THE ACCURACY OF THE BUDGET FORECASTING IN LOCAL GOVERNMENTS IN POLAND

Pawel Galinski
University of Gdansk, Poland
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Abstract

The paper aims to provide a characteristic of disparities between planned and executed local government revenues and expenditures in Poland between 2001 and 2011. Therefore, the article presents errors of the budget forecasting in the local governments in Poland in this period as well as their determinants. First and foremost, the author analyzes the literature in the field of the budget forecasting in the public sector, showing some constraints of this process. Furthermore, the paper examines the reports of the Ministry of Finance in Poland concerning local government budgets after the first quarter (plan of revenues and expenditures) and their execution after the year for the period 2001-2011. Thus, the empirical study conducted by the author characterizes measures of forecast errors of revenues and expenditures of local governments in Poland. Therefore, this research may be helpful in order to determine variables which affect the execution of the local budgets and contribute to construct budget projections more precisely. In consequence, the improvement of the accuracy of the budget forecasting in local government may lead to the better realization of the public tasks in the community.

The type of the article: *Empirical study.*
Keywords: *local governments, revenues, expenditures, budget forecasting.*
JEL Classification: *G17, G18, H72.*

1. Introduction

In local governments the budget is the main instrument of financial management and realizing public tasks. However, the differences between its plan and execution can cause some problems. First and foremost, the potential overestimation of revenues may require unexpected constraints in expenditures. In that case, taking into consideration difficulties in decreasing current expenditures, particurally in the periods of worse economic situation, it is inevitable to restrain investment activity or increase the volume of dept. Thus, these inaccuracies may negatively determine the level of development of the community and the competitiveness of the local economy.

The aim of the paper is to characterize the accuracy of the budget forecasting in local governments in Poland between 2001 and 2011 in the field of their revenues and expenditures. Moreover, there were presented principles of budget forecasting in local governments, techniques and methods of that and measures of the errors. Therefore, there were analyzed both the literature as well as planned and executed main budget categories characterizing revenues and expenditures of local governments in Poland. In consequence, the paper indicates some practical issues, which determine the level of the accuracy of the budget forecasting in local governments in order to realize that process more precisely.

2. Issues of budget forecasting in local governments - the literature review

In local governments the budgeting is the process of planning, adopting, executing, monitoring and auditing the fiscal program, which is oriented for the future (Mikesell, 2007, pp. 27). This process enables to guide the economic, social, political and other forms of activities of a local community. One of the key principle for appraising local budgets is their accuracy, which mainly

concerns the process of forecasting. Hence, the plans of revenues and expenditures should be as reasonable as possible and the whole budget ought to be internally consistent (Högye, 2002, pp. 6-10). In practice, the process of budget forecasting is an element of a budget planning. However, there are some differences in this filed. Firstly, the planning is a kind of strategic prediction of performance of the local government and the community, whereas the forecasting is a revision of the local budget to reflect changing market conditions (Sandu, 2009, pp. 410). Secondly, the appraisal of the budget forecasting in local governments involves, inter alia, the system of their revenues and the extent of their expenditures. In turn, the planning concerns the formulation of local goals or policies (Allen & Tommasi, 2001, pp. 175). The common feature of these concepts is a necessity of gathering information, which determine the volume of public revenues and expenditures. As a result, the execution of the public budget is connected with some internal and external factors of the functioning of the local authorities. The crucial internal issues are:

- the size of the local government, mainly measured by the volume of the revenues and expenditures;
- the economic and social development of the region;
- the capability of the local economic development, e.g. the condition of the social and technical infrastructure;
- the level of entrepreneurship;
- the quality of the social capital in the public authorities and the community.

In turn, these external factors mainly concern:

- the legal regulations of passing the local budget;
- the structure and volume of local revenues;
- the possibilities of regulating the local revenues, especially the local taxes;
- the legal extent of local public expenditures and demands of the community;
- the possibilities of using the alternative sources of revenues (e.g. funds of the European Union (EU)) or a debt.

In consequence, there are a lot of issues or even extraordinary circumstances (e.g. weather catastrophes) which influence both the execution of the budget and the accuracy of its forecast. Moreover, the local budget forecasting is also affected by forecasting in other fields (Penner, 2001, pp. 1) or even the condition of the economy. Thus, the quality of the budget depends on the accuracy of the supporting data, the quality of the methods used and the expertise as well as the integrity with which it has been compiled (Högye, 2002, pp. 6-10). However, an effective forecast model is not a budget that remains static as well as it is not an absolute prediction of the future. Instead, a forecast model presents a range of possible outcomes, based on a set of diagnosed variables and assumptions (Swanson, 2008, pp. 60). So, the basis of the effectivelly predicted budget is the proper selection of the data, which determine its revenues and expenditures. Then, it is crucial to choose the adequate forecasting methods and techniques, amongst which it may by distinguished: judgmental forecasts, time-series forecasts, detereministic techniques and statistical models. The judgmental techniques rely on studies of subjective inputs obtained from various sources, such as: staff, managers or panels of experts (practitioners, researchers) (Stevenson, 2012, pp. 80). They generally lead to forecasts that are based upon qualitative criteria and the interactions among the group of experts (Hillier & Lieberman, 1990, pp. 336). Hence, the functioning of the economic council or board in the local authority could be conductive to accurate forecasts of revenues and expenditures in the budget. It may be here applied the Delphi technique, which is aimed at achieving the specific view by responding some panellists (experts) and reducing potential variants (Rowe & Wright, 1999, pp. 363).

On the other hand, the time-series forecasts simply attempt to project past into the future, using historical data (Stevenson, 2012, pp. 80). As a result, forecasts of the budget categories are made by extrapolating the components estimated at the end of the sample (Harvey, 2003, pp. 14). Thus, the accuracy of this method is especially tied with the economic, legal and political stability, both in the country and the community. However, using only time-series forecasts in local

governemnts during the budget preparation may cause some negative consequences, such as (Owsiak, 2008, pp. 33):

- the constraint of the activity of the local authorities in the field of anticipating the potential future events which determine the local budget;
- repeating the wrong decisions from the past;
- the appearance of uneconomical operations in local authorities;
- preparing the future budget taking adventage of the data from the actual budget, which is still the kind of the plan.

As far as the deterministic models are concerned, it is crucial to find variables as determinants of future revenues or expenditures. Whereas, the most common statistical approach is linear regression analysis. But the difficulty and the complexity of the last two techniques decrease their pratical application, particularly in smaller local governments. For example, in New York City the Office of Management and Budget relies on a 77-equation econometric model that characterizes the local economy. Among its variables there are especially: local unemployment rate, wage rates for some sectors, consumer price index, personal income, gross city product as well as some real estate indicators (Schroeder, 2007, pp. 54-60). However, in many local governments statistically sophisticated or complex methods of budget forecasting do not have to produce more accurate forecasts than simpler ones (Meade, 2000, pp. 515). Furthermore, some researchers claim that a simpler model is to be preferred to a complicated one, but the beginning with a simpler model is not always the best way to proceed (Harvey, 2003, pp. 13).

3. Method of measuring the forecast accuracy of revenues and expenditures in local governments

The appraisal of the accuracy of forecasting revenues and expenditure in the local budgets is immensely difficult. First and foremost, it should be taken into consideration some principles, such as (Owsiak, 2008, pp. 33):

- necessity of comparing the executed budget with its original plan, but not with the modificated one;
- noting the signs of deviations, which may disclose the systematical over- and underestimation of some budget categories;
- analyzing separately the revenues and expenditures and errors of their forecasts due to differences in the process of their determining.

The disclosed differences between the planned and the executed budget categories result mainly from:

- assuming unrealistic and unprecise data or their inappropriate deviations and rejecting the possibilities of occuring some events;
- setting unrealistic, politically-motivated targets (Leal *et al.*, 2007, pp. 7);
- the wrong selection of the forecasting technique.

S. Owsiak claims that the accuracy of forecasting in the public sector is appraised only in quantitative terms, while the quality of the forecasts takes also into consideration qualitative terms. In consequence, the research of that accuracy concerns the aspect of forecasting, whereas the quality of this process determines the whole system of planning (Owsiak, 2006).

In local governments in the process of appraisal of the forecast accuracy may be successfully applied some empirical measures, such as (Owsiak, 2006 & Makridakis *et al.*, 1998, pp. 42-45):

- Mean Error (ME) - $\frac{1}{n}\sum_{t=1}^{n} e_t$, where $e_t = F_t - Y_t$, $F_t -$ plan, $Y_t -$ execution;
- Mean Absolute Error (MAE) - $\frac{1}{n}\sum_{t=1}^{n}|e_t|$;
- Mean Percentage Error (MPE) - $\frac{1}{n}\sum_{t=1}^{n} PE_t$, where $PE = \left(\frac{F_t - Y_t}{Y_t}\right) x100$;
- Mean Absolute Percentage Error (MAPE) - $\frac{1}{n}\sum_{t=1}^{n}|PE_t|$.

ME parameter indicates the average error of the forecast in the period, while the MPE shows this error in a percentage term. The weakness of the aggregated MPE is its decrease if individual errors have different signs. It resulted from the mutual elemination of them. However, the MAE and the MAPE are devoid of this. They characterize the average level of forecast errors, regardless of the signs of individual forecast errors, in natural and percentage terms (Owsiak, 2008, pp. 33).

The appraisal of the forecast accuracy may consequently contribute to an increase of effectiveness of the policy led by the local authority. It concerns especially the possibilities of satysfying the demands of the community, which are determined by the volume of budget revenues and expenditures. This also can be a useful tool for monitoring the three-step economic cycle faced by local governments, which includes the growth stage of service expansion, the maintenance stage of service continuation and finally the retrenchment stage of cutbacks and reorganization (Rivenbark, 2007, pp. 9). Thus, the process of that appraisal might determine the better orientation of the budget for the local needs and economic condition of the community. Nevertheless, it should be mentioned that there is no one principle of the interpretation of the potential differences of the budget execution. They are determined, as it was mentioned, by the internal and external issues of the functioning of local governments in the economy. Therefore, some inaccuracies in this field might be differently interpreted in the growth stage or in the period of the economic slowdown (Czakon, 2011, pp. 166).

4. The appraisal of the forecast accuracy of revenues and expenditures in local governments in Poland between 2001 and 2011 – research findings

In Poland the revenues of local governments (municipalities, counties and voivodships) consist of own revenues, general subsidy that is divided into educational part, compensatory part and equalizing part (regional part in voivodships), and special purpose grants (table 1). In years 2001-2011, there systematically appeared errors between planned and executed total revenues. Moreover, two sub-periods of these differences may be distinguished, i.e. years 2001-2008, when these revenues were underestimated and 2009-2011, when they were overestimated. Furthermore, in the whole analyzed period in the local governments in Poland the general subsidy was underestimated. In turn, the overestimation of the total revenues in years 2009-2010 resulted from excessively optimistic forecasts of own revenues. This situation was affected by the worse economic situation, which determined the lower revenues from the shares in taxes collected by the state (personal income tax – PIT, corporate income tax – CIT).

Table 1. Measures characterizing the forecast accuracy of local government revenues in Poland between 2001 and 2011

Details	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001-2011
Total revenues												
Planned (bn PLN)	75.61	77.40	77.67	82.62	99.44	110.81	122.84	138.12	157.48	164.17	175.12	x
Executed (bn PLN)	79.59	80.03	79.14	91.50	102.91	117.04	131.38	142.57	154.84	162.80	171.31	x
ME	-3.98	-2.63	-1.47	-8.88	-3.47	-6.23	-8.54	-4.45	2.63	1.37	3.81	-2.90
MAE	3.98	2.63	1.47	8.88	3.47	6.23	8.54	4.45	2.63	1.37	3.81	4.32
MAPE	5.00	3.29	1.86	9.71	3.38	5.33	6.50	3.12	1.70	0.84	2.22	3.90
Own revenues												
Planned (bn PLN)	33.86	34.52	35.38	44.68	54.26	59.79	67.56	74.73	81.33	84.82	85.08	x
Executed (bn PLN)	32.51	33.54	34.46	47.08	54.89	62.88	74.13	78.34	75.30	78.59	83.64	x
ME	1.36	0.98	0.92	-2.40	-0.63	-3.09	-6.57	-3.62	6.03	6.24	1.44	0.06

Details	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001-2011
MAE	1.36	0.98	0.92	2.40	0.63	3.09	6.57	3.62	6.03	6.24	1.44	3.02
MAPE	4.17	2.92	2.67	5.10	1.15	4.92	8.87	4.62	8.01	7.94	1.72	4.73
Special purpose grants												
Planned (bn PLN)	13.70	13.89	11.21	7.77	13.50	17.16	19.21	23.73	31.53	32.73	42.42	x
Executed (bn PLN)	17.66	16.79	12.95	13.11	15.57	19.63	20.49	23.77	34.25	37.04	39.32	x
ME	-3.95	-2.90	-1.74	-5.33	-2.07	-2.47	-1.28	-0.04	-2.72	-4.31	3.11	-2.16
MAE	3.95	2.90	1.74	5.33	2.07	2.47	1.28	0.04	2.72	4.31	3.11	2.72
MAPE	22.40	17.30	13.43	40.69	13.28	12.57	6.26	0.17	7.96	11.63	7.90	13.96
General subsidy												
Planned (bn PLN)	28.05	29.00	31.07	30.16	31.68	33.85	36.07	39.66	44.62	46.62	47.61	x
Executed (bn PLN)	29.43	29.70	31.73	31.31	32.46	34.53	36.75	40.46	45.30	47.17	48.35	x
ME	-1.38	-0.71	-0.65	-1.15	-0.78	-0.67	-0.69	-0.79	-0.67	-0.56	-0.73	-0.80
MAE	1.38	0.71	0.65	1.15	0.78	0.67	0.69	0.79	0.67	0.56	0.73	0.80
MAPE	4.70	2.37	2.06	3.68	2.39	1.95	1.87	2.81	1.48	1.18	1.52	2.36

Source: Own study based on the information from the Ministry of Finance in Poland in the field of the local government budgets after the first quarter (plan) and executed after the whole year (execution) for the years 2001-2011.

As far as the forecast accuracy of the total revenues in local governments in Poland is concerned, there was the highest level of it in year 2009 and 2010 (in 2010 MAPE was 0.84%, whilst in 2009 1.70%, table 1). Despite a significant decrease of the own revenues in local governments they were balanced by higher than expected revenues of the special purpose grants then. Part of these funds came from the acceleration of the absorption of EU funds under the newly-functioning EU financial perspective for 2007-2013. Thus, between 2008 and 2009, grants obtained for co-financing EU programs and projects rose by 165.8%.

Whereas, the lowest accuracy of forecasts of revenues occurred in 2004 (MAPE – 9.71%). It was also due to the significantly higher, than expected, level of grants provided to local governments, which resulted in a very high inaccuracy of forecast of this revenue category (MAPE – 40.69%). In this period only grants for financing the tasks in the field of the state administration exceeded the plan by 3.50 billion PLN. So, the amount of these funds was dependent on the decisions of the central government. In 2004, there appeared also possibilities of using EU funds by local governments under the EU financial perspective for the period 2004-2006. Furthermore, in 2004 in the local governments also occurred rather high forecast inaccuracy of the general subsidy (MAPE – 3.68%). This resulted mainly from alterations in the system of financing local governments there. In addition, there were imposed for these units the responsibilities for financing some family and housing welfare benefits as well as appeared a new formula for determining educational part of the general subsidy. It was tied with the provisions of the state budget. Thus, the forecasting of this part of local government revenues became dependent on the system of the state budget planning. As a consequence of these changes in 2004, the executed general subsidy was higher than planned by 254.30 mm PLN. Therefore, it can be noted that frequent revisions in the system of transfers from the state into the local government may determine the higher inaccuracy of forecasting the local government revenues.

In turn, analyzing the own revenues of these units, it is seen the smallest accuracy of their forecasts between 2009 and 2010 (MAPE – 8.01% and 7.94%) as well as in 2007 (MAPE – 8.87%) and 2004 (MAPE – 5.10%). In 2004, the underestimation of own revenues in local governments in Poland was affected by the changes in the shares of these units in the mentioned state taxes. Between 2003 and 2004, these shares increased: in the case of PIT from 30.10% to 45.74%, while in the case of CIT from 5.50% to 24.01%.

On the other hand, the underestimation of the revenues in 2007 resulted from the decline of the unemployment rate in Poland (from 14.8% in 2006 to 11.2% in 2007), which determines the volume of the shared tax revenues. Moreover, in 2007 it was observed the highest level (for the period 2001-2011) of some indicators, such as: a GDP growth (6.8%) or an increase of revenues from total activity of non-financial enterprises (15.17%) in relation to 2006 (CSO, 2009, pp. 248, CSO, 2010, pp. 744, CSO 2013). Hence, this contributed to the rise of CIT revenues in local government budgets. As a result, in 2007 comparing planned and executed PIT and CIT revenues it was seen their growth from 23.63 bn PLN to 25.60 bn PLN (PIT) and from 6.02 bn PLN to 7.62 bn PLN (CIT).

Table 2. Measures characterizing the forecast accuracy of local government expenditures in Poland between 2001 and 2011

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001-2011
Total expenditures												
Planned (bn PLN)	80.51	82.36	82.28	88.67	108.47	123.38	133.83	154.38	182.59	192.13	195.09	x
Executed (bn PLN)	82.73	83.18	80.95	91.39	103.81	120.04	129.11	145.18	167.83	177.77	181.59	x
ME	-2.23	-0.82	1.33	-2.72	4.66	3.34	4.71	9.20	14.76	14.36	13.49	5.46
MAE	2.23	0.82	1.33	2.72	4.66	3.34	4.71	9.20	14.76	14.36	13.49	6.51
MAPE	2.69	0.98	1.64	2.97	4.49	2.79	3.65	6.33	8.80	8.08	7.43	4.53
Current expenditures												
Planned (bn PLN)	66.53	68.43	68.50	71.91	84.28	93.55	101.91	112.30	125.81	131.72	138.17	x
Executed (bn PLN)	68.66	69.65	68.38	76.20	85.38	95.08	102.05	113.26	124.70	133.52	139.16	x
ME	-2.13	-1.22	0.12	-4.29	-1.10	-1.53	-0.14	-0.96	1.11	-1.80	-0.99	-1.17
MAE	2.13	1.22	0.12	4.29	1.10	1.53	0.14	0.96	1.11	1.80	0.99	1.40
MAPE	3.10	1.75	0.18	5.63	1.29	1.61	0.14	0.85	0.89	1.35	0.71	1.59
Capital expenditures												
Planned (bn PLN)	13.97	13.93	13.78	16.76	24.19	29.83	31.92	42.08	56.78	60.41	56.91	x
Executed (bn PLN)	14.07	13.53	12.57	15.19	18.43	24.96	27.07	31.92	43.13	44.25	42.43	x
ME	-0.10	0.40	1.21	1.57	5.76	4.87	4.85	10.16	13.65	16.16	14.48	6.64
MAE	0.10	0.40	1.21	1.57	5.76	4.87	4.85	10.16	13.65	16.16	14.48	6.66
MAPE	0.71	2.97	9.62	10.35	31.26	19.53	17.93	31.83	31.65	36.52	34.12	20.59

Source: Own study based on the information from the Ministry of Finance in Poland in the field of the local government budgets after the first quarter (plan) and executed after the whole year (execution) for the years 2001-2011.

On the expense side, in Poland local governments allocate their funds in order to finance current expenditures and capital expenditures (mainly investment ones) (table 2). Similarly to the revenues, in the whole analyzed period there were differences between planned and executed expenditures there. From the year 2005 in Poland in local governments it was always seen the overestimation of their expenditures. It resulted from excessively forecasted capital expenditures (table 2). In the budgets local governments could plan investment expenditures, assuming that they would be co-financed by EU funds. However, there were no guarantees to obtain this external financial assistance. Moreover, the eruption of the financial crisis in the late 2007 limited possibilities for the local governments to exploit the external sources of capital (e.g. credits, loans, municipality bonds) for investment purposes. Hence, after the year 2007 the inaccuracy of forecast of capital expenditures rose significantly there (e.g. in 2008 MAPE was 31.83%). Furthermore,

between 2001 and 2011 there were almost always underestimated the current expenditures (table 2). In 2004 there was the most excessive inaccuracy of forecast in this field (MAPE - 5.63%).

In consequence, in the years 2001-2011, among the revenues of local governments in Poland the smallest average absolute prediction error characterized a general subsidy (MAPE – 2.45%), whereas on the expense side there were current expenditures (MAPE – 1.59%). In turn, the high level of this measure appeared in the group of special purpose grants (MAPE – 13.96%) and capital expenditures (MAPE – 20.59%). This resulted from frequent changes in the amount of transfers provided to these entities from the state budget. It can be noted that investment activity of local governments was planned too optimistic. In many cases local authorities assumed too high amount of EU grants in their budgets.

5. Conclusion

Summerizing the above considerations it seen that between 2001 and 2011 in local governments in Poland there were inaccuracies of budget forecasts. They concerned especially the special purpose grants and capital expenditures. These inaccuracies were determined mainly by the system of absorption of EU funds, which influenced both the revenues and capital expenditures of these units. Moreover, the execution of the own revenues was tied with the shares of local governments in PIT and CIT and the economic situation in the country. Furthermore, it can be noted that the system of local government revenues in Poland positively influences the accuracy of budget forecasts. For example, in 2009 lower than expected own revenues (affected by the worse economic indicators) were equalized by the higher than expected special purpose grants (acceleration of the absorption of EU funds) that led to the better forecast accuracy of total revenues in relation to 2008. However, these differences may increase the risk of the activity of the local governments, mainly in the field of their finances, as well as satisfying the demands of the local communities. This risk may especially rise in the periods of the worse financial situation of the whole public sector.

As a result, it is seen that the accuracy of the budget forecast in local government is significantly affected by the external issues of its functioning. Firstly, the local authorities need some time to adjust their budget forecasting to alterations of the system of financing their activity. Secondly, they should take into consideration forecasts of the economic and financial situation in the national and global economy (especially EU economy).

In order to improve the level of forecast accuracy local authorities ought to implement some methods of budget forecasting. However, it is not justified to apply more complex methods and techniques to gain better effects in this field, particularly in the rural local governments or small towns. But it is crucial to analyze the execution of the past budgets (analyzing the measures of forecast errors) in order to plan the budget categories more precisely. Thus, it could be helpful to avoid some typical errors from the past and find some additional variables determining revenues and expenditures.

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