MUNICIPAL CASH HOLDINGS IN THE CZECH REPUBLIC: PRECAUTIONARY SAVINGS OR BUDGET EXECUTION BYPRODUCT?

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Abstract

This paper presents the first empirical analysis of municipal cash holdings in a post-communist EU member state. It examines why Czech municipalities accumulate idle cash instead of allocating it to public services. Using a panel of all Czech municipalities from 2014 to 2024, we found strong support for the precautionary savings hypothesis; revenue volatility was found to significantly increase cash reserves (β=11.286, $p<0.001$). A key contribution is the introduction of budget execution variables as predictors. Municipalities with actual revenues exceeding planned revenues accumulate larger reserves (β=7.081, $p<0.001$), while expenditure overruns deplete cash reserves (β=−7.852, $p < 0.001$). Small municipalities are significantly less able to convert positive revenue deviations into cash reserves, suggesting administrative capacity constraints in the highly fragmented Czech system (β=−2.019, $p<0.001$). Investment grants show a modest positive association. The preferred model explains 94.3 percent of the variation within municipalities. These findings extend the literature beyond the U.S. context and have implications for budget forecasting and EU Cohesion Policy.

Key words: municipal cash holdings, fiscal slack, budget execution, Czech Republic, precautionary savings

JEL Code: H72, H74, H77

Introduction

Municipal governments typically maintain cash reserves to protect against revenue volatility and fiscal uncertainty. The Government Finance Officers Association recommends that local governments maintain an unassigned fund balance equivalent to approximately two months of operating expenditures or 16.7 percent of annual spending. In practice, however, many municipalities hold reserves far above this benchmark. For example, research on U.S. municipalities shows that the median city holds 9.3 months' worth of expenditures in cash, while the average exceeds 12 months (Gore, 2009). Another example is that even during and

after the Great Recession, Florida cities averaged approximately 30 percent of operating expenditures in unassigned fund balances, with seven out of ten cities maintaining levels above the recommended minimum (Arapis & Reitano, 2018).

The academic literature offers two competing explanations for why governments accumulate excess cash. The first is the precautionary motive, whereby municipalities save during prosperous periods to ensure stable service provision during economic downturns, thereby protecting citizens from disruptive spending cuts or tax hikes (Hendrick, 2006). Consistent with this view, studies find that municipalities with higher revenue volatility, fewer revenue sources, and higher population growth accumulate more cash (Arapis & Reitano, 2018). The second explanation points to agency problems, suggesting that entrenched managers accumulate cash for self-interested purposes rather than returning it to taxpayers (Dick-Sagoe & Tingum, 2021; Gore, 2009). Evidence from the U.S. shows that municipalities with excess cash spend more on administrative expenses and pay higher manager salaries and bonuses without reducing taxes (Gore, 2009). Staggered and non-independent councils exacerbate this cash hoarding, which is consistent with manager entrenchment (Gore, 2009).

For several reasons, the Czech Republic is an excellent case study for municipal cash hoarding. First, it has one of the most fragmented municipal systems in the EU with 6,254 municipalities (obce), each with an average population of only about 1,600. This extreme fragmentation creates variations in fiscal capacity, professionalization, and political dynamics that are ideal for testing theories of fiscal slack. Second, Czech municipalities operate under a defined system of shared tax revenues (Rozpočtové určení daní (RUD)), which provides a stable and predictable revenue base. This system differs fundamentally from the property-tax-dependent systems of U.S. municipalities. Third, since joining the EU in 2004, Czech municipalities have received substantial inflows from EU structural and investment funds, creating a unique source of external revenue whose effect on local cash holding behavior remains unexplored. Fourth, the decade from 2014 to 2024 covers a full economic cycle, including the aftermath of the global financial crisis, the pandemic, and high inflation from 2022 to 2024. This provides variation in fiscal conditions.

This paper uses a panel of all Czech municipalities to investigate the determinants of municipal cash holdings in the Czech Republic from 2014 to 2024. We address two research questions: First, what factors explain why Czech municipalities accumulate idle cash in their bank accounts? Second, do inflows of investment funds increase or decrease cash hoarding?

The remainder of the paper is organized as follows. Section 1 describes the institutional context of Czech municipal finance. Section 2 presents the data and methodology. Section 3 reports the empirical results. Section 4 discusses the findings, and Section 5 offers conclusions.

1 Background

Although the empirical literature has grown substantially, it has focused almost exclusively on the U.S. context (Arapis & Reitano, 2018; Gore, 2009; Gorina et al., 2019; Stewart et al., 2018; Wei, 2021). One study examined 145 U.S. cities and found that unassigned fund balances averaged 18 percent of expenditures. However, reserves were more strongly determined by the capacity to save than the need to save (Gorina et al., 2019). Other studies have found that seven out of ten Florida cities maintained balances above the recommended minimum even during the Great Recession (Arapis & Reitano, 2018) and that local governments allocate slack resources countercyclically only during economic downturns (Stewart et al., 2018). Political and institutional factors also matter; voter pro-spending preferences reduce slack, whereas professional management increases it (Hendrick, 2006; Wei, 2021).

A critical gap remains, as nearly all studies focus on U.S. municipalities. The Czech Republic differs in three fundamental ways. First, Czech municipalities receive approximately 85 percent of their tax revenue through a shared-tax system (Rozpočtové určení daní (RUD)), rather than through local property taxes. This creates limited fiscal autonomy and a moral hazard problem (Bryson & Cornia, 2004). Second, the municipal structure is exceptionally fragmented, consisting of over 6,200 municipalities, many of which have populations of only a few hundred. These municipalities lack administrative capacity and economies of scale (Bryson & Cornia, 2004). Third, the legacy of central planning continues to influence fiscal behavior, resulting in lower budget transparency compared to Western standards (Sedmihradská, 2015) and potential inefficiencies in service provision (Šťastná & Gregor, 2015).

A factor unique to EU member states is the inflow of external funds from structural and investment programs. Since 2004, Czech municipalities have received substantial investment resources. One study found that such funds do not systematically crowd out national expenditures at the aggregate level (Janský et al., 2016). However, the effect of investment fund inflows on municipal cash holding behavior remains unexplored.

The preceding review reveals three major gaps. First, the determinants of municipal cash holdings have been studied almost exclusively in the U.S., with no empirical evidence from post-communist EU member states. Second, the impact of structural funds on local fiscal

behavior, particularly cash accumulation, remains unexplored. Third, budget execution dynamics – or the differences between planned and actual revenues and expenditures – have not been systematically studied because most datasets lack the budgeted figures necessary to compute such deviations. This study addresses these gaps by examining the determinants of municipal cash holdings in the Czech Republic from 2014 to 2024 using data from all Czech municipalities.

2 Methodology

This study uses a panel dataset at the municipality level covering approximately 6,254 Czech municipalities from 2014 to 2024. The dataset includes information on planned and actual revenues and expenditures, debt, bank account balances, unemployment, demographic indicators, investment grants, and population dynamics. Inflation data were obtained from the World Bank and organized by year.

Due to its highly fragmented municipal structure and the availability of both planned (rozpočet) and realized (skutečnost) budget data, the Czech Republic is a suitable case for analyzing municipal liquidity behavior. This allows for the direct estimation of discrepancies in budget execution and conservative budgeting behavior.

The dependent variable is municipal cash holdings measured as: Cash Ratio$_{it}$ = Bank Account Balance$_{it}$/(Current Expenditures$_{it}$/12); i: municipality; t: year. This variable captures how many months municipalities can finance operating expenditures with liquid reserves. As a robustness test, we also estimated logarithmic specifications using log(1+Cash Ratio$_{it}$).

The main explanatory variables are revenue volatility (Revenue Volatility$_{it}$ = SD(Revenue$_{i,t-3:t}$)/Mean(Revenue$_{i,t-3:t}$)), revenue diversification (Revenue Diversification$_{it}$ = 1-HHI$_{it}$; HHI: Herfindahl-Hirschman index defined as follows: $HHI_{it} = S_{tax}^2 + S_{notax}^2 + S_{capital}^2 + S_{transfers}^2$; based on the proportion of tax, non-tax, capital, and intergovernmental transfer revenues to total municipal revenue), revenue budget deviation (Revenue Budget Deviation$_{it}$ = [Actual Revenue$_{it}$ – Planned Revenue$_{it}$]/Planned Revenue$_{it}$), expenditure budget deviation (Expenditure Budget Deviationit = [Actual Expenditure$_{it}$ – Planned Expenditure$_{it}$]/ Planned Expenditure$_{it}$), capital spending execution (Capital Spending Execution$_{it}$ = Actual Capital Expenditures$_{it}$/Planned Capital Expenditures$_{it}$), dependence on transfers, debt per capita (Debt Per Capita$_{it}$ = Municipal Debt$_{it}$/Population$_{it}$), the share of personnel expenditures, the share of capital expenditures, unemployment, investments grants per capita, and population growth.

Revenue volatility was calculated using the standard deviation-to-mean ratio of own-source revenues over a rolling four-year period.

The analysis uses municipality- and year-fixed effects panel regressions with municipality-clustered standard errors: $Cash\ Ratio_{it} = \beta X_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$.

Notes: Own work. i denotes municipalities; t denotes years; X_{it} denotes time-varying fiscal characteristics; α_i denotes municipality fixed effects; γ_t captures year fixed effects; ε_{it} is the error term.

Municipality fixed effects control for time-invariant local characteristics, and year effects capture nationwide macroeconomic shocks. Political variables were excluded because Czech local politics are highly fragmented and difficult to operationalize consistently.

Several robustness tests were conducted, including the use of logarithmic specifications, the exclusion of Prague, interaction models for small municipalities, and alternative measures of budget execution. Positive coefficients on fiscal uncertainty and budget deviation variables suggest precautionary municipal liquidity accumulation and conservative budgeting behavior.

3 Results

Table 1 presents the results of the fixed-effects panel regression analysis for Czech municipalities from 2014 to 2024.

Tab. 1: Regression outputs

Variables	Baseline	Budget Execution	Conservatism	Interaction
revenue volatility	11.286***	9.337***	−3.251	10.681***
	-2.742	-2.277	-3.598	-2.21
revenue diversification	−1.626			
	-1.285			
debt per capita	−0.000*	−0.000	−0.000	−0.000***
	0	0	0	0
transfer share	1.86	−4.666***	−22.324+	−5.590***
	-1.375	-1.052	-12.811	-1.024
capital expenditure share	−8.791***			
	-0.847			
personnel cost share	71.771***	68.749***		68.931***
	-7.003	-0.169		-0.187
unemployment rate total	−0.026	−0.043		
	-0.048	-0.051		
investmetns grants per capita	0	0.000**	0.001	
	0	0	0	
population growth (5 years)	1.127			
	-2.52			
log population	−3.459			
	-3.482			
revenue budget deviation	1.963***	7.081***	4.058+	4.396***
	-0.371	-0.444	-2.185	-0.549
expenditure budget deviation		−7.852***		
		-0.344		
tax revenue deviation		−1.483+		
		-0.784		

Variables	Baseline	Budget Execution	Conservatism	Interaction
transfer deviation		0.003		
		-0.003		
capital spending execution		0.004**		
		-0.001		
conservative budgeting dummy			−1.669+	
			-0.877	
small municipality				0.787
				-0.825
revenue budget deviation × small municipality				−2.019***
				-0.583
Num.Obs.	37505	43760	50010	50010
R2	0.842	0.958	0.293	0.947
R2 Within	0.33	0.943	0.016	0.926
RMSE	8.44	8.87	34.64	9.47
Std.Errors	by: municipality	by: municipality	by: municipality	by: municipality
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Source: Own work in R. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The robustness analysis is performed.

Overall, the findings indicate that municipal cash holdings in the Czech Republic are primarily driven by fiscal uncertainty and budget execution dynamics rather than demographic characteristics. Three results are especially important: (1) revenue volatility increases liquidity accumulation; (2) positive deviations between planned and actual revenues greatly increase municipal cash reserves; and (3) smaller municipalities seem less capable of converting positive fiscal shocks into sustained liquidity buffers. These results suggest that municipal cash accumulation in the Czech Republic reflects conservative budgeting and precautionary fiscal management.

4 Discussion

This study is the first to provide an empirical analysis of municipal cash holdings in a post-communist EU member state. It uses panel data from all Czech municipalities between 2014 and 2024. The results demonstrate that fiscal uncertainty and budget execution behavior primarily determine municipal liquidity accumulation.

First, higher cash holdings are consistently associated with revenue volatility, which supports the precautionary savings hypothesis proposed by Hendrick (2006) and Gore (2009). Municipalities with unstable revenues maintain larger liquidity buffers to absorb fiscal shocks. The negative relationship between debt and cash holdings also lends support to Gore's (2009) argument that debt and liquidity serve as alternative forms of financial flexibility.

Second, budget execution dynamics emerge as one of the strongest predictors of municipal cash accumulation. Municipalities whose realized revenues exceed planned revenues

accumulate substantially larger cash reserves, while expenditure overruns reduce liquidity holdings. These findings build on the literature regarding conservative revenue forecasting and budget forecast errors (Benito et al., 2015; Boukari & Veiga, 2018) by demonstrating that conservative budgeting behavior directly contributes to cash accumulation. Czech municipalities that underestimate revenues and control expenditures appear to accumulate liquidity as a byproduct of fiscal planning practices.

Third, the positive coefficient for the personnel cost share suggests that municipalities with higher payroll obligations maintain larger precautionary reserves to ensure wage stability under uncertain fiscal conditions. Conversely, municipalities with higher capital expenditure shares maintain lower liquidity reserves because resources are deployed into infrastructure and investment projects. This is consistent with Su (2019).

The study also contributes to literature on EU Cohesion Policy. Investment grants are positively associated with municipal cash holdings, though the effect size is modest. This finding corroborates the work of Janský et al. (2016), who examined the impact of EU funds on Czech public expenditures. The results suggest that EU (and other upper-budget-level) transfers may temporarily increase municipal liquidity due to project timing mismatches, co-financing requirements, or implementation delays.

Transfer dependence exhibits a negative relationship with cash holdings. Contrary to findings from U.S. studies (Gore, 2009; Hendrick, 2006), Czech municipalities that rely more heavily on intergovernmental transfers appear to maintain smaller precautionary reserves. One possible explanation is that the Czech shared-tax system (RUD) provides relatively stable and predictable formula-based transfers, reducing the need for self-insurance through cash accumulation.

Municipal fragmentation also matters. Small municipalities are significantly less able to convert positive revenue deviations into sustained cash accumulation. This finding is particularly important given the highly fragmented Czech municipal system comprising more than 6,200 municipalities. These results are consistent with those of Šťastná and Gregor (2015), who documented lower efficiency among small Czech municipalities, as well as with those of Bryson and Cornia (2004), who argued that post-communist decentralization often creates municipalities with limited administrative capacity.

Unlike many U.S. studies (Gore, 2009; Gorina et al., 2019; Hendrick, 2006; Lazenby, 2015), demographic and political variables appear to be less important in the Czech context. Political variables were excluded because Czech local politics are highly fragmented and

dominated by independent candidates and unstable coalitions, which makes it difficult to consistently operationalize conventional partisan indicators.

These findings have several policy implications. For example, improving the accuracy of municipal revenue forecasting could reduce unintended cash accumulation. Strengthening the administrative capacity of small municipalities could improve liquidity management and fiscal planning. Additionally, policymakers should monitor whether structural funds lead to the accumulation of idle cash instead of immediate investment spending.

This study has several limitations. First, the analysis cannot distinguish between precautionary savings and agency-driven cash accumulation. Second, budgetary grants only capture investment transfers rather than all funding flows. Third, the dataset does not include formal reserve policies or rainy-day fund rules. Finally, while year fixed effects capture common shocks, future research could directly examine the effects of the 2020s-era high inflation and the 2020s-era pandemic on municipal liquidity behavior.

Overall, the findings demonstrate that municipal cash holdings in the Czech Republic are primarily influenced by fiscal uncertainty, conservative budgeting practices, and institutional fragmentation. This study contributes to the municipal finance literature by providing new evidence from a fragmented post-communist local government system within the European Union, expanding it beyond the U.S. context.

5 Conclusion

This paper is the first to empirically analyze municipal cash holdings in a post-communist EU member state. It uses a panel of all Czech municipalities from 2014 to 2024.

Four main findings emerge. First, revenue volatility is strongly associated with higher cash holdings across all specifications, confirming the precautionary savings hypothesis under a centralized, shared tax system (RUD). Second, budget execution dynamics matter; actual revenues that exceed planned revenues significantly increase cash reserves, while expenditure overruns deplete them. This connects the literature on budget forecast errors with municipal cash holdings. Third, small municipalities are significantly less able to convert positive revenue deviations into cash reserves, reflecting administrative capacity constraints in the fragmented Czech system of over 6,200 municipalities. Fourth, budgetary investment grants are modestly and positively associated with cash holdings.

Demographic controls are not significant, likely due to the homogenizing effect of the RUD system. Political variables were excluded due to the nonideological nature of Czech municipal politics.

Policy implications include improving forecast accuracy to reduce unintended cash accumulation, building administrative capacity in small municipalities through inter-municipal cooperation, and streamlining EU fund disbursement.

Limitations include the inability to distinguish between precautionary and agency-driven savings, a lack of data on formal reserve policies, and an unquantified opportunity cost of idle cash.

In conclusion, municipal cash holdings in the Czech Republic are driven by fiscal uncertainty and budget execution dynamics and moderated by municipal fragmentation. These findings extend the academic literature beyond the U.S. context.

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References

Arapis, T., & Reitano, V. (2018). A Glimmer of Optimism in Government Savings Accumulation? An Empirical Examination of Municipal Unassigned Fund Balance in Florida. *Public Finance Review*, *46*(3), 389–420. https://doi.org/10.1177/1091142116643386

Benito, B., Guillamón, M. D., & Bastida, F. (2015). Budget Forecast Deviations in Municipal Governments: Determinants and Implications. *Australian Accounting Review*, *25*(1), 45–70. https://doi.org/10.1111/auar.12071

Boukari, M., & Veiga, F. J. (2018). Disentangling Political and Institutional Determinants of Budget Forecast Errors: A Comparative Approach. *Journal of Comparative Economics*, *46*(4), 1030–1045. https://doi.org/10.1016/j.jce.2018.03.002

Bryson, P. J., & Cornia, G. C. (2004). Public Sector Transition in Post-Communist Economies: The Struggle for Fiscal Decentralisation in the Czech and Slovak Republics. *Post-Communist Economies*, *16*(3), 265–283. https://doi.org/10.1080/1463137042000257519

Dick-Sagoe, C., & Tingum, E. N. (2021). Flypaper Effect of Intergovernmental Transfers and Incentives to Improve Own-Source Revenue Mobilization of Local Governments in the Central Region of Ghana. *Open Journal of Social Sciences*, *09*(08), 434–447. https://doi.org/10.4236/jss.2021.98030

Gore, A. K. (2009). Why Do Cities Hoard Cash? Determinants and Implications of Municipal Cash Holdings. *Accounting Review*, *84*(1), 183–207. https://doi.org/10.2308/accr.2009.84.1.183

Gorina, E., Maher, C., & Park, S. (2019). Toward a Theory of Fiscal Slack. *Public Budgeting and Finance*, *39*(4), 48–74. https://doi.org/10.1111/pbaf.12240

Hendrick, R. (2006). The Role of Slack in Local Government Finances. *Public Budgeting and Finance*, *26*(1), 14–46. https://doi.org/10.1111/j.1540-5850.2006.00837.x

Janský, P., Křehlík, T., & Skuhrovec, J. (2016). Do EU Funds Crowd Out Other Public Expenditures? Evidence on the Additionality Principle From the Detailed Czech Municipalities' Data. *European Planning Studies*, *24*(11), 2076–2095. https://doi.org/10.1080/09654313.2016.1233168

Lazenby, S. (2015). Commentary: The Roles of Local Government Managers: A View From the Trenches. *Public Administration Review*, *75*(1), 62. https://doi.org/10.1111/puar.12315

Sedmihradská, L. (2015). Budget Transparency in Czech Local Government. *Procedia Economics and Finance*, *25*(May), 598–606. https://doi.org/10.1016/s2212-5671(15)00774-1

Šťastná, L., & Gregor, M. (2015). Public Sector Efficiency in Transition and Beyond: Evidence From Czech Local Governments. *Applied Economics*, *47*(7), 680–699. https://doi.org/10.1080/00036846.2014.978077

Stewart, L. S. M., Hamman, J. A., & Pink-Harper, S. A. (2018). The Stabilization Effect of Local Government Savings: The Case of Illinois Counties. *Public Budgeting and Finance*, *38*(2), 23–39. https://doi.org/10.1111/pbaf.12185

Su, M. (2019). Understanding the Accumulation of Local Government Savings: A Dynamic Analysis. *International Journal of Public Administration*, *42*(11), 893–903. https://doi.org/10.1080/01900692.2018.1522506

Wei, W. (2021). Exploring Local Government Fiscal Slack in a Political-Budgetary-Managerial Framework. *Public Management Review*, *23*(10), 1504–1526. https://doi.org/10.1080/14719037.2020.1764085

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