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# SUSTAINABILITY OF FISCAL POLICY IN POLISH VOIVODESHIPS

# STABILNOŚĆ POLITYKI FISKALNEJ W POLSKICH WOJEWÓDZTWACH

**Summary:** The recent financial and economic crisis turned out to be a catalyst for a sovereign debt crisis in some countries. As a result, the issue of fiscal (in)sustainability has been high on the agenda of economic research and economic policy. In the case of a decentralized government system one should take into account the division of public debt between respective levels of the government. The aim of the article is to verify whether Polish voivodeships conduct sustainable fiscal policies. The impact of fiscal equalization scheme (both vertical and horizontal ones) is also considered. In particular, it is worth examining whether fiscal rules imposed on local government entities counterbalance a soft budget constraint problem. The article uses panel data analysis in conjunction with Bohn's model of fiscal sustainability. The results of the analysis support the hypothesis of sustainability of fiscal policies in Polish voivodeships in the period 2004-2012.

**Keywords:** local government, public debt, Bohn's model.

**Streszczenie:** Niedawny kryzys finansowy i gospodarczy okazał się katalizatorem kryzysu zadłużenia publicznego w niektórych państwach. W efekcie zagadnienie (nie)stabilności fiskalnej zajęło priorytetowe miejsce w badaniach naukowych i polityce gospodarczej. W przypadku państw o zdecentralizowanej strukturze należy wziąć pod uwagę podział długu publicznego między poszczególne szczeble administracji. Celem artykułu jest zweryfikowanie, czy polskie województwa prowadzą stabilną politykę fiskalną. Uwzględniono również wpływ systemu wyrównywania dochodów (zarówno pionowego, jak i poziomego). W szczególności, warte przeanalizowania jest to, czy reguły fiskalne nałożone na jednostki samorządu terytorialnego stanowią przeciwwagę dla problemu tzw. miękkich ograniczeń budżetowych. W artykule wykorzystano analizę danych panelowych w połączeniu z modelem stabilności fiskalnej Bohna. Rezultaty badań wspierają hipotezę, że polskie województwa prowadziły stabilną politykę fiskalną w latach 2004-2012.

**Słowa kluczowe:** samorząd lokalny, dług publiczny, model Bohna.

## 1. Introduction

Although Poland avoided recession during the recent financial and economic crisis, the economic slowdown considerably worsened its fiscal situation.[1] In consequence, in 2009 the European Commission imposed the Excessive Deficit Procedure on Poland. The procedure was closed only on 19 June 2015, after reduction of general government deficit below 3% of GDP [European Council 2015]. Hence, the analyses of the sustainability of national fiscal policy (encompassing the whole general government sector, as well as its components) are particularly timely.

The empirical analysis applies to 16 Polish voivodeships in the period 2004--2012. Admittedly, the share of their debt in total public debt is not significant. As of the end of 2013 the total debt of regional governments accounted for, respectively 0.8% of the public debt and 10% of the debt of local government entities and their associations [Ministerstwo Finansów 2015, p. 4]. At the same time, the average relation of the regional debt to revenues was equal to 40%. The lowest relation occurred for Podlaskie voivodeship (4%) and the highest one for Mazowieckie voivodeship (73%) [Ministerstwo Finansów 2004-2010, 2010-2015].

Nevertheless, there are some arguments that justify the research scope. Firstly, local government units have been given additional tasks without proper financial means [Guziejewska 2013]. Secondly, it is worth examining whether fiscal rules imposed on local government entities counterbalance a soft budget constraint problem. Thirdly, in Poland the actual GDP data is collected only at regional (voivodeship) level. Finally, the respective fiscal equalization scheme has been under severe criticism [Izdebski 2013]. Apart from equity issues, it is worth examining whether this system fosters irresponsible fiscal policies. The author uses panel analysis in conjunction with the Bohn's model of fiscal sustainability.

The paper aims to assess the sustainability of Polish voivodeships' fiscal policies. The period under investigation are the years 2004-2012. The research hypotheses are as follows:

Hypothesis 1: Including vertical and horizontal transfers, the fiscal policies of Polish voivodeships were sustainable during the sample period.

Hypothesis 2: Excluding vertical and horizontal transfers, the fiscal policies of Polish voivodeships were sustainable during the sample period.

The article is structured as follows. Section 2 briefly discusses the concept of fiscal sustainability and selected methods of its testing. Section 3 specifies empirical approach and the set of variables. Section 4 discusses regression results. Finally, Section 5 provides some concluding remarks.

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[1] In 2009 the general government deficit increased by 3.4 p.p. to 7.1% of GDP [Ministerstwo Finansów 2010, p. 12].

## 2. Fiscal sustainability and its testing

Fiscal policy is considered to be sustainable if a stream of budget expenditures is covered by a stream of budget revenues. In other words, an initial debt ($d*$) shall be offset by a stream of future primary surpluses ($s$). Solvency constraint is satisfied if the present value of debt stock approaches zero at infinity (transversality condition, no-Ponzi-game condition) [Bohn 2008, p. 23; Mahdavi 2014, p. 1029-1030]:

$$d_t^* = \sum_{j=0}^{\infty} \frac{1}{(1+r)^j} E_t[s_{t+j}],$$

$$\lim_{n \to \infty} \frac{1}{(1+r)^n} E_t[d_{t+1}] = 0,$$

where: $E[.]$ – conditional expectation, $r$ – discount rate.

The tests of fiscal sustainability usually verify the unit root (stationarity) of the stock of debt and cointegration between the budget revenues and budget expenditures [Afonso 2005]. Nevertheless, there are stochastic processes satisfying intertemporal budget constraint that break stationarity and cointegration conditions [Bohn 2007]. As a result, the abovementioned tests may be misleading. For this reason, H. Bohn [1998] proposed an alternative method of testing fiscal sustainability. What is crucial, this method does not require assumptions concerning a discount rate [Greiner et al. 2007, p. 196]. According to Bohn's model, a government conducts sustainable fiscal policy if a past increase in the public debt leads to an improvement in the primary surplus ($\rho > 0$) [Bohn 1998, p. 951]:

$$s_t = \rho \, d_{t-1} + \mu_t,$$

where: $s_t$ – primary surplus in period $t$ (scaled by income/output), $d_{t-1}$ – debt at the end of period $t-1$ (scaled by income/output), $\mu_t$ – other determinants of primary surplus in period $t$ and error term.

If $\rho > 0$ future debt decreases by about $(1-\rho)^n$ after n periods. It is a sufficient but not necessary condition for fiscal sustainability [Claeys et al. 2008, p. 143]. Therefore Ch. Schoder [2014, p. 249] suggests that in case of lack of positive response (reaction) coefficient, one should use the term "non-sustainable debt" rather than "unsustainable debt".

## 3. Empirical model

The analysis covers the years 2004-2012. In the starting year of the analysis the current system of financing local self-government was implemented. The choice of the ending year derives from data limitations (regarding GDP at regional level).

The baseline panel data model has a following form [Potrafke, Reischmann 2015, p. 983]:

$$s_{ijt} = \alpha\, d_{it\text{-}1} + \sum \beta\, Z_{it} + \eta_i + \varepsilon_t + u_{it},$$

where: $i$ – region ($i = 1, 2, …, 16$), $j$ – type of primary surplus ($j = 1, 2$), $t$ – year ($t = 1, 2, …, 9$), $s$ – relation of primary surplus to revenues, $d$ – relation of debt to revenues, $Z$ – vector of control variables, $\eta_i$ – fixed region effect, $\varepsilon_t$ – fixed period effect, $u_{it}$ – error term.

Scaling primary surplus and debt by budget revenues corresponds to the construction of local government debt limits. Both former (in force until 2013) and new numerical debt limits condition the stock of debt and/or streams of debt repayments on the value of entity's revenues. In result, [Potrafke, Reischmann 2015, p. 981], the dependent variable is expressed twofold. Apart from a standard measure of primary surplus (*primary_surplus_ratio_1*, i.e. a balance excluding interest payments to revenues), the author uses a modified formula (*primary_surplus_ratio_2*, i.e. the balance excluding interest payments, horizontal and vertical equalization transfers to revenues). More specifically, there are upward corrections (for interest payments and transfers paid for the horizontal equalization scheme) and downward corrections (for transfers received in the form of equalizing subvention[2] (vertical equalization scheme) and regional subvention[3] (horizontal equalization scheme)).

In order to control for fluctuations of GDP and budget expenditures around the trend, the following control variables are implemented [Potrafke, Reischmann 2012, p. 10, 11]:

$$y_c = y_t - \hat{y}_t,$$

$$g_c = g_t - \hat{g}_t,$$

where: $y$ – real GDP, $g$ – real expenditures (for *primary_surplus_ratio_1*: expenditures excluding interest payments; for *primary_surplus_ratio_2*: expenditures excluding interest payment and transfers paid for horizontal equalization scheme), $\hat{y}$, $\hat{g}$ – trend values.

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[2] The equalizing subvention was distributed among: voivodeships with tax income per capita lower than the country's average (basic component) and voivodeships with both tax income per capita lower than 125% of the country's average and fewer than 3 million inhabitants (supplementary component) [Act of 13 November 2003].

[3] In the analyzed period, the horizontal equalization scheme was supplied by voivodeships with tax income per capita higher than 120% of the country's average. The funds subsidized the voivodeships that had: the rate of unemployment over 110% of the country's average (20% of the total amount), the area of regional roads per capita greater than the country's average (40% of the total amount), GDP per capita below 75% of the country's average (10% of the total amount), higher expenditures due to the change in the model of financing of the regional tasks (30% of the total amount) [Act of 13 November 2003].

The set of control variables derives from the tax smoothing hypothesis. This hypothesis implies that budget deficits allow keeping tax rates fixed and consequently minimizing deadweight loss of taxation [Fincke, Greiner 2011, p. 6].

Real values were calculated on the basis of the region-specific GDP deflators. Trend values were estimated with Hodrick-Prescott filter with the smoothing parameter equal to 100. Temporary increases in spending were expected to hamper primary surplus. On the contrary, cyclical increases in output were expected to improve primary surplus. The panel analysis also controls for fixed region and fixed period effects.

The robustness of the baseline model for each dependent variable is verified by excluding Mazowieckie voivodeship from the sample and including the lagged dependent variable [Potrafke, Reischmann 2012, p. 14, 15]. The former modification arises from the fact that during the period 2004-2012 Mazowieckie voivodeship was by far the biggest contributor to the horizontal equalization scheme. Cumulative negative difference between funds received and paid amounted to PLN 5 138 million, accounting for over 200% of this region's total expenditures in 2012. The other voivodeships were net beneficiaries of the equalization scheme over the analysed period. Thus, from this point of view, Mazowieckie voivodeship is a significantly different unit. The latter variable reflects inertia in the budgeting process.

## 4. Empirical results

The results of the panel regression analyses are presented in Tables 1, 2 (OLS fixed effects estimation) and 3 (Arellano-Bond dynamic panel data estimation). In total, there are six regression results presented. They account for the twofold specification of the dependent variable (in correspondence to Hypothesis 1 and Hypothesis 2). Additionally, the regression results reported in Table 3 take into account the intertemporal links with respect to the dependent variable.

The response of primary balance to lagged debt is positive and statistically significant in all but two specifications. This supports the hypotheses that fiscal policy of Polish voivodeships was sustainable during the sample period.

The exclusion of Mazowieckie voivodeship increases fiscal policy response coefficients. What is more, in case of the dependent variable – *primary_surplus_ratio_2* – the fiscal reaction coefficient becomes statistically significant only after excluding this local self-government unit. These results may impugn the fiscal sustainability of Mazowieckie voivodeship. Nevertheless, due to a relatively short period of analysis (too small number of degrees of freedom) it is impossible to conduct sustainability analysis exclusively for this region.

Lagged dependent variables are statistically different from zero in both specifications. While the dynamic panel regression for *primary_surplus_1* has the highest reaction coefficient, the coefficient on *primary_surplus_2* is positive but statistically insignificant. These results are in line with fixed effects specifications.

The coefficients on control variables have the expected signs (i.e. positive for cyclical GDP component and negative for temporary spending variations) and are statistically significant in the majority of specifications.

**Table 1.** Panel regression results (dependent variable: *primary_surplus_ratio_1*)

|  | Model 1 | Model 2 |
|---|---|---|
| constant | 0.017<br>(0.028) | 0.018<br>(0.036) |
| lagged $d$ | 0.166**<br>(0.072) | 0.211***<br>(0.080) |
| $y_c$ | 1.250e-06***<br>(3.651e-07) | 1.309e-06*<br>(7.085e-07) |
| $g_{c1}$ | −2.654e-010***<br>(4.738e-011) | −2.413e-010***<br>(9.122e-011) |
| N<br>R² | 144<br>0.568 | 135<br>0.531 |
| DW | 1.510 | 1.505 |

Note: Panel OLS with fixed region and fixed period effects. Heteroskedasticity and autocorrelation consistent standard errors in parentheses.
* Significant at 10%; ** significant at 5%; *** significant at 1%.

Source: own study on the basis of GUS [2015], Ministerstwo Finansów [2004--2010; 2010-2015].

**Table 2.** Panel regression results (dependent variable: *primary_surplus_ratio_2*)

|  | Model 1 | Model 2 |
|---|---|---|
| constant | −0.152***<br>(0.028) | −0.174***<br>(0.033) |
| lagged $d$ | 0.126<br>(0.079) | 0.195**<br>(0.070) |
| $y_c$ | 1.190e-06***<br>(3.973e-07) | 1.295e-06**<br>(5.905e-07) |
| $g_{c2}$ | −3.004e-010***<br>(5.452e-011) | −2.603e-010***<br>(8.154e-011) |
| N<br>R² | 144<br>0.830 | 135<br>0.741 |
| DW | 1.504 | 1.502 |

Note: Panel OLS with fixed region and fixed period effects. Heteroskedasticity and autocorrelation consistent standard errors in parentheses.
* Significant at 10%; ** significant at 5%; *** significant at 1%.

Source: own study on the basis of GUS [2015], Ministerstwo Finansów [2004--2010; 2010-2015].

**Table 3.** Dynamic panel regression results

|  | primary_surplus_ratio_1 | primary_surplus_ratio_2 |
|---|---|---|
| constant | −0.083**<br>(0.036) | −0.143***<br>(0.048) |
| lagged $d$ | 0.265**<br>(0.111) | 0.174<br>(0.135) |
| lagged $s^a$ | 0.388***<br>(0.070) | 0.252**<br>(0.113) |
| $y_c$ | 4.42e-07<br>(4.02e-07) | 5.39e-07<br>(4.50e-07) |
| $g_c^a$ | −1.3e-10<br>(9.54e-11) | −2.08e-10*<br>(1.09e-10) |
| N | 112 | 112 |

Note: [a] Respectively lagged $s_1$ / lagged $s_2$ and $G_{c1}$ / $G_{c2}$. Arellano-Bond dynamic panel-data estimation (one-step with 39 instruments) including period dummies. VCE-robust standard errors in parentheses.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

Source: own study on the basis of GUS [2015], Ministerstwo Finansów [2004-2010; 2010-2015].

## 5. Conclusion

The article investigated the sustainability of fiscal policy in Polish voivodeships in the years 2004-2012. The research approach was to analyse the reaction of the primary surpluses to changes in debt. The results of the panel regressions suggest that the fiscal policy conducted by Polish voivodeships was sustainable, controlling for fluctuations in output and spending. Therefore, debt limits appear to effectively withstand a soft budget constraint problem. Regarding the fiscal equalization scheme, the existence of adverse incentives to conduct unsustainable fiscal policies requires further research.

Nonetheless, taking into account the short period of analysis, its results should be treated with caution. Moreover, one should bear in mind that sustainability of fiscal policy in the past does not assure that future governments will sustain prudent policy [Wyplosz 2011, p. 26].

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