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journal homepage: [www.elsevier.com/locate/ejpe](http://www.elsevier.com/locate/ejpe)Less fiscal oversight, more adjustment<sup>☆</sup>Lars-Erik Borge<sup>a,\*</sup>, Arnt O. Hopland<sup>b</sup><sup>a</sup> Department of Economics, Norwegian University of Science and Technology (NTNU), Norway<sup>b</sup> NoCeT and the Department of Business and Management Science, Norwegian School of Economics (NHH), Norway

## HIGHLIGHTS

- We analyze the effects of a reform in 2001 that lifted administrative controls.
- We evaluate the reform by estimating dynamic GMM models using panel data.
- The reform led to more fiscal adjustment for local governments with past deficits.
- The threat of being listed in a register for fiscal imbalance is effective.
- Local governments with past surpluses are less affected by the reform.

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## ABSTRACT

In Norway, a reform in 2001 lifted budget and borrowing approval for local governments that comply with the balanced budget requirement (BBR). It was a concern that less fiscal oversight would lead to less fiscal discipline. A neglected effect however, was that the reform implicitly introduced sanctions for violating the BBR. In addition a register informing financial institutions about authorities in need of borrowing approval provides voters with reliable information about fiscal performance. We find evidence of stronger fiscal adjustment after the reform, in particular for local governments with past deficits that are at risk of being enrolled in the register. Moreover, an important finding is that this result also holds for local government with past deficits that do not end up in the register. Local governments with past surpluses are less affected by the reform, but there is some evidence in the direction of lower surpluses for this group.

## 1. Introduction

This paper studies the effect of fiscal oversight of Norwegian local governments. In particular, we study how a reform in 2001 that reduced fiscal oversight over a large share of the local governments affected fiscal consolidation. The idea of the reform was to focus the fiscal oversight on local governments that violated the Norwegian budget balance regulation (BBR), which has operational

<sup>☆</sup> Earlier versions of this paper have been presented at the Annual Congress of the International Institute of Public Finance (Lugano), the Annual Conference of Taxation (Santa Fe), the Annual Meeting of the European Public Choice Society (Groningen), the 8th Norwegian-German Seminar on Public Economics (Munich), as well as seminars in Copenhagen (KORA), Oslo (Statistics Norway), Göttingen and UC Irvine. We are grateful for comments and suggestions from the participants, in particular from Jan K. Brueckner, Magnus Hoffman, David Roodman, Theis Theisen, and Ugo Troiano. We also thank two referees and the editor Jan Egbert Sturm for valuable comments that have improved the paper. Some of the data are obtained from the Norwegian Social Science Data Services (NSD) and [Fiva et al. \(2017\)](#). All errors and mistakes are our own.

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budget balance as its main requirement. In the budget (or ex ante) local governments must have a non-negative net operating surplus. Actual deficits can be carried over, but must be covered within two years. While all local governments were subject to budget and borrowing approval before 2001, the reform removed these administrative controls for local governments that comply with the BBR. It was a concern that this liberalization would reduce fiscal responsibility, but we argue that this is not necessarily the case.

First, the reform introduces a form of carrot-and-stick mechanism, in the sense that local governments that comply with the BBR are granted more autonomy, while those that violate it are subject to administrative sanctions (budget and borrowing control). Second, the central government established a register that lists all local governments that violate the BBR. This register (called Robek) has received a lot of media attention, and could serve as a “list of shame” as it signals poor fiscal performance.

Earlier studies of Robek have found that local governments in Robek cut expenditures in order to cover past deficits (Hopland, 2013), and that the incumbent party is punished by voters if the local government is listed in Robek (Hopland, 2014). The latter result is interesting since it shows that voters care about fiscal performance and value the straightforward and easily accessible signal such registers provide.

This study departs from the earlier studies, since our focus is not on the effect of being listed in Robek, but how the reform affected the behavior of local governments in general. By using a dataset that spans over a period of 10 years prior to the reform to 10 years after the reform, we can study how deficit dynamics changed in Norwegian local governments following the reform. Despite the fact that the reform reduced fiscal oversight over a large fraction of the local governments, we find strong evidence of a higher degree of fiscal adjustment in the post-reform period. Moreover, we find that the additional adjustment following the reform is stronger in local governments that have past deficits and thus are at risk of violating the BBR.

One possible explanation for this could be that since the central government now focuses the fiscal oversight directly on local governments in dire straits, the follow-up of these is more effective after the reform. However, if this formal mechanism is driving our results, we should only find results for local governments that are in the register. On the contrary, we find similar results when excluding Robek-listed local governments from our sample. This result indicates that the threat of being listed in Robek is enough for local governments to cover past deficits. In addition to the “list of shame” effect suggested by Hopland (2014), this can be due to local politicians being unwilling to give up the increased autonomy that was granted to the local governments complying with the BBR after the reform.

These findings point towards an interesting conclusion. By using a carrot (more autonomy) and a stick (tighter fiscal control and “shaming”), one can obtain stronger fiscal adjustment than by having tight oversight over all local governments.

The flipside of the coin is that we also find some evidence of stronger adjustment towards break-even in local governments with past surpluses after the reform, i.e., that local governments with past surpluses reduce their surpluses more as a result of less fiscal oversight. Although it is not obvious that lower surpluses in local governments with past surpluses is inefficient, such a result would indicate that these can now allow themselves to increase spending and/or lower taxes. However, the effect of the reform is much smaller for local governments with past surpluses compared to local governments with past deficits.

The paper proceeds as follows: In Section 2 we give a brief overview over the related literature. In Section 3 we provide more details on the Norwegian institutional context and the balanced budget requirements. We also discuss the 2001 reform and derive hypotheses for the effect of the reform. Section 4 is devoted to the empirical specification and the operationalization of the hypotheses. The estimation results are discussed in Section 5. Finally, Section 6 offers concluding remarks.

## 2. Literature review

The paper adds to the literature on the design and effectiveness of fiscal rules. Such requirements are implemented to impose fiscal discipline on governments, and are typically motivated by large and persistent budget deficits and increased public debt. While there are many theoretical explanations for deficit bias and excessive public borrowing, a dynamic common pool problem is underlying many of them (Persson and Tabellini, 2000 ch. 13.2; Wyplosz, 2012). General tax financing of public services with more or less concentrated benefits may result in deficits and increased debt. Other explanations are political instability, either resulting from disagreement over the composition (Alesina and Tabellini, 1990) or level of public spending (Persson and Svensson, 1989), and delayed stabilization (Alesina and Drazen, 1991).

During the 1990s several contributions utilized the variation in balanced budget requirements across US states to empirically analyze whether BBRs are effective in imposing fiscal discipline and reducing budget deficits (see, e.g., Alt and Lowry, 1994; Bohn and Inman, 1996; Poterba, 1994, 1995). The aim was to explore possible lessons for the federal level in the US, and also for the EU countries in face of implementing a common currency. The findings supported the effectiveness of BBRs, but since the BBRs in US states are self-imposed, it was questioned whether the estimates could be given a causal interpretation.<sup>1</sup> More recently, Bergman et al. (2016) study 27 EU countries throughout the period 1990–2012. They find that fiscal rules are effective in reducing deficits in all levels of government, but that the effect is smaller the more efficient the government is. Hence, they conclude, fiscal rules and government efficiency are institutional substitutes. They also find that BBRs are the most effective form of fiscal rules.

Budget requirements for local governments are important for at least three reasons. First, the common pool problem may be more severe at the local level since local politicians may expect to be bailed out by the central government in case of fiscal troubles. This soft budget constraint problem (Kornai, 1979) leads to fiscal indiscipline and excessive deficits. Pettersson-Lidbom (2010) offers

<sup>1</sup> However, Poterba (1996) argued that the rules were adopted as part of a constitution that is difficult to modify and therefore have an exogenous component. He concluded (p. 399) that the “results support the view that modifying the federal budget process may affect the level of budget deficits”.

empirical support for the soft budget constraint problem in a study of Swedish local governments. Second, the Maastricht rules in the EU apply to the public sector in aggregate. It is then important that a tighter fiscal policy at the national level is not counteracted by increased deficits at the sub-national level.<sup>2</sup> Moreover, reduced deficits at the sub-national level may be a prerequisite to comply with the Maastricht rules in countries with a high degree of decentralization of their public sectors. This has led to more emphasis on fiscal co-ordination and fiscal rules for local governments. Third, balanced budget requirements for local governments are implemented and enforced by higher level government. This solves the empirical challenge of endogeneity related to self-imposed rules as it can be argued that the rules are exogenous from the point of view of the local governments. Another empirical challenge however, is that there is little or no variation in the fiscal rules across local governments. Reliable empirical analyses must utilize changes in rules over time and/or rules that vary across local governments.

Among the recent studies of fiscal rules using local government data are [Grembi et al. \(2016\)](#) and [Bonfatti and Forni \(2019\)](#) who study an Italian reform and [Christofzik and Kessing \(2018\)](#) who study a German reform. These studies have the advantage that the reforms they study provide variation in regulatory framework both over time and across local governments, adding strength to their identification. Other studies that provide insights into the effects of fiscal rules and oversight of sub-national governments within a single country include [Köppel-Turyna and Pitlik \(2018\)](#) who use data for Austrian municipalities, [Ben-Bassat et al. \(2016\)](#) who study Israeli local governments, [Schaltegger and Feld \(2009\)](#) who study Swiss cantons, and [Argimón and de Cos \(2012\)](#) who focus on Spain. [Foremny \(2014\)](#) compares fiscal rules in sub-national governments across European countries. His findings suggest that the effectiveness of fiscal rules and tax autonomy depends on the countries' constitutional structure. Fiscal rules only decrease deficits in unitary countries, while tax autonomy help to avoid deficits in federations.

As most of the contributions mentioned in the previous paragraph we also focus on a reform of fiscal rules in a single country, i.e. Norway. However, there are also important differences. Our focus is not on treatment effects based on regression discontinuity (RD) approaches with well-defined treatment and control groups. The Italian reform analyzed by [Grembi et al. \(2016\)](#) and [Bonfatti and Forni \(2019\)](#) only applied to local governments with population size above 5000. Thus, they can use an RD-design where they compare authorities with population size just below and just above 5000. On the other hand, we estimate dynamic models where the current budgetary balance is modeled as a function of lagged balances. Since our primary interest is in the dynamics of fiscal adjustment, we rely on GMM-regressions that are more suited for our purpose. In addition, we perform separate analyses for local governments with respectively past deficits and past surpluses.

### 3. The Norwegian BBR and the expected effects of the 2001 reform

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. Other important tasks are culture and infrastructure. Operating and investment expenditures amount to around 15% of Mainland GDP. The main revenue sources for the local governments are taxes, grants from the central government, and user charges. Whereas the local governments have substantial discretion on the expenditure side, revenues are highly regulated.

The main requirement in the Norwegian BBR is operational budget balance.<sup>3</sup> In the budget (or ex ante), current revenues must be sufficient to cover operating expenditures and debt servicing costs (net interest payment and net installment on debt). The main rule is that borrowing is for investment purposes, i.e. the golden rule of investment financing applies to Norwegian local governments. There is no explicit limit on borrowing or debt level, but the level of debt is indirectly controlled by the inclusion of debt servicing costs in the definition of operational budget balance.

An ex ante BBR does not prevent deficits ex post, and actual deficits (negative net operating surpluses) are not rare events. During the period under study (1991–2010) on average 20–25% of the local governments ran deficit each year, see [Fig. 1](#).<sup>4</sup> The substantial variation from year to year is largely due to varying revenue growth. In 1994 and 1997 the growth of tax revenue became higher than expected and contributed to a low number of local governments with a deficit. In the early 2000s the revenue growth was modest and the number of local governments with deficit increased. In 2004–2006 the revenue growth was high and the number of local governments with deficit was sharply reduced. The peak in 2008 is due lower tax revenues because of the global financial crisis. From 2008 to 2009 the number of local governments with deficits dropped substantially. The main reason is that the Norwegian central government was able to combat the financial crisis by running an expansionary fiscal policy by use of resources from the large oil fund. Part of the expansionary fiscal policy was targeted towards the local governments as increased grants. In 2009 the real revenue growth was on average 8.6 percent, compared to 2.0 percent in 2008 and 2.5 percent in 2010.

An ex post deficit does not mean that the BBR is violated. Deficits are either covered by rainy-day funds or carried over to the next fiscal year. Deficits that are carried over can be financed by short term loans. If a deficit is carried over, it must as a main rule be covered within two years. This means that the surpluses in the following two years must be sufficient to cover the accrued deficit. The BBR is violated when deficits are carried over and not covered on time.

Before 2001, local governments that violated the BBR were not subject to formal sanctions. All local governments had to have

<sup>2</sup> In an analysis of 17 OECD countries in the period 1978–2009, [Foremny et al. \(2017\)](#) find that fiscal consolidation seems to have less effect in countries with a decentralized public sector.

<sup>3</sup> We refer to [Borge and Rattso \(2002\)](#) for more a detailed discussion of the regulatory framework in Norway.

<sup>4</sup> The number of local governments was 448 in 1990, and was gradually reduced to 430 in 2010.

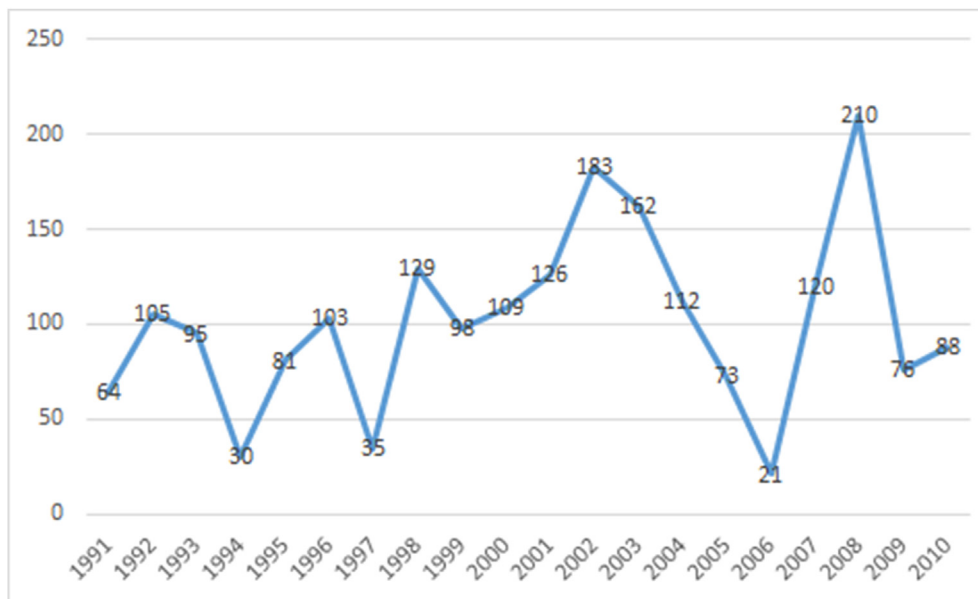


Fig. 1. Local governments with deficits.

their budgets and borrowing approved by the regional commissioners (the central government's representative in the county<sup>5</sup>). The control of budgets and borrowing was mainly a review of legality, e.g. whether the budget was made up with a non-negative net operating surplus or whether the purpose of borrowing could be defined as investment. A more detailed evaluation of the appropriateness of budget and borrowing was considered to be in conflict with local self-rule. Borrowing was not denied because projects were considered to have a low benefit-cost ratio, and in particular the regional commissioners could not reject borrowing to finance accrued deficits as long as the local council had decided on a plan to cover the deficit. And as long as the revenue projections were not unreasonable, the budget was not disapproved because it was likely to end up with a net-operating deficit when the accounts were settled. In practice most budgets and borrowing applications were approved, see Borge and Rattsø (2002, p. 202). Experiences from the US (Bohn and Inman, 1996), indicate that BBRs like the Norwegian, that are imposed ex ante, are likely to be ineffective.

The 2001 reform abolished the system of administrative control for local governments that complied with the BBR, while local governments that have violated the BBR are subject to budget and borrowing approval until the accrued deficit is covered. Automatic control is replaced by conditional control. The main arguments for introducing conditional control were that the resources spent on control and advice could be more effectively targeted towards local governments with past deficits and that credit institutions would get stronger incentives to check the local governments' abilities to service the loans.

The reform was unanimously decided by the parliament, but was strongly opposed by a majority of the regional commissioners and the bankers' association. They argued that the system of administrative control was important to achieve budgetary balance in the local public sector and that local governments would face higher and more varying interest rates. However, the experience after the reform is that interest rates were not much affected. The most likely explanation is that local governments that have violated the BBR also after the reform are subject to borrowing approval, and the credit institutions interpret this as an implicit guarantee from the central government.

A largely neglected effect of the reform however, was that it implicitly introduced sanctions for violating the BBR. Before the 2001 reform, all local governments, both violators and non-violators, were subject to the same system of administrative control. After 2001 non-violators no longer need to have budgets and borrowing approved by the regional commissioner, while violators are subject to the same control as before. Since budget and borrowing approval means less autonomy, we expect that the replacement of automatic control by conditional control strengthens the incentives for fiscal responsibility and compliance with the BBR. This mechanism will most likely affect the behavior of local politicians by limiting deficit bias because of either dynamic common pool problems (Persson and Tabellini, 2000 ch 13.2), political instability (Alesina and Tabellini, 1990; Persson and Svensson, 1989), and delayed stabilization (Alesina and Drazen, 1991). It would be nice to be able to provide information on manifestations of reduced autonomy, e.g. to what extent local governments must make revisions to their submitted budgets. Unfortunately, such information is not easily available. One reason for this is that in many cases there is informal communication of the requirements for approval before the budget is submitted.

In addition the new system of conditional control requires a register to keep track of local governments that need borrowing approval. The register is named Register for Governmental Approval of Financial Obligations (with the Norwegian abbreviation

<sup>5</sup> The 18 regional commissioners are civil servants, not elected politicians.

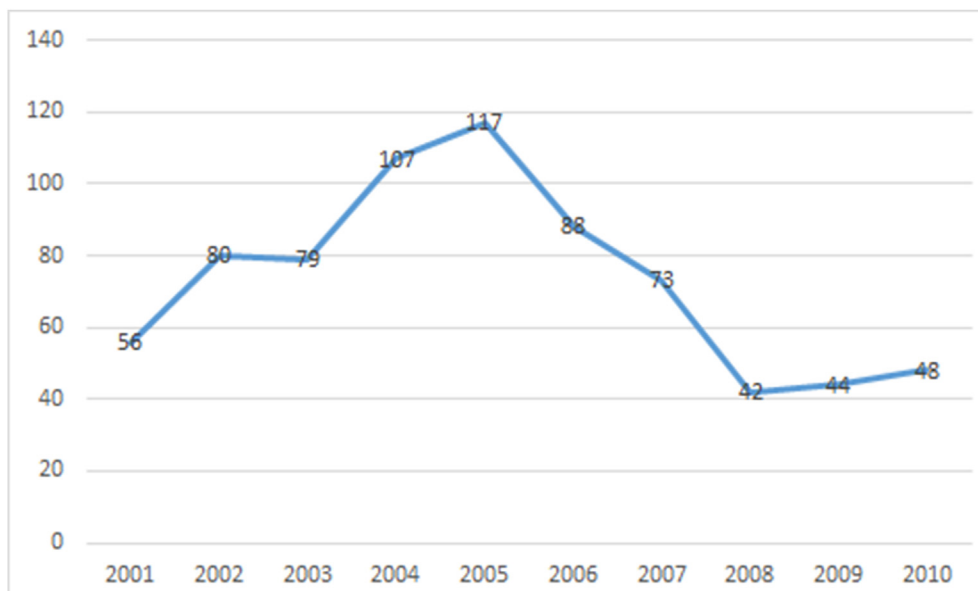


Fig. 2. Local governments in Robek.

Robek) and informs financial institutions whether local governments need approval to raise new loans. The register is administered by the Ministry of Local Government and an updated list is available on their web-site. Local governments remain in the register until the deficit is covered. Fig. 2 shows that the number of local governments in the register follows the number of local governments running a deficit (Fig. 1) with a lag. In 2005 slightly more than 25% of the local governments were listed in Robek.<sup>6</sup> It may come as surprise that the peak in the number of local governments running a deficit in 2008, due to the financial crisis, did not lead to a significant increase in the number of local governments in Robek in 2010. The main reason for this is that most local governments were able to cover their deficits by 2010 because of the high revenue growth in 2009.

The register soon received a lot of media attention that further strengthened the incentives for fiscal responsibility, some examples are documented in Fig. 3. Both entries and exits from Robek are emphasized by local media. The media attention has contributed to increased salience of fiscal performance of local governments in the general public, and Hopland (2014) shows that the mayor's party is punished by the voters when the local government is listed in Robek. This "list of shame" effect as a discipline device was not emphasized when Robek was established, but has turned out to be a valuable supplement to the administrative sanctions. This media attention provides voters with reliable information on fiscal performance, and is related to the hypothesis of fiscally conservative voters that punish policy makers for running deficits (Brender, 2003; Brender and Drazen, 2008). This interplay between local media and voters makes information less costly, implying that voters can make more informed decisions when they cast their vote.

In the Norwegian centralized system of financing, increased salience of deficits in the local public sector may represent a challenge for the central government by creating a pressure for bailouts. If local governments expects to receive additional grants when entering Robek, there will be a moral-hazard problem that weakens the incentives for fiscal responsibility. Most of the grants to Norwegian local governments are distributed by objective criteria (population size, age composition, settlement pattern, etc) and deficits are in general not "rewarded" by additional grants. However, a small amount of the total grant is distributed by the judgment of the regional commissioner. According to the guidelines for this discretionary grant, local governments in Robek may receive extra grants if they agree on a binding plan with the regional commissioner to cover the deficit. However, Hopland (2013) does not find any empirical support for a hypothesis that enrollment in Robek increases the discretionary grant.

While sanctions and increased voter awareness of fiscal performance promote fiscal responsibility, less control and the possibility of extra grants have the opposite effect. However, the empirical analysis does not allow for identification of the underlying mechanisms. Only the net effect can be identified. The expected effect of the 2001 reform is ambiguous and may differ between local governments depending on their financial situation. In the empirical analysis we pay particular attention to local governments with past deficits that are at risk of being enrolled in the register. We expect these local governments to be most affected by the reform because they immediately will experience the negative consequences of sanctions and voter attention if they are unable to avoid being enrolled in the register. On the other hand, we expect local governments with past surpluses to be less affected by the reform. If anything, they may utilize the reduction in fiscal oversight to lower their surpluses.

<sup>6</sup> In addition to local governments that have not covered a deficit on time, Robek lists local governments that have not passed a balanced budget. However, the vast majority of local governments in the register is listed because they have not been able to cover a deficit on time.

Vil ut av Robek om to år | lofofposten.no

Side 1 av 3



Ordfører Jonny Petráf har akkurat stått klukka i beretning om regnskap 2012. Den er av Vestvågøy kommune Robek-kommune. T.v. rådmann Kjetil Stør Berg og L.H. vararepresentant Elisabeth Holand Fjell. Lisa Fagerbakk

### Vil ut av Robek om to år

Vestvågøy kommune skreller neste års budsjett med 25 millioner kroner for å komme vekk fra den fryktede Robek-løsta.

Lisa Fagerbakk

Ordfører

Publisert 17.06.2013 kl 11:08 Oppdatert 17.06.2013 kl 13:41

"Wish to get out of Robek in two years"

Averøy på sporet mot Robek | tk.no

Side 1 av 2:



Regjører Øyvind har etter innleiing fra ordfører Arne Kristian Svareid orientert politikarane i Averøy om kommunarskissene 7 og Robek-løsta.

### Averøy på sporet mot Robek

Politikarane har en taff jobb foran seg.

Eliene Marie Fredriksen-Gustad

Ordfører

Publisert 17.06.2013 kl 06:00 Oppdatert 17.06.2013 kl 06:00

"Averøy on track towards Robek"

Ute av Robek | blv.no

Side 1 av 2



Ordfører Jonny Botsvik og rådmann Kristian Leifne Fredriksen i Andøy kommune. Foto: Frankik Spangheim

### Ute av Robek

— Vi har vært klar over det lenge, men det var en lettelse å få brevet som viser at vi endelig er ute av Robek-løsta, sier Andøy-ordfører Jonny Botsvik.

Frankik Spangheim

Ordfører

Publisert 14.02.2013 kl 17:48 Oppdatert 14.02.2013 kl 17:48

"Out of Robek"

Fig. 3. Examples of local media coverage of Robek.

#### 4. Empirical strategy, data, and estimation method

The purpose of the empirical analysis is to investigate whether and how the reform of the BBR in 2001 affected fiscal adjustment. The empirical analysis is based on the following dynamic specification:

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

In equation (1)  $y_{it}$  is the net operating surplus in local government  $i$  in year  $t$  (measured in constant NOK 1000 per capita),  $R_t$  is a dummy variable equal to 1 in the post-reform period (i.e. 2001 and later years),  $\mathbf{x}_{it}$  is a vector of control variables,  $\alpha_i$  is a local

government fixed effect,  $\delta_t$  is a year fixed effect, and  $\varepsilon_{it}$  is an error term. We are particularly interested in how the net operating surplus responds to lagged surpluses and whether the effect is different after the reform, i.e. the  $\beta_s$  and the  $\gamma_s$ . In general the surplus is expected to follow a mean reverting process. To achieve a balanced budget over time, local governments must typically respond to high deficits in previous years by reducing the deficit. On the other hand, local governments with lagged surpluses may reduce the surplus. This is what we label fiscal adjustment. If the deficit follows a mean reverting process, we expect the  $\beta_s$  to be negative. High deficits one year is followed by lower deficits in later years, and high surpluses one year is followed by lower surpluses in later years. The response to lagged surpluses before the reform is captured by  $\beta_s$ , while  $\beta_s + \gamma_s$  is the response after the reform. The  $\gamma_s$  are the parameters of main interest as they can be interpreted as the difference between the responses before and after the reform. The hypothesis of stronger fiscal adjustment after the reform can be formulated as  $-(\beta_s + \gamma_s) > -\beta_s$  or  $\gamma_s < 0$ .

It is important to distinguish between local governments with past deficits and local governments with past surpluses, since stronger fiscal adjustment after the reform (negative  $\gamma_s$ ) has opposite implications for budgetary balance. Consider first local governments with past deficits. For this group stronger fiscal adjustment means that deficits are covered faster after the reform than before. To see this keep in mind that a deficit is a negative surplus ( $y_{it-s} < 0$ ). Then we expect the surplus to increase (lower deficit) both before ( $\beta_s y_{it-s} > 0$ ) and after the reform ( $(\beta_s + \gamma_s) y_{it-s} > 0$ ), but the increase in the surplus (reduction in the deficit) will be largest after the reform ( $(\beta_s + \gamma_s) y_{it-s} > \beta_s y_{it-s} > 0$ ). Consequently, for local governments with past deficits stronger fiscal adjustment after the reform will represent a change in the direction of reduced deficits or improved budgetary balance.

Since the BBR requires a deficit to be covered within two years, we particularly expect the effect of the second lag to become stronger after the reform. Consider a local government that runs a deficit in year  $t - 2$ . This deficit must be covered in year  $t$  at the latest in order to avoid being listed in Robek. When the budget for year  $t - 1$  is passed (in the fall of year  $t - 2$ ), it may not be known whether there will be a deficit in year  $t - 2$  or at least not the size of the deficit. It is therefore likely that much of the adjustment is postponed until year  $t$  and that  $\gamma_2$  will be the interaction coefficient with the highest absolute value.

For local governments with past surpluses ( $y_{it-s} > 0$ ) stronger fiscal adjustment after the reform has the opposite effect on budgetary balance. We expect the surplus to be reduced both before ( $\beta_s y_{it-s} < 0$ ) and after  $((\beta_s + \gamma_s) y_{it-s} < 0)$  and after the reform, but the reduction in the surplus will be largest after the reform ( $(\beta_s + \gamma_s) y_{it-s} < \beta_s y_{it-s} < 0$ ). So for local governments with past surpluses stronger fiscal adjustment after the reform will represent a change in the direction of lower surpluses.

The vector of control variables includes time varying local characteristics that may be of importance for the net operating surplus.<sup>7</sup> First, we control for local government revenues defined as the sum local taxes and general purpose grants (measured in constant NOK 1000 per capita). As mentioned in Section 3, Norway has a centralized system of financing where the local governments have little discretion over their revenues. Most taxes are of the revenue sharing type where effective tax limits have been in place since the late 1970s. The general purpose grant is distributed by objective criteria (population size, age composition, settlement pattern, etc) not directly affected by the local government. Thus, we follow earlier Norwegian studies (Borge, 2005; Tovmo, 2007) and treat local government revenues (taxes and general purpose grants) as exogenous in the estimation. We expect local government revenue to have a positive effect on the net operating surplus. It is an interesting observation that there is a negative correlation between local government revenue and private income (Borge, 2006). Private income and tax revenue are both higher in urban than in rural areas. However, the combination of an ambitious equalization system and regional policy grants to small local governments and local governments in Northern-Norway, turns the correlation negative.

Second, we control for the age composition of the population since Norwegian local governments are responsible for age specific services like child care, primary and lower secondary education, and care for the elderly. In order to capture the spending needs for these services, we include the share of children (0–5 years), youths (6–15 years), and elderly (80 years and above). Third, we control for the population size. Fourth, we include the local unemployment rate to control for business cycle effects. Fifth, we include political variables capturing party fragmentation and ideology. Party fragmentation is measured as the effective number of parties (the inverse of the Herfindahl index) and ideology as the share of socialists in the local council (representatives from the Labour Party and all parties to its left). Earlier studies of Norwegian local governments (e.g. Borge, 2005) have found that increased party fragmentation reduces the net operating surplus,<sup>8</sup> while the share of socialists is insignificant. We still choose to control for the share of socialists because of the strong negative correlation between the effective number of parties and the share of socialists.

Descriptive statistics for the net operating surplus and the control variables are reported in Appendix.

The local government fixed effects (the  $\alpha_{it}$ s) are likely to bias the 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 not lead to an unbiased estimator either (Nickell, 1981). Even though the within-group/LFE estimators are consistent, since the bias fades away as the number of periods increases, we rather use the GMM procedure suggested by Holtz-Eakin et al. (1988) and Arellano and Bond (1991) (henceforth Arellano-Bond estimation).<sup>9</sup>

In short, the Arellano-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  $\varepsilon_{it}$  is serially uncorrelated, surpluses from  $t - 2$  and backwards are valid as instruments, in addition to lagged values of the exogenous variables. Some preliminary

<sup>7</sup> The data are obtained from the Ministry of Local Government, Norwegian Social Science Data Services (NSD), and Fiva et al. (2017).

<sup>8</sup> In addition party fragmentation is shown to increase administrative spending (Kaltheth and Rattsø, 1998), reduce efficiency (Borge et al., 2008 among others), and worsen building conditions (Borge and Hopland, 2017).

<sup>9</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 Arellano-Bond estimates, the results still suggested that there is some bias in the LFE estimates. The Arellano-Bond procedure has been implemented using the Stata package xtabond2, thoroughly described by Roodman (2009).

analyses, however, indicated that neither the second, third, nor fourth lag perform well as instruments, since they frequently failed to pass the overidentification tests. As a consequence, we use lags  $t - 5$  to  $t - 8$  as instruments. Moreover, we treat not only the first lag, but all lags of  $y_{it}$  and  $R_t y_{it}$  as potentially endogenous variables. All reported results are from two-step difference GMM estimations with Windmeijer-corrected standard errors (Windmeijer, 2005).<sup>10</sup>

Except for the capital Oslo, which is both a local government and a county, the dataset includes most of the 430 local governments that existed in 2010. The dynamic specification implies that the number of observations is 7577 when  $k = 1$  (estimation period 1992–2010) and 6296 when  $k = 4$  (estimation period 1995–2010).

## 5. Estimation results

### 5.1. Investigating dynamics

We start out in Table 1 by investigating fiscal adjustment in general using data for all local governments and without taking the 2001 reform into account (the  $\gamma$ s are set to 0). The purpose is to determine the appropriate lag length ( $k$ ). In columns (A)–(D) we gradually extend the lag length from one to four. In the most general specification the second and third lags come out as significant, while the first and fourth lags are insignificant. Based on the results in Table 1, we set  $k = 3$  when analyzing the effects of the 2001 reform.

Irrespective of the chosen lag length, two of the seven control variables, local government revenue and population size, come out as significantly positive. Neither the age composition of the population, the local unemployment rate, nor the two political variables come out with significant effect in any of the specifications.

Except for the specification in column (C), the Hansen J test does not reject the hypothesis of valid instruments (overidentifying restrictions) at the 5% level in any of the model specifications in columns (A)–(D) in Table 1. Since this our preferred specification, it is a bit unfortunate. However, the hypothesis of valid instruments is not rejected in Table 2 when we limit the sample to local governments with past deficits. Finally, the autocorrelation tests ( $m_1$  and  $m_2$ ) show evidence of first order autocorrelation, but no evidence of second order autocorrelation. This is consistent with the error term  $\varepsilon_{it}$  being serially uncorrelated.

It is possible that the dynamics are affected by the global financial crisis in 2008 and 2009. In column (E), an extension of the specification in column (C), we investigate this issue by interacting year dummies for 2008 and 2009 with lagged surpluses. None of the estimated coefficients related to the financial crisis come out as significant. Moreover, it turns out that their joint significance cannot be rejected (p-value of 0.23). Among the three  $\beta$ s,  $\beta_2$  is the only coefficient that comes out as individually significant in column (E). Nevertheless, the joint hypothesis  $\beta_1 = \beta_2 = \beta_3 = 0$  is clearly rejected (p-value of 0.0001). A reasonable interpretation is that the dynamics seem not to be affected by the global financial crisis.

### 5.2. Local governments with past deficits

It is not straightforward to identify local governments with past deficits. First, local governments that run deficits may cover the deficit by use of rainy-day funds. In that case they are registered with a deficit (the funds are savings from the past, not current revenues), but are not at risk of being listed in Robek. Second, it is possible to be listed already one year after a deficit. If a local government runs a deficit (not covered by rainy-day funds), the local council must decide on a plan on how to cover the deficit within the next two years. If the surplus the first year does not meet the plan, the local government is listed. Because of these complications, we use several operationalizations of past deficits: (i) deficit last year, (ii) accumulated deficit the last two years, and (iii) accumulated deficit the last three years.

In Table 2 we investigate the effects of the 2001 reform by including interaction terms between lagged surpluses and a dummy variable that equals one in 2001 and later years. For comparison we start out in column (A) by estimating the model using data for all local governments. It appears that only the coefficients for the third lags ( $\beta_3$  and  $\gamma_3$ ) come out as significant. There is evidence of stronger fiscal adjustment after the reform since the estimate of  $\gamma_3$  is significantly negative. But contrary to our expectations, the interaction term for the second lag ( $\gamma_2$ ) does not come out as significant.

There is more action in the second lag in column (B)–(D) where the sample is restricted to local governments with past deficits. In column (B) where we include local governments with deficit last year, the interactions terms for both the first and the second lags are significantly negative. In column (C) (local governments with accumulated deficits last two years) all three interaction terms are significantly negative, and in column (D) (local governments with accumulated deficits last three years) the interactions terms for the second and third lags are significantly negative. In column (B) and (D) the interaction term for the second lag is highest in

<sup>10</sup> Blundell and Bond (1998) develops an alternative approach outlined by Arellano and Bover (1995) that has become known as system GMM. The difference between the two methods is essentially that when using difference GMM we instrument differences with levels, while we instrument levels with differences when using system GMM. System GMM introduces another assumption compared to the difference GMM, namely that changes in the instrumenting variables are uncorrelated with the fixed effects. If this is satisfied, system GMM will be more efficient than difference GMM. Despite the appeal of a potentially more efficient estimator, one must note that the additional assumption is non-trivial. Roodman (2009, p. 114) issues a clear warning: "But the new assumption is not trivial; it is akin to one of stationarity. (...) The assumption can hold, but only if the datagenerating process is such that the fixed effect and the autoregressive process governed by  $\alpha$ , the coefficient on the lagged dependent variable, offset each other in expectation across the whole panel, much like investment and depreciation in a Solow growth model steady state." Moreover, when we compare the methods, we find that the difference GMM performs better in the Hansen test for overidentification, in particular when we run Table 1 using system GMM rather than difference GMM overidentification is rejected at the 1% level in all specifications. We thus use difference GMM throughout our analysis.



**Table 1**  
Investigating dynamics, the dependent variable is net operating surplus per capita (NOK 1000).

	(A) One lag	(B) Two lags	(C) Three lags	(D) Four lags	(E) Three lags and financial crisis dynamics
$\beta_1$	0.0462 (0.0916)	0.0766 (0.0799)	0.0389 (0.0912)	0.0196 (0.0726)	0.115 (0.208)
$\beta_2$		-0.280*** (0.0890)	-0.241** (0.111)	-0.239** (0.103)	-0.192* (0.106)
$\beta_3$			-0.360** (0.164)	-0.359** (0.168)	-0.422 (0.313)
$\beta_4$				-0.0363 (0.143)	
$\beta_1 \times year2008$					0.615 (1.240)
$\beta_2 \times year2008$					1.415 (4.544)
$\beta_3 \times year2008$					-2.209 (3.735)
$\beta_1 \times year2009$					-0.436 (0.947)
$\beta_2 \times year2009$					-2.232 (3.001)
$\beta_3 \times year2009$					2.543 (2.708)
Local government revenue per capita (in NOK 1000)	0.482*** (0.0597)	0.477*** (0.0669)	0.478*** (0.0867)	0.438*** (0.0522)	0.324** (0.158)
Share of children (0–5 years)	11.06 (11.09)	16.72 (12.14)	14.31 (14.61)	9.653 (13.97)	24.45 (24.38)
Share of youths (6–15 years)	6.620 (8.280)	6.918 (9.049)	6.728 (9.561)	3.280 (9.462)	18.66 (18.85)
Share of elderly (80 years and above)	-0.325 (14.65)	8.117 (14.65)	4.400 (15.01)	5.322 (15.57)	7.198 (26.31)
Unemployment	0.0414 (0.0642)	0.0482 (0.0740)	0.0707 (0.0703)	0.117 (0.0788)	-0.0518 (0.164)
Population size (in 10,000)	2.785*** (1.057)	3.058*** (1.147)	2.998** (1.227)	2.769*** (0.938)	1.965 (1.432)
Effective number of parties	0.0556 (0.0890)	0.0397 (0.0925)	0.0765 (0.0964)	0.0294 (0.0861)	0.0892 (0.125)
Share of socialists	1.135 (0.793)	0.916 (0.759)	1.127 (0.797)	1.118 (0.968)	1.153 (1.233)
Estimation period	1992–2010	1993–2010	1994–2010	1995–2010	1994–2010
# of observations	7577	7143	6706	6269	6706
# of local governments	428	428	428	426	428
# of instruments	80	79	78	77	78
Hansen p-value	0.07	0.08	0.04	0.07	0.01
$m_1$ (p-value)	0.01	0.00	0.00	0.00	0.37
$m_2$ (p-value)	0.49	0.50	0.90	0.86	0.49

Windmeijer-corrected standard errors in parentheses. Time dummies (not reported) are included in all equations. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

absolute value. The same is the case in column (C), but in this case the difference is much smaller. Overall the results yield support to our working hypothesis of stronger fiscal adjustment after the 2001 reform for local governments with past deficits.

It is not possible to conduct a general analysis of whether the degree of fiscal adjustment is sufficient to obey the BBR for local governments experiencing a deficit shock. Whether a deficit is covered within two years, will, in addition to the estimated coefficients, depend on the size and durability of the deficit shock and also the development of local government revenues and other exogenous variables. However, in order to illustrate the difference in fiscal adjustment before and after the reform, we find it useful to present calculations based on a stylized example. The point of departure is a local government that in steady state has exact budgetary balance, and where the net operating surplus has been zero the last three years. Then we assume that the local government experiences a two year deficit shock of NOK 1000 per capita. Moreover, we assume that the exogenous variables remain constant the next three years and that the total effect of the exogenous variables is exact budgetary balance.

Table 3 illustrates the fiscal adjustment based on the estimates in column (B)-(D) in Table 2. We start out by looking at a local government with deficit last year, i.e. we use the estimates from column (B) in Table 2. In year 0, the first year with a deficit shock, the local government runs a deficit of NOK 1000. Before the reform the deficit in year 0 would work to reduce the year 1 deficit by NOK 426 ( $0.426 \times 1000$ ). Taking into account that there is deficit shock of NOK 1000 also in year 1, we end up with a deficit of NOK 574. In year 2 the deficit shock ceases and the net operating surplus becomes NOK 524 ( $0.426 \times 574 + 0.279 \times 1000$ ).

**Table 2**

Investigating the effects of the 2001 reform, local governments with past deficits, dependent variable is local net operating surplus per capita (NOK 1000).

	(A) All	(B) Deficit last year	(C) Accumulated deficit last 2 years	(D) Accumulated deficit last 3 years
$\beta_1$	0.111 (0.200)	-0.426** (0.185)	-0.459** (0.228)	-0.491 (0.351)
$\beta_2$	-0.129 (0.120)	-0.279 (0.243)	-0.374*** (0.0847)	-0.209 (0.337)
$\beta_3$	-0.229* (0.129)	0.0107 (0.158)	-0.196 (0.153)	-0.423** (0.183)
$\gamma_1$	-0.0934 (0.302)	-0.714*** (0.204)	-0.625** (0.253)	-0.514 (0.355)
$\gamma_2$	-0.0602 (0.0823)	-1.112*** (0.175)	-0.861*** (0.259)	-1.003*** (0.360)
$\gamma_3$	-0.319*** (0.101)	-0.291 (0.358)	-0.832*** (0.255)	-0.626** (0.265)
Local government revenue per capita (in NOK 1000)	0.569*** (0.0768)	0.256*** (0.0906)	0.451*** (0.0914)	0.366*** (0.0908)
Share of children (0–5 years)	2.485 (13.82)	-13.06 (21.73)	15.55 (22.54)	16.51 (22.62)
Share of youths (6–15 years)	3.686 (9.671)	-18.50 (30.18)	-12.02 (22.82)	-25.03 (26.69)
Share of elderly (80 years and above)	-9.330 (16.54)	-11.71 (25.21)	34.18 (28.64)	37.41 (33.01)
Unemployment	0.108 (0.0794)	0.0344 (0.131)	0.00276 (0.120)	-0.221 (0.148)
Population size (in 10,000)	3.543*** (1.251)	2.255 (2.569)	3.356 (2.315)	4.098 (3.170)
Effective number of parties	0.0891 (0.0895)	0.163 (0.129)	0.288** (0.145)	0.296 (0.184)
Share of socialists	0.968 (0.776)	-1.651 (1.397)	-1.386 (1.432)	-2.984 (2.396)
Total post-reform adjustment				
$\beta_1 + \gamma_1$	0.0176	-1.140***	-1.084***	-1.005***
$\beta_2 + \gamma_2$	-0.189	-1.391***	-1.235***	-1.212***
$\beta_3 + \gamma_3$	-0.548***	-0.280	-1.028***	-1.049***
Estimation period	1994–2010	1994–2010	1994–2010	1994–2010
# of observations	6706	1629	1358	1103
# of local governments	428	389	357	299
# of instruments	78	78	78	78
Hansen p-value	0.05	0.30	0.53	0.78
$m_1$ (p-value)	0.00	0.28	0.01	0.20
$m_2$ (p-value)	0.45	0.48	0.07	0.78

Windmeijer-corrected standard errors in parentheses. Time dummies (not reported) are included in all equations.  
\*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

**Table 3**

Fiscal adjustment before and after the reform for local governments with past deficits, net operating surplus per capita.

	Deficit last year		Accumulated deficit last 2 years		Accumulated deficit last 3 years	
	Before 2001	After 2001	Before 2001	After 2001	Before 2001	After 2001
Year 0	-1000	-1000	-1000	-1000	-1000	-1000
Year 1	-574	140	-541	84	-509	5
Year 2	524	1231	622	1144	459	1207

Although budgetary balance is restored after two years, the initial deficit is not covered. Rather the accumulated deficit slightly increases to NOK 1050 per capita.

After the reform fiscal adjustment is much stronger. The year 0 deficit of NOK 1000 works to reduce the year 1 deficit by NOK 1140 ( $1.140 \times 1000$ ). Again we must take into account that the deficit shock persists for one more year, and we end up with a surplus of NOK 140. In year 2 the deficit shock ceases and the net operating surplus becomes NOK 1231 ( $-1.140 \times 140 + 1.391 \times 1000$ ). The surplus in year 2 is more than sufficient to cover the initial deficit. Over the three years the accumulated surplus is NOK 371.

The results are similar when past deficits is defined as accumulated deficit over the last two or three years. Before the reform the local government still runs a deficit in year 1 and has a surplus in year 2. However, in neither case is the initial deficit covered after two years. The accumulated deficits are respectively NOK 919 and NOK 1050. After the reform budgetary balance is restored in year

1. Moreover, the surplus in year 2 is sufficient to cover the initial deficit. There is clear evidence of stronger fiscal adjustment after the reform irrespective of the exact operationalization of past deficits.

The calculations in Table 3 should not be interpreted as if any deficit shock is not covered within two years before the reform and that all deficit shocks are covered within two years after the reform. It is obvious that less persistent shock could be covered within two years before the reform, while more persistent shocks will not necessarily be covered within two years after the reform. With increased local government revenue in year 1 and/or year 2 a deficit could be covered within two years before the reform. On the other hand, with a drop in revenues in year 1 and/or year 2 a deficit is not necessarily covered within two years after the reform. The main purposes by the calculations are to illustrate that fiscal adjustment has become stronger after the reform, and that a deficit shock not covered on time before the reform may well be covered on time after the reform. The calculations in Table 3 also illustrate that the large estimates of  $|\beta_s + \gamma_s|$  in column (B)-(D) in Table 2 may be necessary to cover a deficit on time. It is important to notice that the estimates are conditional on past deficits and do not indicate a non-stationary time series. In particular, the estimated models would not apply to year 3 in Table 3 since the conditions of past deficits are not fulfilled.<sup>11</sup>

Table 2 includes local governments with past deficits. Some of them are already in Robek, while others are not. It is of particular interest to investigate whether the results also hold for local governments not in Robek. The stronger adjustment after the reform may be driven by local governments already in Robek as they try to get out of the list, as well as guidance and advice from the regional commissioner. If we find that the results also hold for local governments not in Robek, it will indicate that the threat of being listed is sufficient to cover past deficits.

We investigate this issue in Table 4. In column (A) we restrict the sample to local governments not currently in Robek when past deficits is operationalized as deficit last year.<sup>12</sup> It appears that the results are strikingly similar to the corresponding results in Table 2, column (B). The parameters  $\gamma_1$  and  $\gamma_2$  come out as significantly negative, and provide evidence of stronger fiscal adjustment after the reform. Moreover, both pre-reform and post-reform adjustments are of similar magnitude as the corresponding results in Table 2. In column (B) we restrict the sample to local governments that have never been in Robek. Again, the parameters  $\gamma_1$  and  $\gamma_2$  are significantly negative. Pre-reform and post-reform adjustments for the first lag is of similar magnitude as the corresponding results in Table 2, but post-reform adjustment for the second lag is lower in absolute value and not significant. The latter reflects that the estimate of  $\beta_2$  becomes positive. If we rather focus on  $\gamma_2$ , the parameter of main interest, it is of similar magnitude as in column (A). We consider the evidence of stronger fiscal adjustment after the reform also for local governments not in Robek as an important result. One interpretation of this finding is that it has become more costly to violate the BBR after the reform.

Finally, as discussed in Section 2, deficits may be covered by use of funds rather than by fiscal adjustment. In column (C) we take account of this by adding rainy-day funds (lagged) as an additional explanatory variable. Rainy-day funds comes out as positive and significant. It is not obvious how to interpret the estimated effect of funds. The positive coefficient is not consistent with the view that large funds reduces the need for large surpluses, but may reflect third factors like fiscal awareness that affects both the net operating surplus and rainy-day funds. Anyway, there is still strong support for the hypothesis that fiscal adjustment is stronger after the reform.

### 5.3. Local governments with past surpluses

Prior to the reform it was a concern that the lifting of budget and borrowing control would reduce fiscal responsibility. The analyses in Section 5.2 clearly demonstrates that this is not the case for local governments with past deficits that risk being enrolled in Robek. However, the reform may have worked differently for local governments with past surpluses that may have utilized the reduced fiscal oversight to reduce their surpluses. It is important to notice that for local governments with past surpluses, stronger fiscal adjustment would mean faster adjustment towards a lower surplus, see the discussion in Section 4. It is therefore of interest to investigate whether and how local governments with past surpluses are affected by the reform.

In Table 5 we report regression results for different operationalizations of past surpluses. In column (A) the sample is restricted to local governments with a net operating surplus last year. It follows that the third lag is significantly negative before the reform and that the interaction term for the third lag also is significantly negative. None of the coefficients for the first and second lag come out as statistically significant, neither before or after the reform. The results are similar when past surpluses is operationalized as accumulated surplus the last two years (column (B)), accumulated surplus the last three years (column (C)), or surpluses each of the last three years (column (D)).

A comparison of the estimates in Tables 2 and 5 reveals some interesting differences. First, before the reform budgetary balance seems to be more responsive to past budgetary balances for the local governments with past deficits compared to local governments with past surpluses. This finding indicates that the BBR had some effect also before the reform. Moreover, fiscal adjustment is much stronger in the post-reform period for local governments with past deficits than for local governments with past surpluses. This means that the reform first and foremost affected local governments with past deficits. However, there is some evidence of stronger fiscal adjustment after the reform also for local governments with past surpluses. More fiscal adjustment for this group means lower surpluses, and may be considered as an unintended consequence of the reform.

<sup>11</sup> Strictly speaking, the estimates from column (B) in Table 2 cannot be applied for year 2 after the reform since the local government had a surplus in year 1. This reservation does not apply for the two other operationalizations of past deficits.

<sup>12</sup> We obtain similar results for the two other operationalizations of past deficit.

**Table 4**  
Excluding local governments in Robek and controlling for rainy-day funds, dependent variable is net operating surplus per capita (NOK 1000).

	(A) Local governments not in Robek	(B) Local governments never in Robek	(C) Controlling for rainy-day funds
$\beta_1$	-0.481** (0.190)	-0.301** (0.123)	-0.665*** (0.0952)
$\beta_2$	-0.356 (0.388)	0.177 (0.358)	-0.366** (0.179)
$\beta_3$	0.0284 (0.188)	0.118 (0.216)	-0.222* (0.133)
$\gamma_1$	-0.724*** (0.218)	-0.819*** (0.208)	-0.496*** (0.101)
$\gamma_2$	-0.968** (0.449)	-0.855* (0.444)	-1.141*** (0.163)
$\gamma_3$	-0.270 (0.404)	-0.420 (0.408)	-0.283 (0.379)
Local government revenue per capita (in NOK 1000)	0.210*** (0.0663)	0.222** (0.0999)	0.231*** (0.0696)
Share of children (0–5 years)	-24.13 (23.36)	16.11 (27.56)	-21.70 (20.95)
Share of youths (6–15 years)	-24.42 (29.44)	8.269 (30.07)	-29.02 (26.67)
Share of elderly (80 years and above)	-17.16 (31.12)	16.28 (40.21)	-16.34 (23.18)
Unemployment	0.00820 (0.126)	-0.0713 (0.164)	0.0491 (0.122)
Population size (in 10,000)	2.811 (2.553)	2.069 (3.447)	2.513 (2.617)
Effective number of parties	0.136 (0.128)	0.220 (0.219)	0.202 (0.130)
Share of socialists	-1.689 (1.522)	-0.0124 (2.131)	-1.596 (1.295)
Rainy-day funds per capita (in NOK 1000)			0.0633*** (0.0128)
Total post-reform adjustment			
$\beta_1 + \gamma_1$	-1.205***	-1.120***	-1.161***
$\beta_2 + \gamma_2$	-1.324**	-0.678	-1.507***
$\beta_3 + \gamma_3$	-0.242	-0.302	-0.505
Estimation period	1994–2010	1994–2010	1994–2010
# of observations	1406	625	1584
# of local governments	389	191	389
# of instruments	78	78	78
Hansen p-value	0.45	0.36	0.89
$m_1$ (p-value)	0.71	0.28	0.10
$m_2$ (p-value)	0.69	0.29	0.90

Windmeijer-corrected standard errors in parentheses. Time dummies (not reported) are included in all equations. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1 Sample consists of local governments with deficits in the previous year (corresponding to Column (A) in Table 2).

## 6. Concluding remarks

The main requirement in the Norwegian BBR is operational budget balance. Actual deficits can be carried over, but has to be covered within two years. A reform in 2001 lifted the previous central government controls of budget and borrowing for local governments that comply with the BBR, while the controls still apply for local governments that have violated the BBR. The reform strengthened the incentives for fiscal responsibility by implicitly introducing administrative sanctions for violating the BBR. Moreover, the central government had to establish a register (Robek) to keep financial institutions informed about whether local governments need approval to raise new loans. The register has received much media attention and provides voters with reliable information about fiscal performance. Our empirical approach does not allow for identification of the underlying mechanisms. However, the study by Hopland (2014) indicates that the register has improved voter information through a list of shame effect, but it cannot be ruled out that reduced autonomy has an additional effect.

In this paper we have investigated whether the reform has contributed to a higher degree of fiscal adjustment. We find strong evidence that fiscal adjustment is stronger after the reform, in particular for local governments with past deficits that risk being listed in Robek. The same finding applies to local governments not in Robek, indicating that the fear of being listed, due to a list of shame

Table 5

Investigating the effects of the 2001 reform on local governments in economic balance, dependent variable is local net operating surplus per capita (NOK 1000).

	(A) Surplus last year	(B) Accumulated surplus last 2 years	(C) Accumulated surplus last 3 years	(D) Surplus each of the 3 last years
$\beta_1$	-0.0326 (0.199)	0.0330 (0.157)	0.0708 (0.183)	0.00967 (0.160)
$\beta_2$	-0.187 (0.150)	-0.212 (0.136)	-0.183 (0.118)	-0.203 (0.152)
$\beta_3$	-0.354*** (0.131)	-0.261** (0.111)	-0.276** (0.108)	-0.342** (0.137)
$\gamma_1$	-0.121 (0.276)	0.0325 (0.281)	-0.0632 (0.316)	0.0702 (0.262)
$\gamma_2$	0.0767 (0.0782)	-0.0954 (0.113)	0.0263 (0.110)	-0.105 (0.0900)
$\gamma_3$	-0.311** (0.151)	-0.309** (0.121)	-0.299** (0.0923)	-0.214* (0.122)
Local government revenue per capita (in NOK 1000)	0.561*** (0.0897)	0.578*** (0.0935)	0.547*** (0.0821)	0.566*** (0.114)
Share of children (0–5 years)	-4.007 (13.32)	3.072 (13.17)	7.738 (12.93)	6.266 (17.36)
Share of youths (6–15 years)	7.693 (11.73)	12.66 (9.817)	7.696 (9.527)	17.73 (13.31)
Share of elderly (80 years and above)	-3.945 (18.32)	1.033 (17.10)	-5.658 (17.77)	-0.795 (25.53)
Unemployment	-0.0195 (0.0966)	0.0623 (0.109)	0.0170 (0.0943)	-0.103 (0.161)
Population size (in 10,000)	4.759** (1.884)	3.686** (1.705)	4.002*** (1.519)	5.322* (2.887)
Effective number of parties	0.0995 (0.0902)	0.0938 (0.0880)	0.174** (0.0870)	0.120 (0.124)
Share of socialists	1.530 (0.978)	1.762* (0.955)	1.096 (0.823)	2.957** (1.455)
Total post-reform adjustment				
$\beta_1 + \gamma_1$	-0.154	-0.0624	0.00760	0.0799
$\beta_2 + \gamma_2$	-0.110	-0.307	-0.157	-0.308*
$\beta_3 + \gamma_3$	-0.665***	-0.570***	-0.575***	-0.556**
Estimation period	1994–2010	1994–2010	1994–2010	1994–2010
# of observations	5074	5350	5604	3332
# of local governments	428	428	428	421
# of instruments	78	78	78	78
Hansen p-value	0.02	0.03	0.08	0.09
$m_1$ (p-value)	0.00	0.00	0.00	0.02
$m_2$ (p-value)	0.45	0.63	0.93	0.68

Windmeijer-corrected standard errors in parentheses. Time dummies (not reported) are included in all equations. \*\*\*p &lt; 0.01, \*\*p &lt; 0.05, \*p &lt; 0.1.

effect and/or reduced autonomy, is sufficient to cover past deficits. Local governments with past surpluses are less affected by the reform, but there is some evidence in the direction of lower surpluses for this group.

Our main results of stronger fiscal adjustment for local governments with past deficits may be of interest beyond the Norwegian context. A first lesson is that lifting of budget and borrowing control does not necessarily lead to reduced fiscal responsibility. It may rather have the opposite effect if the controls are lifted only for local government that comply with the BBR. Conditional control means that violators of the BBR are met with sanctions. Second, some kind of register of local governments that have violated the BBR provides reliable and easily accessible information about fiscal performance. Third, the literature on fiscal rules emphasizes that sanctions must be credible in order to be effective (Journard and Kongsrud, 2003; Ter-Minassian, 2007). Administrative sanctions are often more credible than financial sanctions, since financial sanctions may give rise to a time-consistency problem because they are politically difficult to effectuate towards governments already in deficit. In our case the administrative sanctions have particularly high credibility since the sanctions are just the control regime that previously applied to all local governments. A possible objection against this reasoning is that the equalization system is sub-optimal in the sense that, even after equalization, there is a positive correlation between private income and local government revenue. If so, budget deficits can be interpreted as a way to communicate the sub-optimality of the equalization system. However, this objection is of less relevance in our case where the grant system produces a negative correlation between private income and local government revenue (see Section 4).

The analysis is particularly relevant for other unitary countries where the powers of the local governments are set by the central government. In federations, where the states and the federal government share powers, federal control of states' budget and borrowing may be unconstitutional. However, the analysis may still be of relevance for the relations between states and local governments also in federal countries.

## Declaration of competing interest

We are not aware of any conflict of interest regarding this publication.

## Appendix

### Appendix A. Descriptive statistics

Variable	Mean (st.dev)
Net operating surplus per capita (in NOK 1000)	1.22 (3.46)
Local government revenue per capita (in NOK 1000)	25.71 (12.73)
Share of children 0–5 years	0.08 (0.01)
Share of youths 6–15 years	0.13 (0.02)
Share of elderly 80 years and above	0.05 (0.02)
Unemployment (%)	2.45 (1.27)
Population (in 10,000)	0.93 (1.75)
Effective number of parties	4.12 (1.08)
Share of socialists in the local council	0.38 (0.15)

Based on the regression sample in Table 1, Column (A).  $N = 7577$ .

All monetary values are in constant 2011 prices.

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