

Side effects of fiscal rules: a case of Polish local self-government¹

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Abstract: The trend towards decentralization of government activities has prompted an increased interest in sub-national fiscal rules. The paper investigates an ex ante adaptation to the modified subnational fiscal framework. Using a panel of 2,479 Polish municipalities in the years 2011-2013 the aim is to verify the existence of the side effect of the new debt repayment rule. The empirical results show that local government units for which the new rule would have been more demanding than the former generated higher revenues per capita from asset sales.

Keywords: debt repayment rule, fiscal gimmickry, window dressing, budget constraint.

JEL codes: H71, H72, H74.

Introduction

The problem of soft budget constraints poses a severe threat to an efficient fiscal decentralization (Rodden, Eskeland, & Litvack, 2003). If subnational government units expect bail out from central government they are prone to conduct profligate budget policies. Eventually it will undermine their own or even the nation-wide fiscal sustainability. In order to mitigate deficit bias central government introduces some institutional measures. Prominent amongst them are (numerical) fiscal rules (Sutherland, Price, & Joumard, 2006; Eyraud & Gomez Sirera, 2015; Ter-Minassian, 2015).³

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³ It is also possible that subnational governments adopt fiscal rules on a voluntary basis. In that case an analysis of implications of fiscal rules may suffer from an endogeneity bias since economic outcomes may be prompted by conservative preferences of voters in fact (Poterba & Rueben, 2001, p. 538).

A meta-regression-analysis by Heinemann, Moesinger and Yeter (2018) indicates that generally sub-national fiscal rules constrain fiscal policy. Nevertheless, as Ter-Minassian (2007) claims, fiscal rules may also trigger side effects – window dressing and creative accounting. Specifically the resulting ill-designed incentive framework may lead to the adoption of budgetary policies aimed at satisfying legal requirements at the expense of medium and long term fiscal and economic outcomes. Contrary to previous theoretical literature a model of structural and cyclical responses to fiscal rules by Milesi-Ferretti (2003) incorporates the assumption that fiscal variables subject to fiscal rules can differ considerably from the actual fiscal position.

Easterly (1999) documents plenty of cases in which fiscal adjustment measures led to a decrease in fiscal deficit or public debt but had no effect on the public sector's net worth. In a similar vein Milesi-Ferretti and Moriyama (2004) provide numerous examples of improvements in public accounts subject to EU fiscal rules without long-term positive budgetary effects. Disinvestment and hidden borrowing through sale-and-leaseback contracts are measures that enable illusive improvement in fiscal stance. Irwin (2012) lists some cases of such practices in the USA and EU countries.

In cross-country and intra-country empirical studies illusive budget adjustments are captured by various measures such as: stock-flow adjustment and its components, revenue residuals and the accuracy of budget projections. Koen and van den Noord (2005), von Hagen and Wollf (2006) and Buti, Martins and Turrini (2007) point to a positive association between the difficulty in meeting fiscal rules and susceptibility to fiscal gimmickry. Using a sample of Italian municipalities Balduzzi and Grembi (2011) explore the impact of fiscal rules and some socio-economic covariates on window dressing practices. Such behaviour is detected in terms of tax and fare residuals, i.e. monetary amounts recorded as revenues but not yet cashed. They do not find a causal impact of the adoption of subnational fiscal rules on window dressing practices. Interestingly the empirical analysis for Swiss cantons by Luechinger and Schaltegger (2013) provides evidence that the balanced budget rule brings about a positive side effect in the form of more accurate deficit projections and thereby improves budget transparency. In their study on the debt brakes of Swiss cantons Burret and Feld (2017a) explicitly distinguish direct (intended) effects, i.e. reduction in public deficits from indirect (unintended) effects, i.e. the abuse of unrestricted investment budgets, the abuse of funds and special financing as well as passing on budget imbalances to local governments. They conclude that the debt brakes fulfill their purpose, while only one unintended effect in the form of excessive investment spending finds some empirical support. The hypothesis of 'exporting' deficits to lower-level governments induced by cantonal fiscal rules in Switzerland is investigated thoroughly and rejected in another paper by Burret and Feld (2017b).

Against this background, the paper investigates a potential side effect of ex ante adaptation to a modified subnational fiscal framework. To this end it uses

data for Polish municipalities. It was feared that a new fiscal rule might stimulate self-government entities to carry out asset sales as the legislation conditions debt repayment capacity equally on current balance and proceeds from asset sales. The aim of the paper is to test the proposition that the new debt rule prompted an increase in asset sales. The identification strategy rests on: (i) the difference between the stringency of the 15 percent debt-repayment-to-revenues limit (the former rule) and the individual debt indicator (the new rule), (ii) dependency of the new rule on individual budget outcomes in last three years and (iii) over the four-year-long *vacatio legis* of the new rule; it was promulgated in August 2009 but it replaced the old rule only in 2014.

The panel regression results for 2,479 municipalities support the hypothesis that the new debt limit incentivized municipalities to sales of assets in a transition period. By the transition period the years 2011-2013 are meant in which the new rule was binding in *de facto* terms (as budget outcomes from these years determined the individual debt indicator for the year 2014) but not in *de jure* terms (as local government units were still bound by the old rule). The empirical analysis provides evidence of the existence of some kind of announcement effect.

The remainder of the paper is organized as follows: Section 1 discusses the institutional background. Section 2 introduces empirical models. This section is followed by discussion of regression results (Section 3). Finally some concluding remarks are presented.

1. Institutional background

The rapid growth of debt has been considered as one of the most worrisome phenomena in the Polish local government sector. In the period 2004-2009 the debt of subnational government entities and their associations (in absolute terms) grew annually by more than 10 percent, except for the year 2007.⁴ In that period the average debt-revenue ratio for subnational government units increased from 20.9 percent to 26 percent (Krajowa Rada Regionalnych Izb Obrachunkowych, 2005, 2010). Importantly local government units in Poland cannot go bankrupt and can receive a central government loan in case of severe financial problems.

In order to prevent local government debt repayment difficulties new fiscal rules were enacted in 2009. Because of a significant impact on budgeting policy their implementation was scheduled as of the year 2011 (a ban on borrowing to cover current expenditures) and 2014 (an individual debt limit).

Until the year 2013 debt repayments, that is a sum of principal instalments and interest payments, should not have exceeded 15 percent of local govern-

⁴ The growth rate reached a peak of 45.7 percent in 2009. The data are expressed on a consolidated basis (Ministerstwo Finansów, 2015).

ment's revenues and total debt should not have exceeded 60 percent of these revenues. The response to the criticism of the uniform approach to limiting local government debt was to condition debt issuance on their individual repayment capacity. In essence the new legislation replaced a constant factor of a debt repayment limit common to all units with one which is time-varying and unit-specific. The individual debt limit has the following formula (Act of Public Finance of 2009):

$$\left(\frac{P+I}{R} \right)_t \leq \frac{1}{3} \left(\frac{CB_{t-1} + AS_{t-1}}{R_{t-1}} + \frac{CB_{t-2} + AS_{t-2}}{R_{t-2}} + \frac{CB_{t-3} + AS_{t-3}}{R_{t-3}} \right),$$

where:

t – year for which the indicator is calculated;

P – principal instalments;

I_t – interest payments, discounts, etc.;

R – total revenues;

CB – current balance;

AS – asset sale proceeds.

A three-year average ratio of current balance and asset sales proceeds to revenues serves as a proxy for the debt repayment capacity. The current balance is subject to another fiscal rule according to which current revenues jointly with budget surpluses from the past and free financial means shall cover all current expenditures⁵ (Act of Public Finance of 2009). This requirement has been binding since the year 2011.⁶ In principle it should diminish the propensity for asset sales in order to satisfy the new debt repayment rule. For the sake of clarity Figure 1 presents all the fiscal rules that shaped local government units' budgetary policies in the period analyzed.

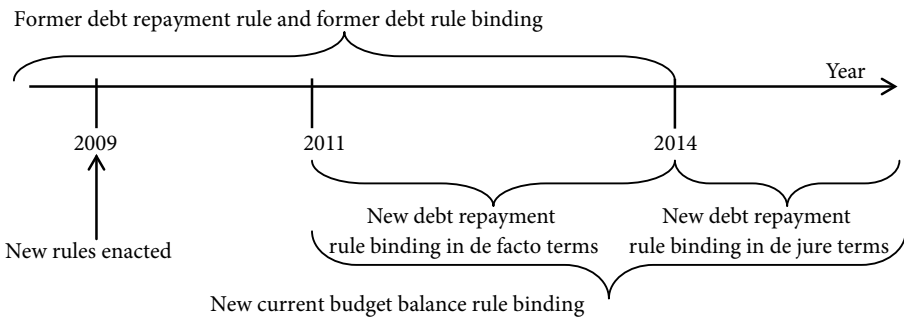


Figure 1. Former and new fiscal rules on a time scale

Source: own work.

⁵ These funds stand for non-utilized money from debt incurred in previous years.

⁶ Current expenditures to be covered by non-refundable foreign funds that have not been received until the end of the year are excluded from the limit.

Table 1. Distribution of individual debt limits for the years 2011-2013

| Number of municipalities with IDL of: | 2011 | 2012 | 2013 |
|--|-------------|-------------|-------------|
| Below 0% | 47 | 77 | 41 |
| 0–5% | 341 | 594 | 712 |
| 5–10% | 902 | 1 033 | 1 109 |
| 10–15% | 758 | 549 | 455 |
| Total below 15% | 2 048 | 2 253 | 2 317 |
| 15–20% | 304 | 163 | 120 |
| 20–25% | 76 | 40 | 27 |
| 25–30% | 29 | 11 | 4 |
| 30–35% | 14 | 5 | 5 |
| 35–40% | 4 | 2 | 3 |
| above 40% | 4 | 5 | 3 |
| Total above 15% | 431 | 226 | 162 |
| Total | 2 479 | 2 479 | 2 479 |

Notes: Data for the year $t - 1$ according to budgetary plans as of 3rd quarter.

Source: own work on the basis of Krajowa Rada Regionalnych Izb Obrachunkowych (2012, 2013, 2014).

In order to assess the impact of the new regulations on local government units' budgetary policy the Regional Chambers of Audit calculated new debt limits in the years preceding the actual implementation of the relevant regulation. Table 1 illustrates the aggregate calculations for the years 2011-2013. They indicate that for the vast majority of municipalities (at least 80 percent) the new debt limit would have been more demanding than the former. Moreover the number of municipalities with an individual debt limit less than 15% increased year by year.

There have been lots of critical remarks concerning the formula of the new rule (e.g. Filipiak and Dylewski, 2013; Wójtowicz, 2013). The one that deserves special attention is stimulating self-government entities to excessive asset sales. This threat is partially alleviated by a legal requirement to balance current revenues and current expenditures. Nonetheless a current surplus may turn out to be insufficient in comparison to debt repayments.

Along with the advent of the new debt debt-repayment-rule there is some anecdotal evidence on window-dressing practices such as sell-buy back and reverse lease operations (Kluza, 2015; Krajowa Rada Regionalnych Izb Obrachunkowych, 2016). At the same time, to the best of the author's knowledge there is no systematic study on the phenomenon of local government asset sales, employing an empirical approach that allows for a causal interpretation.

2. Methods

The paper aims to empirically verify the existence of the side effects of the individual debt limit in the form of an increased propensity to asset sales. The empirical analysis is based on panel data for 2,479 Polish municipalities (including cities with county rights) over the period 2011-2013. What is crucial from the perspective of fiscal policy is that the municipal debt accounts for over 80 percent of total local government units' debt.

The hypothesis is that the individual debt indicator affected local self-governments' fiscal choices since fiscal year 2011. This is because an individual debt indicator for a given year is based on fiscal variables from the three previous years. Moreover the year 2014 was an election year so there could have been an incentive to create some fiscal space in advance to afford pork-barrel spending. This assumption is in line with Benito, Bastida and Vicente (2013) who provide evidence of political budget cycles in Spanish municipalities constrained by a balanced budget rule.

Asset sales proceeds constitute only a minor source for financing municipalities in Poland. As is shown in Figure 2 typically they did not exceed 5 percent of total revenues.⁷ Nevertheless they could play a pivotal role in satisfying the new debt rule.

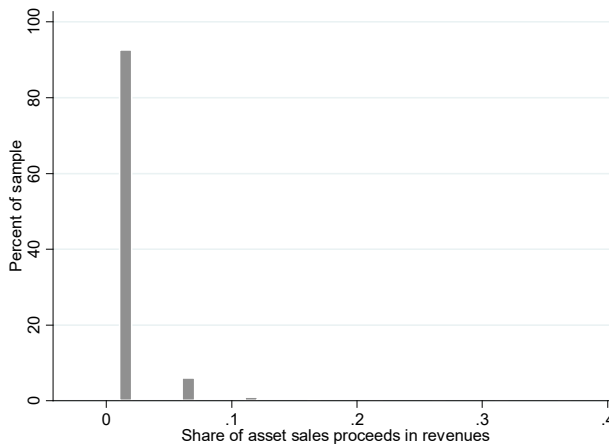


Figure 2. Distribution of share of asset sales proceeds in revenues in municipalities in the years 2011-2013

Source: Own work on the basis of Ministry of Finance database.

The research hypothesis is as follows: local government units for which the new rule would have been more demanding than the former generated higher revenues per capita from asset sales.

⁷ Asset sales proceeds encompass revenues recorded in paragraphs 077, 078 and 087.

Before employing panel regression methods that control explicitly for treatment intensity and other fiscal, demographic and political covariates, difference-in-differences (DD) estimates of the effects of the new debt repayment rule imposition were calculated. The year 2010 serves as a pre-treatment period. A treatment group consists of municipalities for which the new rule in the years 2011, 2012 and 2013 would have been less favourable than the former fixed 15 percent threshold. The population DD estimate is calculated as:

$$\delta = [E(Y_{rt} | r = 1, t = 1) - E(Y_{rt} | r = 1, t = 0)] + \\ - [E(Y_{rt} | r = 0, t = 1) - E(Y_{rt} | r = 0, t = 0)],$$

where:

$E(Y)$ – subsample average asset sales per capita;

r – group of municipalities;

$r = 1$ – treatment group;

$r = 0$ – control group;

t – year;

$t = 1$ – post-treatment period;

$t = 0$ – pre-treatment period.

The DD analysis indicates that there was a decrease in asset sales per capita in both treatment and control groups but it was much less significant in the case of municipalities affected by the new rule (see Table 2). It translates into a positive impact of the new rule on asset sales proceeds per capita in all three years analyzed.

In the next stage fixed effects (FE), random effects (RE) and generalized two-stage least squares (G2SLS) random-effects IV models were used. The dependent variable is expressed as a natural logarithm of per capita asset sales. Since in some cases⁸ municipalities did not generate any revenues from asset sales, in alternative specifications 0.01 to per capita values was added and thereby the sample size was maximized (from 6,948 to 7,433 observations).

The independent variable of particular interest is the difference between the old and new debt rule. It is expressed as:

$$new\ vs\ former = \begin{cases} 0.15 - \text{individual debt limit (IDL) for a municipality } m \text{ in year } t & \text{if } IDL_{mt} < 0.15 \\ 0 & \text{if } IDL_{mt} \geq 0.15 \end{cases}$$

Its positive value indicates that the new debt rule would have been more demanding than the old one for a municipality in year t .⁹ In other words, ob-

⁸ 485 observations representing around 6 percent out of total.

⁹ Ideally IDL should be calculated on the basis of projected data but as there are no independent projections for individual municipalities a calculation based on executed fiscal variables from previous years serves as a best-guess estimate of the impact of shift in fiscal regulatory framework.

Table 2. Average asset sales per capita (in zlotys) before and after the *de facto* implementation of the new debt repayment rule

| Group of municipalities | Pre-treatment | Post-treatment | Difference |
|-------------------------|---------------|----------------|---|
| Treatment group | 46.28 | 46.17 | -0.11 |
| Control group | 74.06 | 56.91 | -17.15 |
| | | | $\delta_{2011 \text{ vs. } 2010} = 17.04$ |
| Treatment group | 47.53 | 44.05 | -3.48 |
| Control group | 86.88 | 63.48 | -23.40 |
| | | | $\delta_{2012 \text{ vs. } 2010} = 19.92$ |
| Treatment group | 47.25 | 47.19 | -0.06 |
| Control group | 104.68 | 63.93 | -40.75 |
| | | | $\delta_{2013 \text{ vs. } 2010} = 40.69$ |

Source: Own work on the basis of the Ministry of Finance database.

servations with positive values account for a treatment group and the others constitute a control group. In 1,907 municipalities (77% observations) values of *new vs former* were positive in all three years analyzed. The combination of three zero values was recorded in 190 municipalities (8% of observations). For 381 municipalities (15% of observations) there were switches from 0 to positive values (and vice versa) within the time span analyzed. A positive and statistically significant coefficient on the variable discussed will indicate that municipalities tried to adjust beforehand to the new rule through increased asset sales.

A lagged ratio of debt repayments to revenues is included, which in the analyzed period was subject to a fixed 15-percent limit (*lagged debt repayment to revenues*).¹⁰ By including this variable the proposition that municipalities responded in a similar way (i.e. through asset sales) to both the old and the new debt repayment rule can also be tested.

In general debt repayment limitations are tighter for heavily indebted entities. Hence the set of independent variables contains lagged debt-revenue ratio. In addition, because of preferential treatment of debt incurred for the purpose of implementation of European Union and EFTA projects, a lagged ratio of debt excluding "EU-debt" to revenues (*lagged debt to revenues*) was used. In the sample period this ratio was subject to a 60-percent legal limit.

¹⁰ According to the legislation debt repayments under constraint did not include principal instalments of debt incurred for the purpose of implementation of European Union and EFTA projects.

The fixed-effects (FE) model has the following formula:

$$\ln(\text{asset sales per capita})_{mt} = \beta_1 \text{ new vs former}_{mt} + \beta_2 \text{ lagged debt repayment to revenues}_{mt} + \beta_3 \text{ lagged debt to revenues}_{mt} + a_m + l_t + e_{mt}$$

where:

m – municipality,

t – year,

a_m – municipal fixed effect,

l_t – time fixed effect,

e_{mt} – error term.

In the next step – random-effects (RE) panel regression – control for a set of socio-economic municipal characteristics was used. They are represented by variables: *share of own revenues*, *share of young population*, *share of old population*, *population density*, *re-election concern* and *city with county rights*. To diminish endogeneity concerns, *share of own revenues*, *share of young population*, *share of old population* and *population density* are expressed as averages for the years 2008-2010. The model is as follows:

$$\ln(\text{asset sales per capita})_{mt} = \beta_1 \text{ new vs former}_{mt} + \beta_2 \text{ lagged debt repayment to revenues}_{mt} + \beta_3 \text{ lagged debt to revenues}_{mt} + \gamma X_m + a_r + l_t + e_{mt}$$

where:

X_m – vector of control variables,

a_r – region fixed effect.

There is no clear prediction regarding the sign of the coefficient on *share of own revenues*. On one hand it may be easier for more financially self-reliant municipalities to collect extra tax and fee revenues instead of selling fixed assets. On the other their own revenues encompass rents and dividends. It implies that more financially self-reliant units may have a higher capacity to generate revenues from asset sales.

In line with standard practice in empirical analyses of local government policies demographic characteristics are included: a percentage share of population up to 17 years old (*share of young population*), a percentage share of women above 59 years and men above 64 years¹¹ (*share of old population*) and persons per square kilometer (*population density*).

Polish municipal government is a mayor-council one. A mayor proposes a budget which is then approved by a municipal council. Hence it is possible that a mayor who is more concerned about his/her re-election prospects would try to create fiscal space for pork-barrel spending through sales of assets. Such prediction is in line with Melo, Pereira and Souza (2014) who doc-

¹¹ These thresholds conform to the statutory retirement age at that time.

ument the impact of political factors on creative accounting in the Brazilian states. On the other hand mayors that won previous elections only by a slight margin may not care for fiscal space after elections that they are likely to lose. Alternatively they may be more concerned about public opinion on excessive asset sales. The explanation for this relationship may also be that mayors with a stronger political position better understand the implications of the construction of subnational fiscal rules. A dummy *re-election concerns* that takes value 1 if in the 2010 elections a mayor was re-elected in a second ballot is included, 0 otherwise.

There are two types of local government units on the municipal level in Poland: “ordinary” municipalities (2,413 units) and cities with county rights (66 units). The latter perform both municipal and county tasks. To account for this variation a dummy variable *city with county rights* is introduced that assigns 1 for these units, 0 otherwise.

Firstly a FE model is employed to verify the impact of the old and the new fiscal rules (variables *new vs former*, *lagged debt repayment to revenues*, *lagged debt to revenues*) on asset sales. Then, to investigate the influence of selected socio-economic municipal characteristics, a RE model is used. This estimator enables the inclusion of independent variables that are constant over time. Finally, to test potential interactions between asset sales and a current balance, a G2SLS estimation is made.

Beyond the independent variables already discussed, FE regressions also control for time-invariant municipal-specific effects and common year effects. In a similar vein, RE and G2SLS regressions account for fixed region effects and common year effects. Summary statistics and a correlation matrix between dependent and independent variables are included in the Appendix (see Table A.1 and A.2).

3. Findings

The fixed-effects estimation results show a positive and statistically significant effect of *new vs former* on revenues from asset sales (see Table 3).¹² At the same the coefficients on *lagged debt repayment to revenues* are found not to be significant at the 5 percent level. Coefficients on *lagged debt to revenues* turn out to be positive and statistically significant at the 5 percent level only for the sample restricted to observations with positive asset sales proceeds. However very low values of adjusted R-squared indicate that independent variables hardly explain variations in municipal asset sales revenues.

¹² Another dependent variable was tested – the share of asset sales proceeds in total municipal revenues. The impact of *new vs former* in that case is also positive and statistically significant across all fixed-effects specifications. The results are available from the author upon request.

Table 3. Fixed-effects (FE) regressions for the years 2011-2013

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|-----------------------|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| natural logarithm of asset sales per capita | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample |
| new vs former | 4.020*** (0.942) | 4.805*** (1.289) | 3.782*** (0.978) | 4.267*** (1.378) | 3.322*** (0.981) | 4.056*** (1.365) | 3.176*** (1.008) | 3.647*** (1.440) |
| lagged debt repayment to revenues | | | 0.628 (0.658) | 1.418 (1.077) | | | 0.438 (0.662) | 1.220 (1.077) |
| lagged debt to revenues | | | | | 0.591* (0.241) | 0.653 (0.336) | 0.574* (0.243) | 0.607 (0.335) |
| Const | 2.542*** (0.00497) | 0.829*** (0.000741) | 2.509*** (0.0350) | 0.753*** (0.0577) | 2.410*** (0.0539) | 0.679*** (0.0773) | 2.391*** (0.0611) | 0.624*** (0.0939) |
| N | 6948 | 7433 | 6948 | 7433 | 6948 | 7433 | 6948 | 7433 |
| adj. R ² | 0.004 | 0.004 | 0.004 | 0.004 | 0.005 | 0.005 | 0.005 | 0.005 |
| F statistics | 6.20*** | 6.47*** | 4.82*** | 5.32*** | 5.93*** | 5.70*** | 4.81*** | 4.84*** |

Notes: Regressions denoted by (1), (3) and (5) use data only for municipalities that sold assets in a given year. Regressions denoted by (2), (4) and (6) use data for all municipalities. All regressions include fixed municipality effect and fixed year effect. Robust standard errors are shown in parentheses. Significance denoted by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Own work on the basis of the Ministry of Finance database.

In the next step a random-effects estimation is used. As can be seen in Table 4 these regressions are far better fitted to the data. R-squared overall is between 0.243 and 0.261. *New vs former* is again positive and statistically significant in all specifications. *Lagged debt repayment to revenues* loses its statistical significance when the *lagged debt to revenues* is simultaneously taken into account. On the contrary *lagged debt to revenues* is both positive and statistically significant in all relevant regressions. A statistically significant and positive impact of *share of own revenues* and *population density* was also found. The variables that are found to be negatively correlated with assets sales are *share of young population* and *share of old population*. The impact of *re-election concerns* turns out to be negative, albeit the coefficient is significant only for the restricted sample and at the 5 percent level. At the same time one should consider that the respective dummy variable gives us a rather crude measure of re-election concerns.

In the third step a variable *current balance to revenues* was added. It is because municipalities may have adjusted to the modified regulatory framework as well through a current budget consolidation. Due to a potential simultaneity between a current balance and asset sales proceeds in a given year, a current balance is instrumented with its lagged values for years $t - 1$ and $t - 2$. The results of the G2SLS regressions are reported in Table 5. Sargan-Hansen statistics indicate that the instruments are not correlated with an error term. Whereas the main variable of interest remains positive and statistically significant there is no evidence of either substitution or complementarity between the current balance and asset sales proceeds. The magnitude and statistical significance of other independent variables – except for *population density* – are close to these in random-effects regressions.

Under the most conservative estimate (the coefficient equal to 2.057), a 1 percentage point difference between the old and the new debt repayment rule leads to an approximately 2 percent increase in asset sales proceeds per capita. Consequently the effect for a mean *new vs former* (0.061) is an about a 13 percent increase in revenues from asset sales.

Conclusions

The paper employs a previously unexplored database to investigate the effects of the imposition of subnational fiscal rules. The empirical strategy exploits the shift in the regulatory framework. Statistically significant and stable results were obtained that point to the impact of the new debt-repayment rule on municipal asset sales proceeds in Poland. The empirical evidence is in line with Koen and van den Noord (2005), von Hagen and Wollf (2006), Buti et al. (2007) who indicate that window dressing and creative accounting practices are positively associated with stringency of fiscal rules. The empirical results also suggest that municipal governments adjusted ex ante to the modified fiscal

Table 4. Random-effects regressions (RE) for the years 2011-2013

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| natural logarithm of asset sales per capita | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample |
| new vs former | 3.710*** (0.520) | 4.713*** (0.726) | 2.924*** (0.547) | 3.569*** (0.768) | 2.210*** (0.559) | 2.760*** (0.789) | 2.079*** (0.567) | 2.521** (0.800) |
| | | | 2.377*** (0.516) | 3.444*** (0.794) | | | 0.871 (0.553) | 1.547 (0.862) |
| lagged debt repayment to revenues | | | | | 0.997*** (0.144) | 1.308*** (0.201) | 0.893*** (0.157) | 1.123*** (0.220) |
| share of own revenues | 2.990*** (0.233) | 3.730*** (0.350) | 2.923*** (0.232) | 3.635*** (0.350) | 2.789*** (0.231) | 3.476*** (0.352) | 2.785*** (0.232) | 3.469*** (0.352) |
| share of young population | -0.141*** (0.0206) | -0.227*** (0.0277) | -0.139*** (0.0205) | -0.223*** (0.0276) | -0.137*** (0.0204) | -0.221*** (0.0275) | -0.136*** (0.0204) | -0.220*** (0.0275) |
| | -0.0405** (0.0124) | -0.101*** (0.0197) | -0.0362** (0.0123) | -0.0948*** (0.0196) | -0.0333** (0.0124) | -0.0916*** (0.0197) | -0.0325** (0.0124) | -0.0900*** (0.0196) |
| population density | 0.000147** (0.0000461) | 0.000161** (0.0000581) | 0.000148** (0.0000461) | 0.000164** (0.0000583) | 0.000131** (0.0000454) | 0.000140* (0.0000578) | 0.000133** (0.0000455) | 0.000144* (0.0000580) |

| | | | | | | | | |
|-------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| re-election concern | -0.127* (0.0524) | -0.124 (0.0722) | -0.117* (0.0522) | -0.111 (0.0720) | -0.109* (0.0519) | -0.102 (0.0717) | -0.107* (0.0519) | -0.0988 (0.0718) |
| city with county rights | 0.605*** (0.110) | 0.593*** (0.129) | 0.590*** (0.109) | 0.571*** (0.129) | 0.579*** (0.111) | 0.560*** (0.133) | 0.576*** (0.110) | 0.555*** (0.132) |
| Const | 4.857*** (0.699) | 6.526*** (0.959) | 4.670*** (0.699) | 6.237*** (0.953) | 4.492*** (0.698) | 6.024*** (0.953) | 4.462*** (0.699) | 5.965*** (0.953) |
| N | 6945 | 7430 | 6945 | 7430 | 6945 | 7430 | 6945 | 7430 |
| R ² overall | 0.243 | 0.253 | 0.247 | 0.257 | 0.251 | 0.261 | 0.252 | 0.261 |
| Wald statistics | 1733.1*** | 1711.0*** | 1767.0*** | 1731.2*** | 1796.9*** | 1746.7*** | 1798.8*** | 1747.3*** |

Notes: Regressions denoted by (1), (3), (5) and (7) use data only for municipalities that sold assets in a given year. Regressions denoted by (2), (4), (6) and (8) use data for all municipalities. All regressions include the fixed region effect and the fixed year effect. Robust standard errors are shown in parentheses. Significance denoted by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Own work on the basis of Ministry of Finance database; Central Statistical Office Local Data Bank.

Table 5. Generalized two-stage least squares (G2SLS) random-effects IV regressions for the years 2011-2013

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| natural logarithm of asset sales per capita | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample | asset sellers | full sample |
| current balance per capita | -0.000041 (0.000061) | -0.000074 (0.000085) | -0.000032 (0.000060) | -0.000060 (0.000085) | -0.0000072 (0.000060) | -0.000028 (0.000085) | -0.0000074 (0.000060) | -0.000029 (0.000085) |
| new vs former | 3.665*** (0.536) | 4.650*** (0.737) | 2.878*** (0.565) | 3.517*** (0.777) | 2.186*** (0.575) | 2.741*** (0.790) | 2.057*** (0.583) | 2.501** (0.801) |
| lagged debt repayment to revenue | | | 2.409*** (0.556) | 3.441*** (0.761) | | | 0.876 (0.623) | 1.556 (0.850) |
| lagged debt to revenues | | | | | 1.000*** (0.147) | 1.302*** (0.202) | 0.895*** (0.165) | 1.117*** (0.226) |
| share of own revenues | 3.041*** (0.248) | 3.820*** (0.343) | 2.962*** (0.248) | 3.709*** (0.342) | 2.797*** (0.249) | 3.511*** (0.343) | 2.794*** (0.249) | 3.505*** (0.343) |
| share of young population | -0.138*** (0.0204) | -0.222*** (0.0281) | -0.136*** (0.0203) | -0.219*** (0.0279) | -0.136*** (0.0202) | -0.219*** (0.0278) | -0.136*** (0.0202) | -0.218*** (0.0278) |
| share of old population | -0.0394** (0.0142) | -0.0995*** (0.0196) | -0.0353* (0.0142) | -0.0932*** (0.0195) | -0.0331* (0.0141) | -0.0909*** (0.0195) | -0.0323* (0.0141) | -0.0893*** (0.0195) |
| population density | 0.000141* (0.0000680) | 0.000151 (0.0000955) | 0.000144* (0.0000677) | 0.000155 (0.0000950) | 0.000130 (0.0000674) | 0.000136 (0.0000947) | 0.000132 (0.0000675) | 0.000140 (0.0000947) |

| | | | | | | | | |
|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| re-election concern | -0.129* (0.0537) | -0.128 (0.0742) | -0.119* (0.0535) | -0.114 (0.0740) | -0.109* (0.0533) | -0.103 (0.0737) | -0.108* (0.0533) | -0.100 (0.0737) |
| city with county rights | 0.613*** (0.176) | 0.607* (0.247) | 0.596*** (0.175) | 0.583* (0.246) | 0.580*** (0.174) | 0.566* (0.245) | 0.577*** (0.174) | 0.561* (0.245) |
| const | 4.785*** (0.745) | 6.404*** (1.032) | 4.611*** (0.743) | 6.137*** (1.029) | 4.479*** (0.740) | 5.980*** (1.026) | 4.448*** (0.740) | 5.919*** (1.026) |
| N | 6945 | 7430 | 6945 | 7430 | 6945 | 7430 | 6945 | 7430 |
| R ² overall | 0.243 | 0.253 | 0.247 | 0.257 | 0.251 | 0.261 | 0.252 | 0.261 |
| Wald statistics | 1340.9*** | 1437.6*** | 1371.9*** | 1471.2*** | 1409.7*** | 1503.2*** | 1411.8*** | 1506.5*** |
| Sargan-Hansen statistics | 0.220 | 0.686 | 0.163 | 0.564 | 0.520 | 1.131 | 0.449 | 0.990 |

Notes: Regressions denoted by (1), (3), (5) and (7) use data only for municipalities that sold assets in a given year. Regressions denoted by (2), (4), (6) and (8) use data for all municipalities. All regressions include the fixed region effect and the fixed year effect. Standard errors shown in parentheses. Significance denoted by: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Own work on the basis of Ministry of Finance database; Central Statistical Office Local Data Bank.

framework. For individual municipalities this phenomenon could take place because of precautionary as well as political considerations.

A noteworthy policy implication from the research is that the individual debt indicator should not condition the debt repayment capacity on asset sales proceeds. There is also scope for further research. In particular it would be worthwhile to investigate the impact of (shift in) subnational fiscal rules on municipalities' debt management strategies (in terms of debt maturity, debt amortization profile, etc.) and the accuracy of municipal budget projections.

Appendix

Table A1. Summary statistics of dependent and independent variables

| Variable | Number of observations | Mean | Standard deviation | Minimum | Maximum |
|---|------------------------|---------|--------------------|----------|----------|
| natural logarithm of asset sales per capita (asset sellers) | 6948 | 2.897 | 1.739 | -9.820 | 8.207 |
| natural logarithm of asset sales per capita (full sample) | 7433 | 2.415 | 2.485 | -4.605 | 8.207 |
| new vs former | 7437 | 0.061 | 0.044 | 0.000 | 0.264 |
| lagged debt repayment to revenues | 7437 | 0.058 | 0.038 | 0.000 | 0.446 |
| lagged debt to revenues | 7437 | 0.268 | 0.167 | 0.000 | 1.216 |
| share of own revenues in total revenues | 7434 | 0.393 | 0.157 | 0.121 | 0.969 |
| share of young population | 7434 | 20.857 | 2.409 | 11.200 | 31.833 |
| share of old population | 7434 | 16.051 | 3.194 | 7.500 | 43.200 |
| population density | 7434 | 221.669 | 471.158 | 5.000 | 4051.000 |
| re-election concern | 7437 | 0.298 | 0.457 | 0.000 | 1.000 |
| city with county rights | 7437 | 0.026 | 0.160 | 0.000 | 1.000 |
| current balance per capita | 7437 | 266.923 | 524.530 | -820.290 | 22996.66 |

Source: own elaboration on the basis of Ministry of Finance database; Central Statistical Office Local Data Bank.

Table A2. Correlation matrix between dependent and independent variables

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| natural logarithm of asset sales per capita (asset sellers) (1) | 1.000 | | | | | | | | | | |
| natural logarithm of asset sales per capita (full sample) (2) | 0.999 | 1.000 | | | | | | | | | |
| new vs former (3) | 0.083 | 0.083 | 1.000 | | | | | | | | |
| lagged debt repayment to revenues (4) | 0.124 | 0.126 | 0.315 | 1.000 | | | | | | | |
| lagged debt to revenues (5) | 0.214 | 0.217 | 0.365 | 0.646 | 1.000 | | | | | | |
| average share of own revenues in total revenues (6) | 0.374 | 0.378 | -0.201 | 0.050 | 0.157 | 1.000 | | | | | |
| share of young population (7) | -0.251 | -0.252 | -0.117 | -0.035 | -0.086 | -0.408 | 1.000 | | | | |
| share of old population (8) | -0.090 | -0.092 | 0.079 | -0.061 | -0.097 | -0.186 | -0.587 | 1.000 | | | |
| population density (9) | 0.242 | 0.245 | 0.014 | 0.059 | 0.147 | 0.436 | -0.373 | 0.030 | 1.000 | | |
| re-election concern (10) | 0.041 | 0.041 | 0.066 | -0.005 | 0.015 | 0.124 | -0.138 | 0.029 | 0.127 | 1.000 | |
| city with county rights (11) | 0.162 | 0.164 | 0.020 | 0.042 | 0.084 | 0.191 | -0.269 | 0.062 | 0.531 | 0.072 | 1.000 |

Source: own elaboration on the basis of Ministry of Finance database; Central Statistical Office Local Data Bank.

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