standardised values of the variables by using the z-score normalisation of the original values of the variables, applying the following calculation for each variable:

$$z = \frac{x - \mu}{\sigma},$$

where z is the standardised value, x is the original value of the variable, μ is the mean value, and σ is the standard deviation.

This paper applies K-means clustering in which n observations are divided into k clusters, and each observation belongs to the cluster with the closest mean. Cluster analysis was conducted for all LGUs of Pannonian Croatia – cities and municipalities.

Table 2: Descriptive statistics (average values, 2017-2021)

	DCUREXP	DCAPEXP	DTOTEXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
Min.	-76.3	-146.7	-37.6	1	308	-1,382	368	15,262	4.4	1,733	0.2	0.0
Median	8.5	50.1	29.2	4.2	1,603	-37	2,590	26,938	13.3	2,441	0.4	25.5
Mean	6.3	43.0	28.5	4.0	1,786	-69	5,561	27,313	15.0	2,652	0.4	25.2
Max.	38.6	85.6	67.8	5	7,052	775	100,687	41,421	37.0	9,322	1.0	51.3

Source: Authors

The descriptive statistics in Table 2 show significant differences in the values of the variables used (especially in grants pc, budget balance pc, population, income pc and fiscal capacity pc).

Pannonian Croatia's LGU with the lowest average level of BT is the municipality Punitovci (1). There are 31 LGUs with the highest average level of BT (5): 9 cities and 22 municipalities. In the observed period, Gradina had the highest average negative budget deviation (spending more than planned) for current expenditures (-76.3%) and total expenditures (-37.6%), while Draž had the highest negative budget deviation for capital expenditures (-146.7%). On the other hand, on average, the highest positive budget deviation (spending less than planned) for current expenditures was seen in Štefanje (38.6%), for capital expenditures in Martinska Ves (85.6%) and for total expenditures Podravska Moslavina (67.8%). Preferably, LGUs should have budget deviations around zero, i.e. planned and actual expenditures are similar, which is on average the case for Tovarnik for current expenditures (0.7%), Sirač for capital expenditures (0.6%) and Sisak for total expenditures (0.8%).

The cluster analysis results are presented in tables 3, 4 and 5. The cluster mean values reported indicate a relationship between budget deviations in expenditures and BT for all of Pannonian Croatia's LGUs. The main conclusion is that LGUs with lower BT exhibit higher budget deviations, i.e. they overestimate their expenditures.

Table 3: Cluster means – deviations in current expenditures

	DCUREXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
1	15.3 (0.55)	3.2 (-0.83)	2,096 (0.35)	56 (0.42)	1,980 (-0.35)	22,812 (-0.89)	20.4 (0.91)	2,421 (-0.28)	0.52 (0.59)	28.0 (0.28)
2	1.4 (-0.30)	3.8 (-0.17)	1,758 (-0.03)	-196 (-0.42)	3,141 (-0.23)	25,998 (-0.26)	15.2 (0.03)	2,686 (0.04)	0.40 (-0.30)	17.0 (-0.79)
3	5.3 (-0.06)	4.6 (0.64)	1,626 (-0.18)	-32 (0.12)	9,836 (0.41)	31,164 (0.77)	11.6 (-0.57)	2,760 (0.13)	0.43 (-0.08)	30.7 (0.53)

Note: Standardised values are in parentheses.

Source: Authors

The cluster analysis results for deviations in current expenditures (Table 3) show three clusters, and the variables used in clustering contribute differently. The most significant contribution is from *income pc* ranging from -0.89 (cluster 1) to 0.77 (cluster 3), while the least significant is from *fiscal capacity pc* ranging from -0.28 (cluster 1) to 0.13 (cluster 3). We single out the cluster of the "worst performers":

- Cluster 1: LGUs with the lowest BT (OLBI) and highest deviations in current expenditures. These LGUs receive the highest grants per capita and conversely have the lowest fiscal capacity. They record a positive budget surplus indicating that their budget planning is, to a certain extent, determined by external circumstances (e.g. central government allocations) since the underlying economic foundations – they exhibit the lowest average values of income per capita and population together with highest levels of unemployment – are the weakest. Political variables point to an absolute majority of the ruling party in the local council (Herfindahl index above 0.5) indicating a politically monolithic ecosystem.

Confirming the conclusions reached by Ríos et al. (2018), we report that LGU's with lower BT tend to overestimate their current expenditures. Needing to be taken into account in a comparison of these results are the size of Spanish municipalities, economic strength and the level of fiscal decentralisation but since these are the first empirical results for any Croatian LGU's the possibilities for comparative analysis are rather limited.

Table 4: Cluster means – deviations in capital expenditures

	DCAPEXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
1	50.0 (0.22)	3.2 (-0.81)	1,955 (0.19)	-9 (0.20)	2,294 (-0.32)	23,266 (-0.80)	19.90 (0.83)	2,396 (-0.31)	0.49 (0.35)	24.7 (-0.05)
2	19.6 (-0.72)	4.1 (0.18)	2,629 (0.94)	-268 (-0.66)	4,678 (-0.09)	29,472 (0.43)	14.93 (-0.01)	3,462 (0.98)	0.45 (0.03)	25.7 (0.05)
3	47.2 (0.13)	4.5 (0.53)	1,320 (-0.52)	-34 (0.12)	8,340 (0.27)	29,441 (0.42)	11.34 (-0.61)	2,515 (-0.17)	0.41 (-0.27)	25.4 (0.02)

Note: Standardised values are in parentheses.

Source: Authors

The cluster analysis results for deviations in capital expenditures (Table 4) show again three clusters, and the variables used in clustering contribute differently. The most significant contribution is given by *grants pc* ranging from -0.52 (cluster 3) to 0.94 (cluster 2), while the least significant is given by *women councillors* ranging from -0.05 (cluster 1) to 0.05 (cluster 2). We single out the cluster of the "worst performers":

- Cluster 1: LGUs with the lowest BT (OLBI) exhibit the highest deviations in capital expenditures. Additional similarities with the "worst performers" cluster in current expenditures include the lowest average values of income per capita, population and fiscal

capacity together with the highest levels of unemployment and monolithic political landscape within local councils. Unlike the "worst performers" cluster in current expenditures they accomplish middle grants per capita and lowest % of woman councillors.

One immediately recognises the higher level of deviations in capital than in current expenditures. Out of the possible theoretical reasons that are behind this – e.g. fiscal centralisation, political leadership, economic foundations and transparency – existing empirical research tends to suggest political accountability (Ott et al., 2019; World Bank, 2022). A region that is decoupling should record negative deviations in capital expenditures according to both beta and gamma convergence criteria, but that is unfortunately not the case. That is even more surprising if one takes into consideration that voters are not fiscal conservatives, i.e. they reward increases in expenditures in election years (Mačkić, 2021). This surely opens an interesting research avenue, one however, that is outside the scope of this paper.

Table 5: Cluster means – deviations in total expenditures

	DTOTEXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
1	35.2	3.0	2,016	54	2,090	22,897	21.3	2,453	0.49	25.9
	(0.36)	(-1.07)	(0.26)	(0.41)	(-0.34)	(-0.88)	(1.07)	(-0.24)	(0.36)	(0.07)
2	29.3	4.2	1,627	-181	3,176	26,337	13.1	2,313	0.45	21.8
	(0.04)	(0.28)	(-0.18)	(-0.37)	(-0.23)	(-0.19)	(-0.32)	(-0.41)	(0.05)	(-0.33)
3	21.5	4.4	1,844	3	12,221	32,554	12.7	3,353	0.39	29.9
	(-0.37)	(0.46)	(0.07)	(0.24)	(0.65)	(1.04)	(-0.39)	(0.85)	(-0.38)	(0.46)

Note: Standardised values are in parentheses.

Source: Authors

The cluster analysis results for deviations in total expenditures (Table 5) show again three clusters[2], and the variables used in clustering contribute differently. The most significant contribution is given by *income pc* ranging from -0.88 (cluster 1) to 1.04 (cluster 3), while the least significant is given by *grants pc* ranging from -0.18 (cluster 2) to 0.26 (cluster 1). We single out the cluster of the "worst performers":

- Cluster 1: LGUs with the lowest BT (OLBI) exhibit the highest deviations in total expenditures. Additional similarities with the "worst performers" cluster in current expenditures include the lowest income per capita and population together with the highest grants per capita and unemployment rate. They also share a politically monolithic ecosystem characterised by an absolute majority of the ruling party in the local council (Herfindahl index above 0.5). They record a positive budget surplus indicating that their budget planning is, to a certain extent, determined by external circumstances (e.g. central government allocations).

The results confirm our stated hypothesis on the negative correlation between BT and budget credibility. On average, LGUs with lower LBT record higher budget deviations in current/capital/total expenditures for all of Pannonian Croatia's LGUs. Additionally, Pannonian Croatia's LGUs on average record the highest grants per capita and unemployment rate. They accomplish budget surplus and have an absolute majority of the ruling party in the local council (Herfindahl index above 0.5). On the other side, on average they record the lowest population, income per capita and fiscal capacity per capita.

[2] The most interesting results for cluster 1 the "worst performers" are in Appendix. Due to insufficient space, all other tables with cluster results are available upon request.

5. Conclusion

This paper presents the first empirical examination of budget credibility on the local level in Pannonian Croatia. It analyses the influence of LBT on budget credibility, i.e. the effect of LBT on the LGUs' budget deviations in expenditures in Pannonian Croatia. Conducting a cluster analysis on all Pannonian Croatian LGUs during 2017-2021, the paper confirmed a negative correlation between LBT and budget deviations in current/capital/total expenditures.

Both research goals have been met. Firstly, based on a descriptive analysis, Pannonian Croatia LGUs were among the lowest performers in the 2017-2020 period, while in 2021, they were the lowest performers compared to the remaining three NUTS 2 regions (Adriatic and Northern Croatia and the City of Zagreb). They exhibit low/lowest BT and high/highest budget deviations in current/capital/total expenditures (planning much higher expenditures than later spending). The most significant budget deviations arise from planning much higher capital expenditures than later executing. Second, based on cluster analysis, on average Pannonian Croatia LGUs with low levels of LBT have higher deviations in current, capital and total expenditures. This cluster shares some similarities regardless of whether current, capital or total expenditures are under examination. These include the lowest average values of income per capita, population and fiscal capacity per capita together with the highest unemployment rate levels, grants per capita and monolithic political landscape within local councils (Herfindahl index).

Future studies may conduct cluster analysis for all Croatia's LGUs or use different methods, e.g. panel analysis, where cluster analysis may serve as a first step in the inference analysis. Although BT certainly explains part of the budget credibility story, in order to see the full picture, future research should widen the scope of the variables used. For example, including public participation in budget processes on the local level might be promising. On the political side, one could include the ideology and longevity of the incumbents as well as political conformity between central/county and local levels (especially in the case of capital expenditures). Also, a clear sticks & carrots strategy by the Ministry of Finance (better legal regulations and control of LGUs budget credibility, as well as introducing penalties when low LGUs budget credibility cannot be reasonably explained) could change incumbents' preferences during the budgetary planning and executing stages. More inclusive empirical analysis might yield policy recommendations beneficial to economic agents both in terms of credibility and of achieving desired economic policy outcomes.

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APPENDIX

Table A1: Cluster 1 "worst performers", Pannonian LGUs by deviations in total expenditures

LGU	m/c	DTOTEXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
Berek	m	61.2	4	2,690	-192	1,168	23,270	16.7	2,763	0.87	38.0
Borovo	m	29.1	3	1,238	4	4,029	22,377	14.2	2,031	0.68	24.3
Bošnjaci	m	30.9	3	1,372	31	3,099	22,685	19.4	2,449	0.41	26.2
Darda	m	44.2	2	3,478	80	5,830	27,428	22.2	2,353	0.31	14.0
Donja Motičina	m	47.8	2	1,327	-37	1,398	26,589	17.9	2,384	0.67	28.5
Donji Kukuruzari	m	21.0	3	3,117	136	1,097	21,490	30.4	2,257	0.40	19.0
Dragalić	m	57.3	3	1,780	190	1,065	25,692	19.6	3,060	0.42	26.3
Drenovci	m	35.6	3	2,042	-97	3,976	21,585	23.1	3,644	0.53	19.1
Drenje	m	13.1	2	2,342	-175	2,228	21,231	21.0	1,946	0.32	16.9
Dvor	m	34.8	3	1,644	33	3,412	22,919	27.0	2,760	0.30	19.1
Đulovac	m	33.3	5	1,838	-113	2,791	17,474	29.6	2,038	0.33	10.7
Gorjani	m	53.1	2	3,041	-540	1,362	25,193	15.7	2,180	0.49	9.5
Gornji Bogićevci	m	34.3	2	1,207	-43	1,483	20,712	29.6	2,388	0.39	37.1
Gradina	m	-37.6	3	1,337	531	2,985	21,647	22.0	2,373	0.39	19.8
Gradište	m	41.7	3	1,363	151	2,270	24,682	15.1	2,137	0.91	29.2
Gunja	m	54.1	4	1,497	258	2,805	17,779	27.3	2,029	0.40	15.2
Gvozd	m	44.8	3	1,765	74	1,953	22,387	37.0	2,623	0.51	32.3
Hrvatska Dubica	m	44.5	4	2,295	621	1,497	23,975	27.0	2,729	0.30	46.0
Hrvatska Kostajnica	c	37.7	3	2,807	419	1,983	32,479	13.0	2,940	0.48	29.9
Jagodnjak	m	9.6	4	4,260	-165	1,632	21,116	33.7	2,432	0.43	34.0
Krnjak	m	36.8	3	2,545	37	1,423	20,979	14.0	2,608	0.39	35.8
Levanjska Varoš	m	31.4	4	3,398	-664	947	16,802	28.1	2,376	0.50	40.0
Majur	m	33.2	2	3,629	-390	831	29,132	20.7	2,334	0.36	46.4
Markušica	m	48.7	2	1,804	302	2,000	19,388	18.4	2,041	1.00	46.2
Negoslavci	m	23.2	2	1,933	141	1,163	24,226	13.1	1,848	1.00	45.3
Okučani	m	52.4	3	1,699	300	2,421	20,609	32.2	2,651	0.48	24.6
Petlovac	m	16.3	4	1,336	-82	1,909	26,556	26.5	2,781	0.43	9.5
Plaški	m	37.2	3	2,018	-201	1,638	21,394	22.8	2,023	0.33	35.8
Podgorač	m	42.2	3	1,517	-20	2,518	21,207	25.9	2,424	0.49	26.7
Podravska Moslavina	m	67.8	2	3,344	203	974	23,769	16.1	2,168	0.52	13.9
Popovac	m	22.2	4	1,945	132	1,467	27,012	27.1	3,688	0.54	19.0
Privlaka	m	48.3	3	1,657	267	2,351	26,290	12.0	2,583	0.60	12.3
Punitovci	m	45.7	1	3,349	-256	1,603	25,067	17.6	2,020	0.51	15.6
Semeljci	m	34.7	4	1,769	378	3,801	25,774	18.5	2,136	0.55	43.6
Severin	m	30.5	2	1,859	-55	754	25,983	13.3	2,599	0.39	5.0
Slavonski Šamac	m	43.8	4	1,654	158	1,662	19,160	13.3	1,892	0.43	50.3
Sopje	m	27.3	4	2,022	106	1,969	23,710	20.7	2,800	0.45	17.3
Staro Petrovo Selo	m	36.0	3	1,249	-73	4,230	25,384	17.3	2,180	0.40	23.7
Šodolovci	m	27.7	5	1,945	106	1,279	24,672	22.9	2,532	0.49	28.5
Štitar	m	49.1	4	1,388	301	1,608	21,409	16.4	1,997	0.36	33.5
Trnava	m	51.3	4	2,267	-243	1,319	22,943	19.0	1,922	0.38	44.4
Trpinja	m	11.8	3	1,141	94	4,494	21,180	14.9	2,493	0.41	18.6

LGU	m/c	DTOTEXP	OLBI	GRAN	BBAL	POP	INC	UNEMP	FISCAP	HERF	WOMEN
Viljevo	m	43.4	2	1,798	-50	1,734	20,834	18.3	2,706	0.54	16.8
Voćin	m	13.3	3	1,453	492	2,006	17,056	32.5	3,312	0.62	0.0
Vrbje	m	50.2	2	925	177	1,749	21,351	24.2	2,112	0.51	22.2
Zdenci	m	1.4	2	896	-32	1,514	26,290	18.8	3,583	0.40	16.8
Zrinski Topolovac	m	35.9	1	1,779	234	783	15,262	15.8	1,967	0.45	32.4

Note: c = city, m = municipality.

Source: Authors