

# Fiscal adjustment and balanced-budget-rules: Evidence from a Norwegian reform\*

Lars-Erik Borge<sup>†</sup> and Arnt O. Hopland<sup>‡</sup>

Preliminary version, January 2014

## Abstract

In Norway, central control of local government borrowing and budgeting was relaxed in 2001. Prior to 2001 budgets and borrowing in all local governments had to be approved by the central government. Since 2001, control has been more selective and applies only to local governments that have violated the balanced-budget-rule (BBR). Local governments subject to control are placed in a register (Robek). This register receives large attention in the public debate and works as a “list of shame”. In this paper we investigate possible disciplinary effects of the register. The main hypothesis is that local governments that run deficits and thereby are in danger of being placed in the register will take actions to avoid this. An implication of this hypothesis is that the current deficit (fiscal balance) will be more affected by past deficits in the post-Robek period than in the pre-Robek period. The empirical analysis confirms a change in deficit dynamics where lagged deficits have become more important in explaining current deficits.

*JEL Classification:* H72, H74, H77

*Keywords:* Local government, decentralization, fiscal discipline

---

\*Comments and suggestions from participants at the 8th Norwegian-German Seminar on Public Economics (München), a workshop in Copenhagen, and David Roodman is gratefully acknowledged. Some of the data is obtained from the Norwegian Social Science Data Services (NSD). All errors and mistakes are our own.

<sup>†</sup>Department of Economics, Norwegian University of Science and Technology. E-mail: larseb@svt.ntnu.no.

<sup>‡</sup>NoCeT and the Department of Business and Management Science, Norwegian School of Economics (NHH). E-mail: arnt.hopland@nhh.no

# 1 Introduction

The varying successfulness of balanced budget regulations (BBRs) calls for more empirical research on the design of such. This paper studies how fiscal adjustment in Norwegian local governments changed following a reform of the regulatory framework. In Norway, local governments are subject to an *ex ante* BBR, allowing them to carry deficits to the next year. In order to avoid fiscal imbalances, however, the central government to some extent controls local budgets and places restrictions on local government borrowing.

In 2001 the system for central government control with the local governments went through a major reform. Until 2001, all local governments had to have budgets and resolutions to raise new loans approved by the county governor, the central government's representative in the county.<sup>1</sup> In 2001 the central government introduced the Register for State Review and Approval of Financial Obligations (Robek). Robek lists local governments that violate the BBR, most often by accumulating deficits over a period of three years or more. The introduction of Robek gives that the local governments capable of managing their finances in a satisfying way become subjects to less control, while those that are not remain under tight central government monitoring. Local governments in the register must tighten their budgetary policy in order to be removed from the register.

Our approach is to study whether the deficit dynamics, i.e., the local government response to deficits, changed after the introduction of Robek. Since the formal guidance was similar before and after 2001, a shift towards stronger adjustment will suggest that there is an informal "list of shame effect" from the register. The results indicate that even though adjustment of deficits took place also in the pre-Robek period, the local governments with deficits clearly adjust their fiscal policy to a larger extent after the introduction of Robek. These findings have interesting policy implications, since they show that it is not necessarily the formal restrictions exclusively that determine the successfulness of the rule.

Our interpretation is that an additional disciplinary mechanism arises from the increased voter awareness of deficits in the new system. This interpretation is strengthened by results indicating that local governments with surpluses do not seem to change their behavior much following the reform. Hence, increasing the transparency of local government finances may in fact be an effective way of promoting fiscal discipline. The relatively low administrative costs of increasing transparency in such a way is also an advantage by this approach. Note, however, that we do not argue that this informal channel should replace formal monitoring and disciplinary mechanisms. A more useful policy advice is to consider informal mechanisms as useful supplements to formal constraints.

---

<sup>1</sup>Note that the county governor is an employed bureaucrat, not an elected politician.

The paper proceeds as follows: In Section 2 we give a brief review of the relevant literature. Section 3 presents the institutional framework. In Section 4 we present our data and empirical strategies. The main results are discussed in Section 5 before an alternative estimation procedure is discussed in Section 6. Finally, Section 7 offers some concluding remarks.

## 2 Related literature

To which extent central government restrictions can stimulate fiscal discipline in local and regional governments has been debated in the economics literature for decades. Studies of US states in general conclude that restrictions may be a helpful tool in order to secure fiscal discipline, but that the efficiency of the restrictions vary with their design and institutional surroundings. Some key contributions are Holtz-Eakin (1988), Alt and Lowry (1994), Poterba (1994) and Bohn and Inman (1996). Bohn and Inman draw an interesting conclusion in that the most important feature of a BBR is whether it is imposed *ex ante* or *ex post*, i.e. whether deficits are allowed to be carried to the next year or not. They conclude that *ex ante* rules (such as the Norwegian) seem to be ineffective.

Two recent studies have looked into the effects from the Robek register. Hopland (2013) investigates how local governments respond to inclusion in Robek in the period 2001-2010. His findings suggest that local governments that enter Robek reduce their deficits, mainly through reductions in expenditures. He goes on to conclude that the treatment effect is likely due to a combination of both formal and informal disciplinary mechanisms, as well as the introduction of *ex post* features to the *ex ante* BBR. The formal mechanism is that local governments in Robek are subject to closer central government monitoring and are forced to be more realistic in their budgeting. In addition, an informal mechanism may arise through that inclusion in Robek gives negative attention in the local media and public debate. Thus it can be considered as a “list of shame” for local politicians. Hopland discusses the mechanisms briefly, but his approach does not allow him to distinguish between them.

Hopland (2014) offers a first insight into the potential of informal mechanisms from the register by studying the voter response to inclusion in Robek. He finds that inclusion in Robek gives a reduction in vote-share for the incumbent party in the area of 3 percentage points, while the re-election probability is reduced by as much as 12%. The interpretation is that Robek acts as a strong and reliable signal of the abilities of the political leadership in the local government. His findings are closely related to the findings in Brender (2003), where it was shown that the extent to which Israeli voters punished fiscally irresponsible mayors is dependent on the transparency of public accounts.

The strong voter-reponse found in Hopland (2014) suggests that the informal channel

suggested in Hopland (2013) is active. It is, however, difficult to translate the findings in Hopland (2014) (and Brender, 2003) into actual fiscal adjustment. Even though voters are in fact responsive to deficits, it is not certain that the politicians respond to this mechanism. This can be the case if, for example, politicians are not aware of the strong voter response to poor fiscal performance. The contribution of the present paper is thus to take a closer look at the importance of informal mechanisms in terms of fiscal adjustment. This should be of clear policy relevance, since it can give policy makers guidance with regards to the design of BBRs.

In a broader context, this paper is related to the large literature on the common-pool problem related to fiscal decentralization.<sup>2</sup> Such problems arise when local politicians focus exclusively on pleasing local voters and expect to be bailed out in the case of a fiscal emergency. A typical prediction is that local tax collection will be too low and local spending too high. Following the seminal work of Kornai (1979) this is referred to as the soft budget constraint problem. Pettersson-Lidbom (2010) studies soft budgets in Swedish local governments based on a dynamic commitment problem. His findings suggest that the predicted effect by going from a hard to a soft budget constraint is an increase in debt by more than 20%. Such costs provide a likely explanation as to why many countries in recent years have imposed stricter surveillance of the fiscal policy in their respective local and regional governments. The book edited by Rodden et al. (2003) contains several examples of increasing central government monitoring of local governments' fiscal dispositions in a wide array of federations. Examples are found in the full range from highly developed countries like the US (Inman, 2003) and Canada (Bird and Tazzonyi, 2003), via economies in transition like Hungary (Wetzel and Papp, 2003) to less developed countries as Argentina (Webb, 2003) and India (McCarten, 2003).

### 3 The Robek register and institutional background

As in other Scandinavian countries, Norwegian local governments are important providers of welfare services like child care, primary and lower secondary education, primary health care and care for the elderly. The main revenue sources for the local governments are taxes, grants from the central government and user charges. Whereas the local governments have a large degree of discretion on the expenditure side, the revenues are heavily regulated under central standards. The opportunity to influence current revenues is in practice limited to property

---

<sup>2</sup>The economic arguments in favor of decentralization are well-known. Tiebout (1956) argues that local governments will have strong incentives to provide efficient public goods, in order to attract tax paying residents. Moreover, decentralization offers the possibility to match local policies to local preferences (Oates, 1972).

tax and user charges.

The political system at the local government level is a representative democracy where the members of the local council are elected every fourth year. The national parties are important players, and the national struggle between the socialist and non-socialist camps is mirrored at the local level. Compared to national politics, a main difference is that the majority coalition does not form a cabinet. The typical organization is an alderman model with an executive board with proportional representation from all major parties. The executive board is led by the mayor, and the members of the executive board, including the mayor and the deputy mayor, are elected among the members of the local council. Prior to each fiscal year, the local council makes decisions regarding current spending, revenue, investment activity and borrowing. The executive board and the chief administrative officer (*rådmannen*) are central players in the early stages of the budgetary process, and the executive board presents a budget proposal for the local council. The groupings in the local council are free to put forward own suggestions, either small or large changes to the proposal from the executive board, or totally different budget proposals. Finally, the local council determines the budget either by voting over alternative budget proposals or issue by issue.

The main requirement in the Norwegian BBR is operational budget balance. In the budget (or *ex ante*), current revenues must be sufficient to cover current expenditures (wages and materials) and debt servicing costs (net interest payment and net installment on debt). Since the introduction in 2001, Robek has listed local governments that have violated the BBR by passing a budget with a net operating deficit, or have been unable to cover an actual deficit within two years.<sup>3</sup> Local governments may enter and exit the register throughout the year. Entries (exits) in the period January-May are most often due to failure (success) in adopting a balanced budget. Entries (exits) in the period June-December are most often due to failure (success) in covering old deficits, based on the accounts from the previous year. The far most common reason for inclusion in Robek is that it has taken too long to cover a deficit.

It should be noted that the introduction of the register was a liberalization, where the local governments that are able to manage their finances in a satisfying way become subjects to less control. The idea to abolish central government control of borrowing was first introduced by the commission that prepared the new Local Government Act of 1993. The introduction of the Robek register several years later can be seen as a compromise, where the monitoring is primarily focused on local governments with fiscal imbalances. The idea was that it is better to focus the county governor's effort on the local governments in need of special attention, rather than spreading the effort on all local governments (see Borge and Rattsø (2002) for

---

<sup>3</sup>An actual deficit is covered when future surpluses are at least as large as the deficit.

a more detailed discussion of the development of the regulatory framework). The formal consequences did not change much for local governments running deficits. The potential for additional informal effects arises from the possibility that voters perceive Robek as a credible signal of the local politicians' abilities.

Interestingly, the 'list of shame effect' was never mentioned as a target when establishing the register (officially at least). However, it is quite possible that the monitoring regime is actually more effective in terms of promoting budget balance when it is only local governments in fiscal distress that are monitored. The reason is that the negative attention in local media associated with inclusion in the register is likely to give politicians extra motivation to strengthen fiscal discipline. In fact, the informal disciplinary effect may have unintentionally turned out to be a valuable supplement to the formal discipline.

Entries and exits usually take place at two occasions during the year. The first occasion is in the winter/spring. During January/February the county governors control the local governments' budgets and economic plans for the coming year. Local governments that pass a budget with a net operating deficit, will enter the register. If a local government is already in Robek, a more thorough control is performed in order to ensure that the budget is in accordance with the requirements for local governments in the register. If it is not, a new budget must be adopted. The second occasion is during summer/fall. The local governments must have adopted their accounts from last year by June/July. Based on these accounts, the county governor decides which local governments that enter the register and which that exit it. Entries (exits) in the period January-May are most often due to failure (success) in adopting a balanced budget. Entries (exits) in the period June-December are most often due to failure (success) in covering old deficits, based on the accounts from the previous year. The far most common reason for inclusion in Robek is that it has taken too long to cover a deficit.

## 4 Data and empirical strategy

Our dataset covers the period 1991-2010, i.e. ten years prior to the introduction of Robek and 10 years after.<sup>4</sup> As our dependent variable, we use the net operating surplus measured in NOK 1,000 per capita (fixed 2011 prices). The development of our dependent variable, aggregated to the national average, is shown graphically in Figure 1. We observe that there is much more volatility in the last 10 years than in the first 10. After a period with large growth in the surpluses between 2002 and 2006, a steep fall occurred in the period 2006-2008,

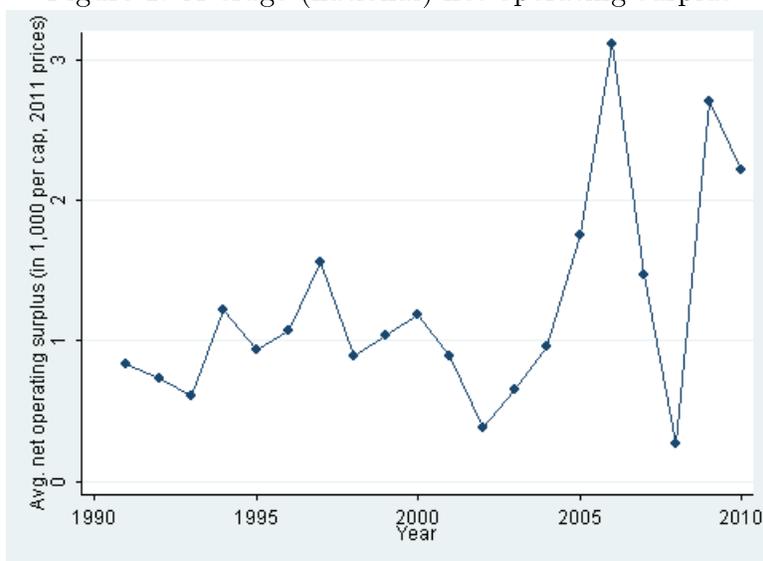
---

<sup>4</sup>Some of the data for the period 1991-2000 has been collected from the Norwegian Social Science Data Services (NSD), structured, and documented by Fiva et. al (2012).

before increasing again.

The low net operating surplus in the early 2000s reflects low revenue growth. The revenue growth gradually picked up in the period 2003-2006 and contributed to an increase in the net operating surplus. The development in 2008 and 2009 reflects the financial crisis. Many Norwegian local governments have substantial financial wealth that is invested in national and global financial markets. They experienced severe financial losses in 2008 when the financial markets dropped and large gains in 2009 when the markets picked up again. In 2009 the local governments also benefited from the fiscal stimulus package to counteract the effects of the financial crisis.

Figure 1: Average (national) net operating surplus



The aim is to study how the net operating surplus in year  $t$  depends on earlier year's surpluses, and in particular if this effect changed after the introduction of Robek in 2001. As a descriptive exercise, we in Table 1 start out by looking at the average net operating surplus over the whole period, and in the sub-periods before and after the introduction of Robek. We observe that the net operating surplus is significantly higher in the post-Robek period. The difference is not only statistically significant, at NOK430 per capita (fixed 2011 prices) it is also of real economic importance.<sup>5</sup>

The fact that surpluses are higher in the period after the introduction of Robek is consistent with the hypothesis of stronger fiscal adjustment in this period. Despite this, it would be premature to make any conclusions at this point, since there can be a variety of reasons for this difference. In order to study the differences in adjustment properly, we must conduct a thorough econometric analysis. We use the following dynamic panel equation as our point

---

<sup>5</sup>6 NOK amounts to roughly 1 USD.

Table 1: Descriptive statistics, net operating surplus.

Period	Full sample (1991-2010)	Before Robek (1991-2000)	After Robek (2001-2010)	Difference
Average	1.22	1.01	1.44	-0.43***
(St.dev)	(3.46)	(2.41)	(4.27)	
No. of obs.	8,574	4,321	4,253	

Measured as 1,000 per capita in fixed 2011 prices.

Based on the 430 local governments in 2010.

\*\*\* p<0.01

of departure:

$$y_{it} = \sum_{s=1}^k \beta_s y_{it-s} + \sum_{s=1}^k \gamma_s (Ry_i)_{t-s} + \mathbf{x}'_{it} \boldsymbol{\theta} + \alpha_i + \delta_t + \epsilon_{it} \quad (1)$$

$y_{it}$  is the surplus in local government  $i$  in year  $t$  and  $R_t$  is a dummy equal to 1 in the post-Robek period (i.e. 2001-2010). In this full dynamic specification, we expect a negative sign on the  $\beta$ s, indicating adjustment. The coefficients of most interest, however, are the  $\gamma$ s. If the introduction of the Robek register led to a stronger adjustment policy, the sign of these should also be negative. We model the dynamics using three lags (i.e.  $k = 3$ ).  $\mathbf{x}_{it}$  is a vector of control variables.<sup>6</sup>  $\delta_t$  includes all observable and unobservable characteristics that vary over time, but not across local governments. In the regressions, we control for this by including time dummies.

$\alpha_i$  is a local government fixed effect that is likely to bias OLS estimates. Moreover, it is well-known that controlling for local government fixed effects (LFE) using the within-group transformation in dynamic panel models will also produce biased estimates (Nickel, 1981). Even though the within-group/LFE estimates are consistent, since the bias fades away as the number of periods increase, we rather use the GMM procedure suggested by Holtz-Eakin et al. (1988) and Arrelano and Bond (1991) (henceforth Arrelano-Bond estimation).<sup>7</sup>

In short, the Arrelano-Bond procedure removes the local government fixed effect by a first difference transformation. Further, lagged values of the endogenous variables are used as instruments for subsequent first-differences. If  $\epsilon_{it}$  is serially uncorrelated, surpluses from  $t-2$  and backwards are valid as instruments. Some preliminary analyses indicated, however, that neither the second, third, nor fourth lag perform well as instruments, since they frequently fail to pass overidentification tests. As a consequence,  $t-5$  is the first lag used as an instrument. Moreover, we treat not only the first lag, but all three lags of  $y_{it}$  and  $(Ry_i)_t$  included in the regression equation as endogenous.

<sup>6</sup>Descriptive statistics for the control variables are reported in the Appendix.

<sup>7</sup>To test which method was most suitable, we estimated a simple AR(1) version of Equation (1). Even though the LFE estimates did not differ dramatically from the Arrelano-Bond estimates, the results still suggested that there is some bias in the LFE estimates. The Arrelano-Bond procedure has been implemented using the Stata package `xtabond2`, thoroughly described by Roodman (2009b).

The vector of control variables includes a set of fiscal indicators, political variables and demographic characteristics of the local government. The fiscal variables are the local government revenues and lagged net debt payment (installment and interest rates). The revenue measure includes the block grants from the central government and local taxes. Both the revenues and debt payments are measured per capita.

Several studies of Norwegian local governments have emphasized the impact of political strength. Of particular interest for the present paper is the study by Borge (2005), who found that political strength reduces deficits. In addition political strength is shown to reduce administrative spending (Kalseth and Rattsø, 1998), to increase efficiency (Borge et al., 2008 among others) and improve maintenance of local public buildings (Borge and Hopland, 2012). We use the effective number of parties ( $ENOP$ ), which is the inverse of the traditional Herfindahl-Hirschman index

$$ENOP = \left( \sum_{p=1}^P SH_p^2 \right)^{-1} \quad (2)$$

where  $SH_p$  is the share of representatives from party  $p$ . In Norway, the socialist camp is dominated by the Labor party, while the non-socialist camp is more fragmented. As a consequence, there is a negative correlation between party fragmentation and the share of socialists in the local council.<sup>8</sup> Since we cannot rule out that socialist influence has an impact on economic outcomes, we control for the share of socialists to avoid that the coefficient for political fragmentation captures ideological preferences. This is useful, even though the political fragmentation also just serves as a control. Socialist parties are defined as the social democrats (The Labor Party) and parties to its left.

The demographic characteristics included are the population size and variables capturing age composition. We include the share of the population below school age (0-5 years), the share of the population in primary and lower secondary schools (6-15 years) and the share of elderly citizens (80 years and above). Kindergartens, primary and lower secondary schools and care for the elderly are the major tasks for a local government, and these demographic variables may capture the relative strength of different interest groups.

## 5 Main results

We present our main results in Table 2. All results are from two-step difference GMM estimations with Windmeijer-corrected standard errors (Windmeijer, 2005). In Column (A)

---

<sup>8</sup>The correlation between the effective number of parties and the share of socialists (both across local governments and over time) is -0.41.

we include all local governments, while we in Columns (B)-(D) split the sample based on the fiscal performance in earlier years. As in the descriptive statistics, all monetary values are in fixed 2011 prices.

Table 2: Arrelano-Bond estimations of net operating surplus per capita

	(A) All	(B) Accumulated deficit over the 3 last years	(C) Accumulated deficit over the 2 last years	(D) Deficit last year
Net operating surplus per capita (in 1,000s) ( $t - 1$ )	-0.293** (0.126)	-0.564 (0.364)	-0.0890 (0.300)	-0.535*** (0.137)
Net operating surplus per capita (in 1,000s) ( $t - 2$ )	-0.256*** (0.0965)	-0.134 (0.266)	-0.226 (0.156)	-0.0733 (0.234)
Net operating surplus per capita (in 1,000s) ( $t - 3$ )	-0.207 (0.126)	-0.499** (0.208)	-0.0909 (0.191)	-0.125 (0.125)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 1$ )	0.450 (0.306)	-0.205 (0.407)	-0.840** (0.346)	-0.526* (0.269)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 2$ )	0.0163 (0.0982)	-1.182*** (0.251)	-1.070*** (0.275)	-0.932*** (0.294)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 3$ )	-0.233*** (0.0665)	-0.625** (0.264)	-1.009*** (0.238)	-0.592** (0.250)
Free disposable income per capita (in 1,000s)	0.512*** (0.0610)	0.382*** (0.0855)	0.366*** (0.0797)	0.300*** (0.0701)
Net debt payment per capita (in 1,000) ( $t - 1$ )	0.600*** (0.202)	0.248 (0.212)	0.0685 (0.112)	-0.0142 (0.208)
Effective number of parties	0.148* (0.0894)	0.196 (0.191)	0.220 (0.157)	0.213 (0.147)
Share of socialists in the local council	1.268 (0.852)	0.0192 (2.349)	0.0812 (1.691)	-1.164 (1.454)
Population	0.000293** (0.000129)	0.000572* (0.000342)	0.000266 (0.000226)	1.44e-05 (0.000224)
Percentage of population 0-5 years	0.0533 (0.120)	0.217 (0.276)	0.213 (0.271)	-0.151 (0.228)
Percentage of population 6-15 years	0.0716 (0.0986)	-0.226 (0.290)	-0.296 (0.237)	-0.253 (0.219)
Percentage of population 80 years or more	-0.146 (0.157)	0.0320 (0.438)	0.276 (0.273)	0.163 (0.248)
Observations	6,294	1,036	1,278	1,515
No. of local governments	428	295	352	386
Lags used as instruments	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$
Hansen p-value	0.08	0.47	0.15	0.07
No. of instruments	144	144	144	144

Windmeijer corrected standard errors in parentheses. Time dummies (not reported) included.

All monetary values are in fixed 2011 prices.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The coefficients for the lagged operating surpluses ( $y_{it}$ ) all come out as negative or zero, indicating that at least some adjustment is taking place independently of Robek. When including all local governments [Column (A)], we have that the two first lags are significantly negative, while the third lag just falls short of significance (t-value = -1.64). Overall, a deficit of NOK 1,000 per capita in the last year will be met by an increase in the operating surplus of about 300 NOK per capita in year  $t$ . The effect for the second lag is a bit lower, about 260 per capita for each 1,000 in deficit per capita. On face value, the (almost significant) coefficient for the third lag indicates that a deficit of 1,000 per capita will be countered by an improvement of the surplus of about 210 NOK per capita.

When including only the local governments that had an accumulated deficit over the three last years in Column (B), the coefficients increase quite a bit for the first and third lag.<sup>9</sup> On face value, the adjustment for these two lags following from a deficit of 1,000 NOK is about 560 and 500 for the first and third lag, respectively.

The coefficient for the second lag, on the other hand, is almost cut half. Further, the precision of the estimates is also lower. With a t-value of -1.55 the first lag is not significant at any conventional level of significance, and the t-value for the second lag is only about -0.5. Hence, only the third lag comes out as significant in this reduced sample. It should be noted that the sample becomes much smaller, dropping from close to 6,300 observations to 1,036 and that only about 2/3 of the local governments experienced such a period. This may be a reason for the relatively low precision of the estimates.

In Column (C) we include the local governments that had an accumulated deficit over the two last years. The number of observation then increases to close to 1,300 and an additional 57 local governments fall into this category. Interestingly, none of the lags of  $y_{it}$  come out as significant, indicating that little adjustment took place in the period as a whole.

Finally, Column (D) includes all local governments that experienced deficits in any year  $t - 1$ . This gives us an extra 237 observations compared to Column (C), and an additional 34 local governments are included, meaning that 90% of the local governments at some time experienced a deficit in a year  $t - 1$ . We observe that only the coefficient for the first lag of  $y_{it}$  comes out as significant, while the coefficients for the second and third lags are close to zero, and far from being significant at any conventional level of significance. The results show that a deficit of 1,000 NOK per capita in the previous year give an improvement of the surplus in year  $t$  of about 540 NOK per capita.

We next turn to the effect from lagged values of the interaction term between the net operating surplus and being in the post-Robek period,  $(Ry_i)_t$ . When including all local governments in Column (A), we observe that the two first lags come out as insignificant, while the coefficient for the third lag is clearly significantly negative. Hence, even when including many local governments with little need for adjustment, we observe both adjustment and an additional effect from being in the post-Robek period. The coefficient indicate that the additional adjustment taking place after the introduction of Robek translates into about NOK 230 per capita for each NOK 1,000 per capita in deficit.

The picture is clearer when looking at the local governments with deficits in earlier years.

---

<sup>9</sup>Note that even though these local governments have an accumulated deficit over the last three years they need not be in Robek or even in immediate danger of entering Robek in the post-Robek period. The reason is two-fold. First, we do not take the particular timing of Robek into account when splitting the sample, i.e., we do not require that the deficit started to accumulate at  $t - 3$ . Second, we do not take into account whether the local governments had disposable funds available to cover the deficits. We have tried to split the sample following the rule closely, but this gives us a very low number of observations.

When studying local governments with an accumulated deficit over the three last years [Column (B)], we have that the first lag comes out as insignificantly negative, while the two longest lags are both significantly negative. Moreover, the added effect in the post-Robek period is strong. The coefficient for the second lag is about 1, indicating that deficits two years ago are covered at a one-to-one basis in the post-Robek period, whereas there was no significant adjustment in the pre-Robek period. For the third lag, the coefficient is about -0.63. Hence, even though there was also significant adjustment for this lag in the pre-Robek period, the effect is more than doubled in the post-Robek period.

The difference between the two periods is even more evident when looking at Columns (C) and (D). In Column (C), we witness no significant adjustment in the pre-Robek period, but roughly a one-to-one adjustment for all three lags in the post-Robek period. In Column (D), we observe that the adjustment is doubled for the first lag, while there is only significant effect in the post-Robek period for the two last lags. Moreover, the effect for the two last lags is very strong in the post-Robek period, about one-to-one for the second lag, and about 600 NOK pr 1,000 NOK in deficit for the third lag.

The conclusion is thus that Robek seems to have a preventive effect, in the sense that it stimulates local governments with fiscal imbalances to take additional actions. This is consistent with there being an additional “list of shame effect” from the register. Moreover, the additional adjustment taking place after the introduction of Robek is not only significant in statistical terms, but also of real economic importance.

Most of the control variables are of less importance. This is likely due to the fact that there is only a limited variation left to explain after differencing out the fixed effects and including a rich dynamic specification. Not surprisingly however, higher revenues give higher surpluses. There are also some indications that populous local governments have higher surpluses.

Since a large number of instruments may weaken the tests for instrument validity (i.e. give too high Hansen p-values), it is recommended to routinely report robustness analyses where fewer lags are used as instruments (Roodman, 2009a). Even though the Hansen p-values in our main results are not implausibly large, we address this in Table 3 where we use only the period  $t - 5$  to  $t - 8$  as instruments. The first observation is that the number of instruments is reduced to about half of that in Table 2. The second observation is that the Hansen p-values go up rather than down. The third, and final, observation is that the main results are not affected much by the change in lag structure of the instruments.

The results thus far seem to clearly support our hypothesis. To test the validity of our interpretation, we next take a look at the local governments with better fiscal performance, i.e., we split the sample in a similar way as in Tables 2 and 3, but include only those with

Table 3: Arrelano-Bond estimations of net operating surplus per capita. Robustness check using fewer instruments.

	(A) All	(B) Accumulated deficit over the 3 last years	(C) Accumulated deficit over the 2 last years	(D) Deficit last year
Net operating surplus per capita (in 1,000s) ( $t - 1$ )	-0.241 (0.172)	-0.719 (0.576)	-0.201 (0.255)	-0.582*** (0.0966)
Net operating surplus per capita (in 1,000s) ( $t - 2$ )	-0.222* (0.125)	-0.367 (0.343)	-0.326*** (0.118)	-0.293 (0.226)
Net operating surplus per capita (in 1,000s) ( $t - 3$ )	-0.173 (0.135)	-0.493** (0.239)	-0.139 (0.164)	-0.227 (0.175)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 1$ )	0.474 (0.288)	-0.0955 (0.629)	-0.623* (0.370)	-0.726*** (0.223)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 2$ )	-0.0468 (0.116)	-0.945*** (0.358)	-0.844*** (0.246)	-1.217*** (0.243)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 3$ )	-0.288*** (0.106)	-0.631** (0.312)	-1.032*** (0.281)	-0.475 (0.365)
Free disposable income per capita (in 1,000s)	0.564*** (0.0662)	0.370*** (0.135)	0.488*** (0.0881)	0.205** (0.0910)
Net debt payment per capita (in 1,000) ( $t - 1$ )	0.718*** (0.122)	0.214 (0.345)	0.151 (0.209)	-0.126 (0.168)
Effective number of parties	0.137* (0.0785)	0.245 (0.208)	0.290* (0.155)	0.243* (0.133)
Share of socialists in the local council	0.843 (0.829)	-3.465 (2.399)	-0.649 (1.665)	-1.242 (1.347)
Population	0.000386*** (0.000126)	0.000374 (0.000365)	0.000412* (0.000218)	0.000126 (0.000272)
Percentage of population 0-5 years	-0.0182 (0.124)	0.103 (0.259)	0.222 (0.252)	-0.160 (0.227)
Percentage of population 6-15 years	-0.0121 (0.0997)	-0.325 (0.292)	-0.225 (0.283)	-0.329 (0.295)
Percentage of population 80 years or more	-0.165 (0.162)	0.372 (0.492)	0.0843 (0.318)	-0.154 (0.268)
Observations	6,294	1,036	1,278	1,515
No. of local governments	428	295	352	386
Lags used as instruments	$t - 5$ to $t - 8$	$t - 5$ to $t - 8$	$t - 5$ to $t - 8$	$t - 5$ to $t - 8$
Hansen p-value	0.29	0.54	0.24	0.92
No. of instruments	78	78	78	78

Windmeijer corrected standard errors in parentheses. Time dummies (not reported) included.

All monetary values are in fixed 2011 prices.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

accumulated surpluses the last three, two and one years. Since these need not adjust in order to avoid Robek, we do not expect the reform to affect their behavior much. Some additional adjustment can be expected, since they are more free to increase expenditures after years with surpluses in the new system than in the old. On the other hand, the new system, giving more autonomy to local governments with healthy finances, can give that local governments with surpluses are stimulated to further increase surpluses and thus secure their autonomy. This will, ceteris paribus draw in the direction of a positive sign of the interaction terms. The total effect is thus a priori unclear, but we should at least expect much weaker additional adjustment in the post-Robek period than for the local governments with deficits. The results are reported in Table 4.

The results from Table 4 are supportive of our interpretation of the register. We do

Table 4: Arrelano-Bond estimations of net operating surplus per capita. Including only local governments with surpluses.

	(A)	(B)	(C)
	Accumulated surplus over the 3 last years	Accumulated surplus over the 2 last years	Surplus last year
Net operating surplus per capita (in 1,000s) ( $t - 1$ )	-0.284* (0.147)	-0.274** (0.139)	-0.257** (0.119)
Net operating surplus per capita (in 1,000s) ( $t - 2$ )	-0.278*** (0.0997)	-0.281*** (0.106)	-0.308** (0.131)
Net operating surplus per capita (in 1,000s) ( $t - 3$ )	-0.259** (0.120)	-0.235** (0.110)	-0.277** (0.135)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 1$ )	0.470 (0.300)	0.440 (0.291)	0.418 (0.286)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 2$ )	0.0979 (0.121)	-0.00116 (0.131)	-0.0663 (0.128)
Interaction between net operating surplus per capita and post-Robek dummy ( $t - 3$ )	-0.229** (0.0948)	-0.189* (0.106)	-0.107 (0.0821)
Free disposable income per capita (in 1,000s)	0.474*** (0.0807)	0.489*** (0.0825)	0.515*** (0.0938)
Net debt payment per capita (in 1,000) ( $t - 1$ )	0.572** (0.224)	0.447* (0.233)	0.434** (0.173)
Effective number of parties	0.213* (0.113)	0.142 (0.0989)	0.123 (0.107)
Share of socialists in the local council	1.328 (0.974)	1.478 (0.981)	1.290 (1.036)
Population	0.000387** (0.000186)	0.000351* (0.000212)	0.000575** (0.000292)
Percentage of population 0-5 years	-0.0107 (0.122)	-0.0553 (0.130)	0.0118 (0.127)
Percentage of population 6-15 years	0.131 (0.114)	0.149 (0.106)	0.0656 (0.108)
Percentage of population 80 years or more	-0.128 (0.204)	-0.0818 (0.196)	-0.134 (0.181)
Observations	5,262	5,018	4,776
No. of local governments	428	428	428
Lags used as instruments	From $t - 5$	From $t - 5$	From $t - 5$
Hansen p-value	0.08	0.05	0.11
No. of instruments	144	144	144

Windmeijer corrected standard errors in parentheses. Time dummies (not reported) included.

All monetary values are in fixed 2011 prices.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

observe that local governments with surpluses adjust downwards in the following year(s). The important take-away is, however, that there is very little indications of a stronger adjustment in the period after the introduction of Robek. The conclusion is thus that whereas the reform seems to have a disciplinary effect on local governments with poor fiscal performance, local governments with surpluses behave similarly in both periods.

## 6 Separate estimations for the pre- and post-Robek period

An alternative approach to the one studied above is to split the dataset and treat the periods before and after the introduction of Robek separately. An advantage by this approach is that

the econometric formulation becomes simpler, since we can exclude the interaction terms  $(Ry_i)_t$  and estimate

$$y_{it} = \sum_{s=1}^k \beta_s^p y_{it-s} + \mathbf{x}'_{it} \boldsymbol{\theta}^p + \alpha_i^p + \delta_t^p + \epsilon_{it}^p \quad (3)$$

with the superscript  $p$  indicating that the coefficients may differ between the two periods. Except for the excluded interaction terms, Equation (3) includes the same variables as Equation (1). We also use the same GMM estimation technique and the same number of lags ( $k = 3$ ). The number of instruments will, however, be much lower due to the exclusion of the endogenous interaction terms and the shorter time series. A drawback is that the number of observations is, naturally, reduced drastically when splitting the sample. The results are reported in Table 5.

Table 5: Separate estimations for the pre- and post-Robek period.

	All		Accumulated deficit over the 3 last years		Accumulated deficit over the 2 last years		Deficit last year	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Net operating surplus per capita (in 1,000s) ( $t - 1$ )	-0.179 (0.151)	0.311** (0.132)	-0.690 (0.576)	-0.987* (0.516)	-0.657* (0.387)	-0.754*** (0.262)	-0.577*** (0.107)	-1.319** (0.672)
Net operating surplus per capita (in 1,000s) ( $t - 2$ )	-0.221 (0.405)	-0.328* (0.176)	-0.579* (0.322)	-1.209*** (0.199)	-0.536 (0.327)	-1.050*** (0.294)	-0.520 (0.360)	-0.291 (0.328)
Net operating surplus per capita (in 1,000s) ( $t - 3$ )	-0.0628 (0.281)	-0.628*** (0.174)	-0.436* (0.242)	-1.073*** (0.179)	-0.231 (0.216)	-0.870** (0.339)	-0.224 (0.200)	-0.227 (0.593)
Free disposable income per capita (in 1,000s)	0.542*** (0.0873)	0.566*** (0.0622)	0.373 (0.239)	0.471*** (0.133)	0.517** (0.224)	0.435*** (0.121)	0.318** (0.129)	0.430** (0.178)
Net debt payment per capita (in 1,000) ( $t - 1$ )	4.760*** (1.597)	0.842*** (0.186)	-0.655 (6.635)	-0.00286 (0.597)	1.917 (3.248)	0.166 (0.242)	-0.798 (2.999)	-0.294 (0.761)
Effective number of parties	0.143* (0.0795)	0.344 (0.239)	0.166 (0.326)	1.164 (0.953)	0.284 (0.196)	0.840 (0.681)	0.499*** (0.161)	0.197 (0.377)
Share of socialists in the local council	0.363 (0.991)	2.567 (2.571)	0.632 (1.624)	8.833 (8.595)	2.093 (1.753)	3.188 (5.133)	2.638** (1.300)	0.700 (4.352)
Population	0.000376*** (0.000131)	0.000472*** (0.000176)	0.000735* (0.000379)	0.000321 (0.000392)	0.000307 (0.000298)	0.000281 (0.000258)	0.000101 (0.000193)	0.000190 (0.000453)
Percentage of population 0-5 years	0.112 (0.111)	-0.774** (0.338)	0.126 (0.229)	0.0213 (0.596)	0.0896 (0.239)	-0.0896 (0.604)	-0.0866 (0.217)	0.151 (0.499)
Percentage of population 6-15 years	-0.0108 (0.111)	-0.306 (0.218)	-0.134 (0.177)	-0.774 (0.556)	-0.206 (0.146)	-0.211 (0.688)	-0.330** (0.157)	0.277 (1.006)
Percentage of population 80 years or more	-0.100 (0.147)	-0.683 (0.441)	0.229 (0.386)	-0.236 (0.946)	0.0707 (0.319)	0.0766 (0.780)	-0.198 (0.248)	-0.339 (0.592)
Period	1991-2001	2001-2010	1991-2001	2001-2010	1991-2001	2001-2010	1991-2001	2001-2010
Observations	2,543	2,504	213	476	329	548	464	596
No. of local governments	426	424	114	231	186	273	263	313
Lags used as instruments	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$	From $t - 5$
Hansen p-value	0.15	0.37	0.20	0.58	0.95	0.85	0.45	0.43
No. of instruments	29	29	29	29	29	29	29	29

Windmeijer corrected standard errors in parentheses. Time dummies (not reported) included. All monetary values are in fixed 2011 prices. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In Columns (A) and (B) all local governments are included. We observe that the coefficients are very different for the two periods. While they are all insignificantly negative in the period prior to the introduction of Robek, the picture is very different in the period after the introduction of the register. In the period 2001-2010 we have that the first lag comes out as positive, indicating sluggishness, while the two longer lags are significantly negative, indicating adjustment. Thus it seems that local governments become increasingly sensitive to deficits two and three years ago. The unclear direction of the effect may be due to the inclusion of local governments with strong fiscal performance.

In Columns (C) and (D) we include only local governments with deficits over the last three

year period. For these local governments, we observe a negative sign on lagged surpluses in both periods. The absolute value of the coefficients are, however, much larger in the period after the introduction of Robek. Interpreted on face value, the adjustment per NOK 1,000 per capita in deficit is about NOK 300, 630 and 640 per capita higher in the post-Robek period for the first, second, and third lag, respectively. The adjustment is also much stronger in terms of significance in the post-Robek period. Whereas the adjustment is significant in all three years in this period, we only observe significant adjustment for the two longest lags in the pre-Robek period.

When we in Columns (E) and (F) study the local governments with a deficit over the two last years, we have that only the first lag indicates significant adjustment in the pre-Robek period. In the post-Robek period, on the other hand, all three lags come out as significantly negative. Moreover, the the absolute value of the coefficients are also for these local governments much larger in the post-Robek period. The difference is smallest for the first lag, about NOK 100 per capita for each NOK 1,000 per capita in deficit. For the second and third lag the difference is much larger, respectively about 510 and 640 on face value.

The two regimes look more similar when we include local governments with a deficit in the previous year. In both periods we have that while the first lag indicates significant adjustment, the two longest lags come out as only insignificantly negative. The coefficients for the first lag are, however, quite different between the two periods. On face value the absolute value is about twice as large in the post-Robek period as in the pre-Robek period.

## 7 Concluding remarks

This paper studies the value of informal mechanisms in BBRs using a panel data for Norwegian local governments stretching from 1991 to 2010. In 2001 the central government introduced the Register for State Review and Approval of Financial Obligations (Robek). Robek lists local governments that violate the BBR, most often by having persistent deficits over a period of three years or more. The introduction of Robek gives that the local governments capable of managing their finances in a satisfying way become subjects to less control, while those that are not remain under tight central government monitoring. Local governments in the register must tighten their budgetary policy in order to be removed from the register.

By studying local government behavior before and after the introduction of the register, we are able to discuss the mechanisms underlying Robek more closely. Our results clearly indicate that a stronger adjustment took place in the 10 years following the introduction of Robek than in the 10 years prior to the introduction. The difference between the two

periods is not only statistically significant, but also of real economic importance. In many cases we find that adjustment took place only in the post-Robek period. Moreover, in the cases where we also observe significant adjustment prior to the introduction of Robek, the effect in the post-Robek period is in general much stronger, frequently double that of the pre-Robek period.

Our interpretation is that an additional disciplinary effect arises from the increased voter awareness of deficits in the new system. Hence, increasing the transparency of local government finances may in fact be an effective way of promoting fiscal discipline. The relatively low administrative costs of increasing transparency in such a way is also an advantage by this approach. Note, however, that we do not argue that this informal channel should replace formal monitoring and disciplinary mechanisms. A more useful policy advice is to consider informal mechanisms as useful supplements to formal constraints.

## References

Alt, J., Lowry, R. (1994): “Divided Government, Fiscal Institutions and Budget Deficits: Evidence from the States” *American Political Science Review*, 88, 811-828

Arellano, M. and Bond, S. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277-297

Bird, Richard M., Tassonyi, A. (2003): “Constraining subnational fiscal behavior in Canada: Different approaches, similar results?” in Rodden, J., Eskeland, G.S., and Litvack, J. (eds.), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press, 85-132

Bohn, H., Inman, R. (1996): “Balanced Budget Rules and Public Deficits: Evidence from the US States” *Carnegie-Rochester Conference Series on Public Policy*, 45, 13-76

Borge, L.-E. (2005): “Strong politicians, small deficits: Evidence from Norwegian local governments” *European Journal of Political Economy*, 21, 325-344

Borge, L.-E., Falch, T. Tovmo, P. (2008): “Public sector efficiency: The roles of political and budgetary institutions, fiscal capacity, and democratic participation” *Public Choice*, 136, 475-495

Borge, L.-E., A.O. Hopland (2012). Maintenance and building conditions in Norwegian local governments: Economic and Political determinants. Working Paper No. 8/2012, Department of Economics, Norwegian University of Science and Technology

Borge, L.-E., Rattsø, J. (2002): “Local government budgeting and borrowing: Norway”, in Dafflon, B. (ed.), *Local Public Finance in Europe*, Cheltenham: Edward Elgar Publishing Limited

Brender, A. (2003): “The effect of fiscal performance on local government election results in Israel: 1989-1998” *Journal of Public Economics*, 87, 2187-2205

Fiva, J., Halse, A., Natvik, G.J. 2012. Local Government Dataset. Available at [www.jon.fiva.no/data.htm](http://www.jon.fiva.no/data.htm).

Holtz-Eakin, D. (1988): “The Line Item Veto and Public Sector Budgets: Evidence from the States” *Journal of Public Economics*, 36, 269-292

Holtz-Eakin, D., Newey, W., Rosen, H.S. 1988. Estimating Vector Autoregressions with Panel Data. *Econometrica*, 56(6), 1371-1395

Hopland, A.O. 2013. Central government control and fiscal adjustment: Norwegian evidence. *Economics of Governance*, 14, 185-203

Hopland, A.O. 2014. Voter information and electoral outcomes: The Norwegian list of shame. *Public Choice*, forthcoming.

Inman, R. P. (2003): “Transfers and bailouts: Enforcing local fiscal discipline with lessons from the U.S. federalism,” in Rodden, J., Eskeland, G.S., and Litvack, J. (eds.), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press, 35-83

Kalseth, J., Rattsø, J. (1998): “Political control of administrative spending: The case of local governments in Norway” *Economics and Politics*, 10, 63-83

Kornai, J. (1979): “Resource-constrained versus demand-constrained systems” *Econometrica*, 47, 801-819

McCarten, W. J. (2003): “The challenge of fiscal discipline in the Indian States,” in Rodden, J., Eskeland, G.S., and Litvack, J. (eds.), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press, 249-286

Nickell, S. (1981): “Biases in dynamic models with fixed effects” *Econometrica*, 49, 1417-1426

Oates, W. E. (1972): *Fiscal Federalism*, New York: Harcourt

Pettersson-Lidbom, P. (2010): “Dynamic Commitment and the Soft Budget Constraint: An Empirical Test” *American Economic Journal: Economic Policy*, 2, 154–179, 2010

Poterba, J. (1994): “State Responses to Fiscal Crisis: The Effects of Budgetary Institutions and Politics” *Journal of Political Economy*, 102, 799-821

Rodden, J., Eskeland, G. S, Litvack, J. (editors) (2003): *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press

Roodman, D. 2009a. A Note on the Theme of Too Many Instruments. *Oxford Bulletin of Economics and Statistics*, 71, 135-158.

Roodman, D. 2009b. How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, 9, 86-136

Tiebout, C. (1956): “A pure theory of local expenditures” *The Journal of Political Economy*, 64, 416-424

Webb, S. (2003): “Argentina: Hardening the provincial budget constraint,” in Rodden, J., Eskeland, G.S., and Litvack, J. (eds.), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press, 189-211

Wetzel, D., Papp, A. (2003): “Strengthening hard budget constraints in Hungary,” in Rodden, J., Eskeland, G.S., and Litvack, J. (eds.), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Massachusetts: The MIT Press, 393- 427

Windmeijer, F. 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*. 126, 25-51

# Appendix

## Appendix A: Descriptive statistics

Variable	Mean (st.dev)
Local government revenue per capita ( $N = 8,656$ )	24.52 (13.19)
Net debt payment (in NOK 1,000 per cap) ( $N = 8,364$ )	0.77 (2.21)
Effective number of parties ( $N = 8,555$ )	4.09 (1.07)
Share of socialists in the local council ( $N = 8,589$ )	0.38 (0.15)
Population ( $N = 8,601$ )	9,227 (17,607)
Share of children (%), 0-5 years ( $N = 8,590$ )	7.87 (1.52)
Share of youths (%), 6-15 years ( $N = 8,592$ )	13.00 (1.69)
Share of elderly (%), 80 years and more ( $N = 8,592$ )	4.84 (1.65)

All monetary values are in fixed 2011 prices.