Central European Review of Economic Issues
EKONOMICKÁ REVUE

Budget accuracy in Czech municipalities and the determinants of tax revenue forecasting errors

Lucie SEDMIHRADSKÁ[a*], Adam ČABLA[b]

[a] *Department of Public Finance, Faculty of Finance and Accounting, University of Economics, Prague, W. Churchill Sq. 4, 130 67 Praha 3, Czech Republic.*
[b] *Department of Statistics and Probability, Faculty of Informatics and Statistics, University of Economics, Prague, W. Churchill Sq. 4, 130 67 Praha 3, Czech Republic.*

Abstract

This paper evaluates the accuracy of municipal budgets and their major components and explores the factors influencing tax revenue forecasting errors in municipalities with extended scope between 2002 and 2011 using the generalised method of moments. Tax forecasting errors are influenced by the economic situation and structure of tax revenue. Higher underestimation is observed in municipalities with incremental revenue forecasting. The impact of political factors is quite strong: municipalities with more fragmented municipal councils approve more optimistic tax revenue forecasts and forecasts are more optimistic in election years.

Keywords

Budget accuracy, determinants of forecasting errors, political budget cycle.

JEL Classification: H68, H71

[*] sedmih@vse.cz (corresponding author)
The paper was elaborated as an output of the project *Fiscal federalism in the Czech Republic* supported by the internal grant agency of the University of Economics, Prague, No F1/1/2012.

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ISSN 1212-3951 (Print), 1805-9481 (Online)
ER-CEREI, Volume 16: 197–206 (2013).
doi: 10.7327/cerei.2013.12.01

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1. Introduction

A governmental budget is a financial plan for the period of one year that is submitted by the executive to the legislative body whose approval and authorisation is necessary before the plan can be executed (see Cleveland, 1992). The accuracy of these plans in the case of Czech municipalities is quite low: on average, the approved budgets amounted only to 82% of the executed budgets in 1997 to 2012 with significant differences among individual municipalities. The amount and structure of the approved expenditure depends critically on the amount of forecasted revenues. While most of the revenues not included in the approved budgets are conditional intergovernmental transfers approved in the course of the budget year, other types of municipal revenues contribute to budget inaccuracy as well.

The purpose of the paper is (1) to evaluate the accuracy of municipal budgets and their major components and (2) to explore the factors influencing tax revenue forecasting errors in order to identify the major causes of forecasting error differences among individual municipalities.

While the accuracy of revenue forecasts at the Czech central government level has received repeated attention (e.g., Klazar, 2003; Špalek and Moravanský, 2005 or Bayer, 2011), the study of local government lags behind. Sedmihradská (2009) and Sedmihradská and Kramoliš (2012) show that the majority of municipalities underestimate their tax revenue forecasts and approve budgets with much more conservative estimates than the revenue forecasts of the Ministry of Finance. Municipal tax revenues were on average underestimated by 7% in the past 15 years.

Numerous foreign studies confirm that local government tax revenue forecasts are influenced not only by the economic environment, but also by the fiscal situation, technical and organisational aspects and political factors. Knowing the major determinants of tax revenue forecasting errors allows us to assess if they have purely technical reasons or if political factors play a role as well, because *budget estimates are inherently sensitive to political pressures* (see Plesko, 1988).

First, we discuss the role of revenue forecasting as a part of the municipal budgetary process and review the literature dealing with the identification of the determinants of tax revenue forecasting errors at the local level. Then, we evaluate the accuracy of municipal budgets and their major components in the Czech Republic in the past decade. Thereafter, we present the empirical analysis of the determinants of tax revenue forecasting errors in 198 municipalities of extended scope between 2002 and 2011 using the generalised method of moments (GMM).

2. Revenue forecasting as a part of the municipal budgetary process

Public budgeting is a process of decision-making about resources and their allocation. It is a sequence of numerous steps taken by various actors that can be grouped into four main stages: budget preparation by the executive body, budget debate and approval by the legislative body, budget execution and budget control. The municipal budgetary process in the Czech Republic is mainly regulated by the Budgetary rules for territorial entities (250/2000 Coll.), which lists the basic requirements municipalities must comply with and the Law on municipal establishment (128/2000 Coll.), which specifies the roles different subjects play in the budgetary process. Municipal management is also regulated by the Law on the audit of local government units (420/2004 Coll.) and the Law on financial control in the public administration (320/2001 Coll.). The central regulation leaves significant space for municipalities to choose how they will proceed in preparation including revenue forecasting and debating the draft budget. It only requires that the draft budget and draft final account are available to the public for comments and that they are approved by the municipal council (see Klazar and Sedmihradská (2006) for more details).

Revenue forecasting is one of the first steps while preparing the draft budget and its results influence the

decision-making of resource allocation, thus any inaccuracy of the forecasts may have tangible impacts. Inaccuracy can occur in the form of both underestimation and overestimation; however, the costs of overestimation are much higher than those of underestimation (see Rodgers and Joyce, 1996).

Overestimation means that the estimated and approved revenues exceed the real (actual) ones, thus not all approved expenditure can take place and cuts are needed. Revenue overestimation softens hard budget constraints and shifts the decision-making about the needed cuts from the preparation and approval phase of the budgetary process to the execution phase. Rubin (1987) stresses the associated shift in power in favour of the budget officer. As municipalities in the Czech Republic do not operate under strict balanced budget requirement, revenue overestimation may result in budget deficits.

Underestimation means that during the budget year, some additional revenues appear that can be either added to the year-end balance or spent on newly approved expenditure. The decision-making process during the year, however, may be less transparent than the standard budgetary process. There is required less publicity for budget amendments than the draft budget and there is a common praxis of the delegation of decision-making power from the municipal council to municipal commission or mayor (see Češková and Kinšt, 2011). As the underestimation of budget revenues is considered to be fiscally responsible and thus positive, some authors, e.g. Rodgers and Joyce (1996), argue that a part of the revenue forecast error *can only be explained by the very rational choice to underestimate revenues in order to provide a cushion against a recession that is unanticipated.* Špalek and Moravanský (2005) draw similar conclusions for the Czech Republic.

Forecasting budget revenues is influenced by the revenue structure. Municipal revenues in the Czech Republic are composed of various revenue types, which can be classified as (1) own revenues or grants and (2) current or capital/investment. The ability to exactly estimate individual revenue types differs significantly. Current own revenues such as taxes and current no-tax revenues such as rental incomes and user fees are quite regular and thus easy to forecast, whereas other types are either one-time revenues, such as all types of capital revenues, or subject to decisions or factors outside of the municipality, such as grants. Municipalities own significant property, which can be sold. However, these revenues are usually not approved before the exact amount is known and thus they do not appear in the approved budget. A similar approach is applied in the case of conditional capital grants and to some extent grants that only flow through the municipal budget such as social allowances, which municipalities pay out to recipients, while they receive the exact amount as a grant. The only grant type that is always included in the approved budget is the grant (contribution) for the execution of the delegated power, which is determined based on a formula.

The existing case studies, elaborated as bachelor or master theses at the University of Economics in Prague, present surprisingly similar descriptions of municipal tax revenue forecasting practices in different municipalities: forecasts are based on human judgment and the basis for the tax revenue forecast is the last year's collection. The forecast of the Ministry of Finance, if taken into account at all, is the best possible scenario, never fully included in the budget. Municipalities do not rely on any, even the simplest, forecasting methods such as simple moving average or regression against time (see, for example, Talíř, 2012 and Radilová, 2012).

The accuracy of tax revenue forecasts is influenced by numerous factors, which Chatagny and Soguel (2012) divide into four main groups: economic environment, fiscal situation, technical and organisational aspects and political factors. Some of these factors are the same for all municipalities such as the national GDP growth rate, inflation rate or date of municipal council elections, but many factors are specific to each municipality. For example, economic situation in a particular municipality may influence tax revenues as well. Similarly, each municipality is in a different fiscal situation.

Fiscal situation influences revenue forecasting bias toward underestimation. Rubin (1987) finds that *the greater the city's overall fiscal stress, the greater is the likelihood of overestimating revenue*. Thus, fiscal hardship leads to an acceptance of a thinner *forecast cushion* than generally wanted. This finding is consistent with Rose and Smith (2012), who find that U.S. states that adopted budget stabilisation funds, i.e., have reserve funds at their disposal in the case of an unexpected event, are less conservative in their revenue estimates. Thus, again, a thinner *forecast cushion* is accepted because real reserves exist. At the same time, it is expected that the adjustment of municipal behaviour is quite slow and thus an error in a previous year persists to some extent in the current year (Goeminne et al., 2008).

While revenue forecasting is most of all a technical process regardless of whether sophisticated methods are used, the approved budget, or exactly the expected revenues approved in the annual budget, is a result of political decision-making. *Therefore, regardless of how technically competent or correct specific forecast models tend to be in determining future estimates, the*

budget process is, nevertheless, influenced by competing actors attempting to shape the budget into a form that is most amenable to their needs (Brogan, 2012).

As mentioned above, less conservative revenue estimates may allow the approval of higher or additional expenditure. This can be especially tempting before elections when the incumbent aims to show voters their competence and get re-elected. Empirical evidence on the existence of the political budget cycle in revenue forecasts shows, however, only weak support (see Bischoff and Gohout (2010) in the case of German states or Chatagny and Soguel (2012) in the case of Swiss cantons).

The outcomes of the decision-making are influenced by the strength or composition of the decision-making body. In the case of more fragmented governments, politicians are less certain about their positions after the election and tend to act more strategically (see Ashworth et al., 2005). Goeminne et al. (2008) suppose that more fragmented local governments are more optimistic than a single-party government, because optimistic revenue forecasts can better accommodate the claims of individual parties. Their research into tax revenue forecasting accuracy in Flemish municipalities confirms this hypothesis only partly, because two-party governments seem to be more optimistic than single-party governments, but governments with more than three parties are more cautious. Bischoff and Gohout (2010) find no evidence that coalition governments produce higher tax estimates than single-party governments.

3. Budget inaccuracy in the Czech Republic

Budget inaccuracy is the difference between the approved (budgeted, estimated, planned) and actual (real) revenues or expenditure. In this paper, the following budget inaccuracy or forecasting error indicator is used:

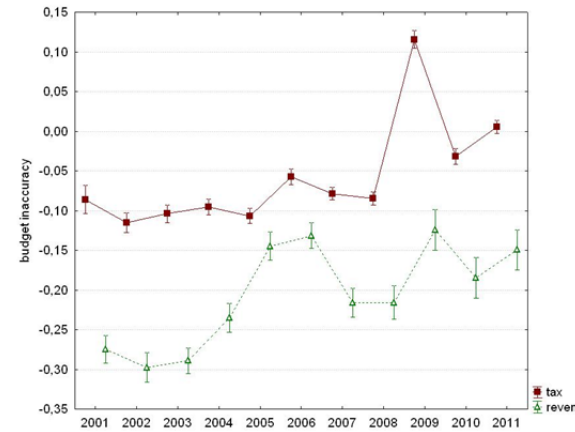
$$BI_x = \frac{B_x - A_x}{A_x}, \qquad (1)$$

where x is the analysed budget segment (revenues, expenditure or a line of them), BI is the budget inaccuracy/error, B is the approved amount and A is the actual amount.

Inaccuracy can be in the form of either overestimation, i.e., the approved revenues (or expenditure) exceed the actual revenues (or expenditure) and $BI_x > 0$, or underestimation, i.e., the estimated revenues (or expenditure) are lower than the actual ones and $BI_x < 0$. Thus, when BI_x grows, the forecasts are less conservative, i.e., the underestimation is smaller, it turns into an overestimation or the overestimation grows. The growth of BI_x thus does not generally mean an improvement in budget accuracy.

The development of budget inaccuracy of municipal tax and total revenues in the municipalities of extended scope between 2001 and 2011 is described in Figure 1. It shows the average inaccuracy and 95% confidence interval of the indicator. The difference between the drawn line and zero line shows the volume of additional revenues received during the budget year with only the exception of tax revenues in 2009 when tax revenues were missing.

Figure 1 Tax and total municipal revenue inaccuracy in municipalities with extended scope (2001–2011)



Source: ARIS, ÚFIS, own calculations and presentation

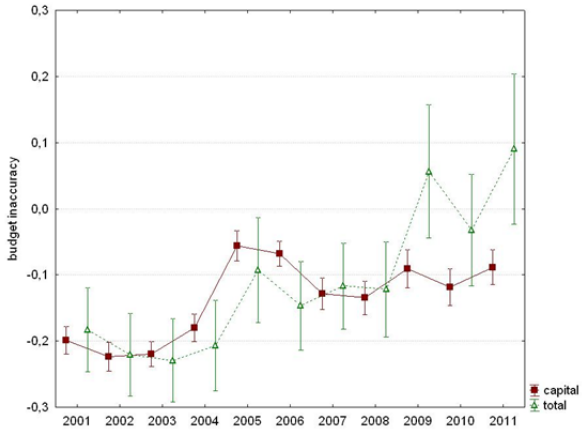
The total revenues show relatively stable development. The correlation analysis confirms our expectation that revenue inaccuracy is negatively influenced by the share of grants and capital revenues in total revenues, the correlation coefficients being –0.2531 and –0.1754, respectively. The inaccuracy of tax revenues shows, with the exception of 2009, improvements. We suppose that one of the reasons could be the continuous decline of the importance of revenues from the individual income tax paid by the self-employed. Altogether, 30% of proceeds from this tax remain in the municipality of the permanent residence of the particular entrepreneur and thus this tax is much more volatile as well as hard to forecast than the taxes shared based on the revenue-sharing formula. The average share of this tax in total tax revenues in the analysed municipalities fell from 9.8% in 2001 to 2.1% 2011. The correlation coefficient between tax revenue inaccuracy and the share of individual income tax paid by the self-employed is –0.3739.

Closer examination of the tax forecasting errors in the municipalities of extended scope shows that there are significant differences among individual municipalities and that the extremes are becoming closer over time (see Table 1). At the same time, the average values for all municipalities and municipalities with extended scope are similar. The forecast of the Ministry of Finance oscillates around the 90th percentile:

thus, the figures confirm the findings of the case studies that municipalities consider these forecasts to be too optimistic.

Figure 2 shows the development of expenditure inaccuracy. The inaccuracy of current expenditure is not shown because the line overlapped that of total expenditure inaccuracy and the picture would not be clear. The inaccuracy of expenditure copies, as expected, the development of the inaccuracy of revenues. The correlation coefficient is 0.8548. The development of capital expenditure inaccuracy copies the development of total expenditure inaccuracy until 2008. This is interesting, as one would expect the gradual approval of capital grants to also lead to the gradual approval of capital investments and thus that the inaccuracy of capital expenditure would be higher. Of course, the analysis of average values is simplified, as confirmed by the greater spread of the 0.95% confidence interval in the case of capital expenditure. Since 2009, the situation has changed; in the budgets of 2009 and 2011, more capital investments were approved than were actually realised. We suppose that this is a result of the growing number of investments financed through the EU structural funds, when the administration process takes longer and intervenes in several budget years.

Figure 2 Expenditure inaccuracy in municipalities with extended scope (2001–2011)



Source: ARIS, ÚFIS, own calculations and presentation

4. Determinants of tax revenue forecasting errors

The key factor influencing the tax revenue forecasting error (BI) is the economic situation, which can be characterised by three major indicators: GDP growth rate, inflation rate and unemployment rate. While data on the former two are available only nationally, the unemployment rate is available for individual municipalities with extended scope. Higher economic growth in the current year (GDP) results in higher actual revenues (i.e., BI decreases). Higher inflation (INFL) means higher actual nominal revenues (i.e., BI decreases). Higher unemployment (UNEMPL) results in lower tax collections due to both lower incomes and lower consumption (i.e., BI grows). This relationship was confirmed by Chatagny and Soguel (2012) in the case of Swiss cantons. Owing to the revenue-sharing mechanism, the differences in the unemployment rate among municipalities have only a limited impact; however, we can perceive it as a proxy for the characteristics of the economic situation in the particular municipality as it can indirectly impact the activity of self-employed and thus the share of the individual income tax paid by the self-employed. To sum up, improved economic conditions increase the underestimation of tax revenue forecasts.

The impact of the size of the municipality (POP) is uncertain: bigger municipalities employ more specialised staff and revenue forecasting can be based on more sophisticated methods. On the other hand, bigger municipalities start budget preparations earlier (see Sedmihradská, 2006), meaning that uncertainty about further development is bigger. Neither Rubin (1987) nor Goeminne et al. (2008) find an effect of population size on the forecasting error. Chatagny and

Table 1 Tax forecasting error in municipalities with extended scope (2001–2011)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	–0.086	–0.116	–0.105	–0.096	–0.107	–0.058	–0.079	–0.084	0.115	–0.032	0.006
Minimum	–0.525	–0.341	–0.374	–0.331	–0.341	–0.248	–0.234	–0.263	–0.156	–0.263	–0.193
Maximum	0.306	0.194	0.105	0.099	0.090	0.100	0.081	0.060	0.377	0.171	0.153
Percentile 10	–0.249	–0.241	–0.210	–0.189	–0.200	–0.155	–0.149	–0.169	0.006	–0.123	–0.074
Percentile 90	0.041	–0.010	–0.014	–0.020	–0.026	0.020	–0.009	–0.019	0.207	0.047	0.078
Variance	0.017	0.008	0.007	0.005	0.005	0.005	0.003	0.003	0.007	0.005	0.004
Std.Dev.	0.129	0.092	0.081	0.071	0.071	0.070	0.056	0.059	0.081	0.073	0.062
Nation wide average	–0.080	–0.125	–0.106	–0.089	–0.126	–0.070	–0.081	–0.098	0.098	–0.041	–0.009
MF forecast			–0.006	–0.032	–0.023	0.006	–0.016	–0.016	0.244	0.080	0.075

Source: ARIS, ÚFIS, Draft state budgets 2003–2011 own calculations and presentation

Soguel (2012) find that smaller cantons tend to underestimate tax revenue more than big ones because forecasting in small cantons is more difficult: if a wealthy taxpayer moves out, the impact on tax revenues is more important and therefore small cantons are more cautious. The same may be true in the case of Czech municipalities and the individual income tax paid by the self-employed.

The fiscal situation of a municipality is described through two indicators: total revenues per capita (REV) and budget balance as a share of total revenues (BAL). These indicators do not indicate if a municipality observes fiscal stress; however, they indicate if the fiscal situation is more or less favorable. We expect that municipalities with lower revenues per capita and budget deficits will be more optimistic. Thus, BI grows if per capita revenues and budget balance falls.

Owing to the high volatility of the individual income tax paid by the self-employed and corporate income tax paid by the particular municipality (i.e., taxes shared based on the origin principle), we suppose that the high share of these taxes relative to total tax revenues (ENT) can lead to higher forecasting caution in the case of tax revenues (i.e., BI decreases).

Based on the description of the tax revenue forecasting process in the Czech Republic, we expect the difference between tax collection in year *t* and *(t–1)* to influence the forecasting error: a substantial increase in the actual tax collection in *t* will mean higher underestimation (i.e., BI decreases). In order to capture this phenomenon, we use the variable INCREM, which is constructed similar to BI:

$$INCREM_{i,t} = \frac{A_{i,t-1} - A_{i,t}}{A_{i,t}}, \qquad (2)$$

where $A_{i,t}$ are tax revenues in municipality *i* in year *t*.

At the same time, conservatism in tax revenue forecasts (last year's budget error BI-1) should lead to conservatism in total revenue forecasts (i.e., BI decreases).

The theory of the political budget cycle assumes that revenue forecasts are more optimistic before elections (ELECT); therefore, BI should be higher in election years (i.e., 2006 and 2010). The weak government hypothesis proposes that more fragmented governments tend to be more optimistic in order to accommodate requests from all political participants. The fragmentation of municipal government is described by the number of political parties or groupings participating in the municipal council (PARTY): more parties mean a higher BI.

To empirically assess the relation between the forecast error and these economic, fiscal, organisational and political factors, we use a panel dataset from 2002 to 2011 for 198 municipalities of extended scope. Of the total 206 municipalities of extended scope, we exclude eight cities (Brno, Liberec, Opava, Ostrava, Pardubice, Plzeň, Praha and Ústí nad Labem), which are divided into districts with their own budgets. We do not have data on individual districts' budgets and the evaluation of the tax revenue forecasting errors of aggregated (consolidated) budgets seems to be inappropriate. In the case of repeated elections (in 2006 in Most and Havířov, and in 2010 in Český Těšín and Roudnice nad Labem), we take into account the results of these repeated elections.

Financial data are acquired from the Automated Budget Information System (ARIS) and Accounting and Financial Information System (ÚFIS) administered by the Ministry of Finance. These data are based on the Czech budget classification, i.e., all data are recorded on the cash principle and we use current prices. The data for GDP growth rate, inflation rate and municipal council composition are from the Czech Statistical Office and for unemployment rate from the Ministry of Labor and Social Affairs. The specification of individual variables and data sources is in Appendix, and the descriptive statistics are shown in Table 2.

Table 2 Descriptive statistics

	Valid N	Mean	Min.	Max.	Std.Dev.
BI	1980	–0.06	–0.37	0.40	0.10
BI-1	1980	–0.04	–0.40	0.50	0.09
GDP	1980	3.31	–4.51	7.00	3.15
ELECT	1980	0.30	0.00	1.00	0.46
POP	1980	18213.15	2884.00	102246.00	17414.31
UNEMPL	1980	9.45	1.50	24.20	3.75
REV	1980	24967.14	11140.06	75264.10	6421.09
ENT	1980	0.13	0.00	0.50	0.06
BAL	1980	–0.01	–0.59	0.40	0.10
INFL	1980	2.26	0.10	6.30	1.56
PARTY	1980	6.31	3.00	14.00	1.29

We estimate the following multivariate model to test our predictions (subscripts *i* and *t* refer to municipalities and time, respectively):

$$\begin{aligned} BI_{i,t} &= a + b_1 GDP_t + b_2 INFL_t + b_3 UNEMPL_{i,t} + \\ &+ b_4 BAL_{i,t} + b_5 REV_{i,t} + b_6 ENT_{i,t} + b_7 POP_{i,t} + \\ &+ b_8 BI_{i,t-1} + b_9 INCREM_{i,t} + b_{10} PARTY_{i,t} + \\ &+ b_{11} ELECT_t + e_{i,t}. \end{aligned} \qquad (3)$$

For the estimation of the model, we use the Arellano–Bond system GMM estimator, which is particularly appropriate for dynamic panel datasets. We use a two-step estimator, which has the advantage that the standard covariance matrix is robust to panel-specific autocorrelation and heteroskedasticity. Standard errors

in this estimation are in some cases downward biased, but we use a specific Stata procedure to get the finite-sample corrected to the two-step covariance matrix. We also tried a one-step estimator, but the results did not differ significantly, so we accepted the results from the two-step estimator.

An important part of the model is always its diagnostics. In the GMM estimator, the most important diagnostics are the Sargan and Hansen tests and the Arellano–Bond test for autocorrelation (AR()). The Sargan and Hansen tests both have the null hypothesis of *the instruments as a group are exogenous* and so we want them not to reject the null hypothesis. The Sargan test is not robust, whereas the Hansen test is, but the latter is weakened by many instruments, whereas the former is not. We use both of them. AR tests have the null hypothesis of *no autocorrelation in differenced residuals*; whereas it is expected to reject this hypothesis in the AR(1) test, we do not want to reject it in the AR(2) test.

We firstly estimated all the explanatory variables in the model and continued by discarding the variable with the largest p-value larger than 0.05 in order to maintain all tests at favorable p-values (significance level for tests during the procedure set at 0.01). After each step, we tried to reintroduce each yet discarded variable independently into the model to ensure that it is still not appropriate in the new model at a significance level of 0.05. When it was appropriate, we omitted the variable in the model. Through this process, mimicking the backward stepwise selection used in linear regression, we arrived at the final model described in Table 3.

Neither the Sargan nor Hansen tests reject the null hypotheses at a significance level of 0.05, while the AR(1) test has the expected result and the AR(2) test has a p-value of 0.044, which we still find to be acceptable.

The obtained results confirm the influence of GDP growth in the current year and inflation on actual revenues and consequently the negative impact on the forecasting error. The effect of unemployment is not significant, which proves that the tax-sharing mechanism equalises the differences among municipalities and that the actual economic situation in a municipality has little effect on tax revenues.

The fiscal situation, characterised by per capita revenues and the budget balance, does not have a significant effect on the tax forecasting error. Thus, we were not able to confirm the findings of Rubin (1987) that fiscal stress leads to more optimistic revenue forecasts. This can be caused, at least to some extent, by the construction of the variables. While Rubin (1987) uses an aggregated indicator of fiscal stress, we were not able to evaluate neither indebtedness nor reserves due to limited data availability.

Table 3 Estimates of the tax revenue forecasting error models (198 cross-sectional units, time-series length 10, 1,980 observations)

	Parametr	p-value
GDP	–0.0165	0.0000
INFL	–0.0119	0.0000
UNEMPL	–	–
BAL	–	–
REV	–	–
ENT	–0.6272	0.0000
POP	–	–
BI-1	–	–
INCREM	–0.2657	0.0000
PARTY	0.0165	0.0000
ELECT	0.0349	0.0000
CONS	–	–
AR(1)	–6.760	0.000
AR(2)	–2.020	0.044
Sargan	15.140	0.057
Hansen	8.850	0.355

On the other hand, the structure of tax revenues (taxes shared based on the origin principle versus other taxes) has a significant impact: the higher is the share of the taxes shared based on the origin, the higher is the underestimation. Municipalities are aware of the higher volatility and uncertainty of these tax revenues and so they are more cautious during their estimation. This finding is consistent with the findings of both Chatagny and Soguel (2012) and Goeminne et al. (2008), who find that municipalities deriving a larger share of their revenues from local taxation underestimate their tax revenue more. Of course, we are aware of the differences between local taxes and taxes shared based on the origin principle.

The size of the municipality does not have a significant effect on the tax revenue forecasting error: thus, the assumption based on the Swiss experience (see Chatagny and Soguel, 2012) that smaller municipalities are more conservative was not proven. This can be caused by our sample, which did not comprise small municipalities (the smallest municipality included has almost 3,000 inhabitants).

While foreign studies such as Chatagny and Soguel (2012) and Goeminne et al. (2008) find a significant influence of the lagged dependent variable (i.e., that local governments with a small forecasting error in the past tend to have a small forecasting error in the current year as well), we were not able to prove

the effect of this factor. On the other hand, our results confirm the incremental character of the revenue forecasting process: in the case of bigger year-to-year tax revenue increases, the tax revenue forecast becomes too conservative.

Both the tested political factors have a significant influence on the tax revenue forecasting error: municipalities are more optimistic when more political parties or groupings form the municipal council and in election years. This is in line with the expectation of Goeminne et al. (2008): *As parties in a coalition government are likely to be less certain about future power than one-party governments, there is a larger incentive to be (over) optimistic with respect to budgeted revenues.*

This finding is particularly interesting, because it confirms that municipal politics influence budget management. While the foreign literature dealing with these aspects at the local government level is quite rich, the situation in the Czech Republic is basically unexplored with only a few exceptions. Šťastná (2009) finds weak evidence that party fragmentation in municipal councils decreases capital expenditure and expenditure on housing, while Sedmihradská et al. (2011) confirm the existence of the political budget cycle at the municipal level in the case of capital expenditure, i.e., there is a significant increase in capital expenditure and a significant decrease in current expenditure prior to elections.

5. Conclusion

Approved municipal budgets amount to only about 82% of the executed ones. Municipalities can approve only expenditure with a clear source of financing, i.e., revenues, reserves or borrowing. Several revenue types become certain only during the course of the budget year (such as conditional capital grants or proceeds from property sales), meaning that municipalities do not include them in the approved budget but rather include them later. This is the first reason behind the low accuracy of municipal budgets.

The second reason is the systematic underestimation of tax revenues. The tax revenue forecasting error was on average 7% in the past 15 years with significant variation among individual municipalities and years. The dominant tax revenue forecasting practice in Czech municipalities is human judgment based on the last year's tax collection. Tax forecasting errors are influenced by the economic situation: higher economic growth and higher inflation influence positively the actual amount, thus leading to higher underestimation. The differences among individual municipalities depend, for instance, on the structure of tax revenues. Municipalities with a higher share of taxes shared based on the origin principle (i.e., individual income tax paid by the self-employed and corporate income tax paid by the municipality) are careful when including these tax revenues in their budgets, which leads to the higher underestimation of tax revenues. Higher underestimation is also observed in municipalities that expect small year-to-year changes in their tax revenues, i.e., their revenue forecasting is strongly incremental.

Despite the general opinion that tax forecasting is a purely technical process, the impact of political factors is quite strong: municipalities with more fragmented municipal councils, i.e., municipal councils composed of more political parties or groupings, approve more optimistic tax revenue forecasts. At the same time, the forecasts are more optimistic in election years. This kind of opportunistic behaviour is described in the literature (e.g. Goeminne et al., 2008), but was empirically proven only partially.

Further research into the accuracy of municipal budgets should focus on the expenditure side of the budget and show what kinds of budget amendments are approved during the budget year and by whom (the municipal council, commission or mayor). Then, we would be able to evaluate the extent of opportunism and transparency in the municipal budgetary process.

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Appendix

List of variables and data sources

BALi,t is the budget balance as a share of total revenues, i.e., the difference between total revenues and total expenditure divided by total revenues. The definition of total revenues complies with Czech budget classification classes 1–4 and the definition of total expenditure complies with Czech budget classification total expenditure classes 5 and 6. The data source is the ARIS and ÚFIS, Ministry of Finance, http://wwwinfo.mfcr.cz/aris/ and http://wwwinfo.mfcr.cz/ufis/, 2 June 2012.

BIi,t is the budget inaccuracy of the tax revenues calculated based on formula (1). The definition of tax revenues complies with Czech budget classification class 1. The data source is the ARIS and ÚFIS, Ministry of Finance, http://wwwinfo.mfcr.cz/aris/ and http://wwwinfo.mfcr.cz/ufis/, 2 June 2012.

ELECTIONt is a dummy variable that takes the value 1 in election years (i.e., 2006 and 2010) and 0 in other years.

ENTi,t is the share of individual income tax paid by entrepreneurs and corporate income tax paid by the particular municipality in tax revenues. The definition of the individual income tax paid by the self-employed complies with Czech budget classification line 1112, that of the corporate income tax paid by the particular municipality complies with Czech budget classification line 1122 and that of tax revenues complies with Czech budget classification class 1. The data source is the ARIS and ÚFIS, Ministry of Finance, http://wwwinfo.mfcr.cz/aris/ and http://wwwinfo.mfcr.cz/ufis/, 2 June 2012.

GDPt is the annual change in GDP expressed in real terms. The data source is the Czech Statistical Office, http://www.czso.cz/eng/redakce.nsf/i/statistics, 2 June 2012.

INCREMi,t is the year-to-year change in tax revenues calculated based on formula (2). The definition of tax revenues complies with Czech budget classification class 1. The data source is the ARIS and ÚFIS, Ministry of Finance, http://wwwinfo.mfcr.cz/aris/ and http://wwwinfo.mfcr.cz/ufis/, 2 June 2012.

INFLt is the yearly average inflation rate. The data source is the Czech Statistical Office, http://www.czso.cz/eng/redakce.nsf/i/statistics, 2 June 2012.

PARTYi,t is the number of political parties or groupings present in the municipal council. Parties elected in 2002 are counted in 2003 to 2006, parties elected in 2006 are counted in 2007–2010 and parties elected in 2011 are counted in 2011. The data source is the Czech Statistical Office, http://volby.cz/, 20 November 2012.

POPi,t is the number of inhabitants. The data source is the Czech Statistical Office, http://www.czso.cz/csu/2012edicniplan.nsf/p/1301-12, 2 June 2012.

REVi,t represents total municipal revenues per capita. The definition of total revenues complies with Czech budget classification classes 1–4. The data source is the ARIS and ÚFIS, Ministry of Finance, http://wwwinfo.mfcr.cz/aris/ and http://wwwinfo.mfcr.cz/ufis/, 2 June 2012.

UNEMPi.t is the unemployment rate, i.e., the number of registered unemployed divided by the number of economically active inhabitants, in December. The data source is the Ministry of Labor and Social Affairs, http://portal.mpsv.cz/sz/stat/nz/uzem, 15 June 2012.