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Institutions improving fiscal performance: evidence from Swedish municipalities

Jens Dietrichson Lina Maria Ellegård

Abstract

Conflicts of interest within hierarchic government organizations regarding the importance of fiscal discipline create the need for institutions that curb the bargaining power of units in charge of implementing policy and align their incentives to the interests of the whole organization. We examine this general public sector problem by collecting unique data on budget institutions and conflicts of interest within the Swedish municipalities. Our estimations suggest that institutions pertaining to both the planning stage and the implementation stage of the budget process are important for fiscal performance. The fiscal surplus is higher in municipalities that have centralized their budget process to some degree, and where local committees are allowed to carry over surpluses or forced to carry over deficits between fiscal years. The associations however differ between municipalities with different degrees of conflicts of interests, calling for further research to understand the incentives given by the result carry-over rules. We further find that the fiscal surplus is higher in municipalities where local managers face a relatively high risk of dismissal as a consequence of budget deficits.

1 Introduction

How to achieve satisfactory fiscal performance is a persistent challenge at all levels of government. The importance of this challenge has been all the more evident in the aftermath of the financial crisis in 2008, as the recession has severely strained the finances of many countries, regions, and municipalities.

One suggested response to the challenge is to strengthen budget institutions – that is, the formal rules and informal norms related to the drafting, approval and implementation of the budget. Previous research suggests that institutional features such as transparent budget documents (e.g. Eslava, 2011), centralized budget processes (e.g. von Hagen and Harden, 1995; Hallerberg and von Hagen, 1999), and, if properly enforced, balanced budget rules (e.g. Bohn and Inman, 1996) improve fiscal performance.¹

This study analyzes the relationship between budget institutions and fiscal performance in the Swedish municipalities, thus adding to the literature on sub-national budget institutions.² We fill a gap in the current literature by examining institutional features that concern the sub-units in charge of implementing policy: rules allowing sub-units to transfer surpluses or deficits to the next budget year – henceforth referred to as result carry-over rules – and the threat of dismissal following non-compliance to the budget. These *incentive-aligning institutions* are interesting in relation to an assumption that is mostly implicit in the empirical part of the literature: that agents within government organizations have conflicting interests with regards to the appropriate level of spending and the importance of fiscal discipline. Compared to centrally placed agents, like a mayor or finance minister, politicians and bureaucrats responsible for specific policy fields (e.g. education or social services) are likely to advocate more spending on their own field and be less concerned about overall fiscal discipline. In our context, these *conflicts of interest* are incarnated in the relation between the centrally placed municipal council and executive committee on the one hand, and the multiplicity of local committees and bureaucracies in charge of implementing policy on the other hand (henceforth referred to as the “central” and the “local” level).

For empirical research, the assumption of conflicting interests has two implications. First, if there are conflicts of interests between central and local levels, then approving a balanced budget does not by itself guarantee satisfactory fiscal performance. When the budget is to be implemented,

¹Poterba (1996); Alesina and Perotti (1999) and Eslava (2011) survey this literature.

²See e.g. Poterba (1994), Bohn and Inman (1996), Strauch and von Hagen (2001), and Krogstrup and Wälti (2008) who find that self-imposed balanced-budget rules are correlated to lower deficits; Foremny (2014) and Grembi et al (2013) who find positive effects of fiscal rules imposed by the central government on fiscal performance; and Feld and Kirchgässner (1999), Hagen and Vabo (2005), Tovmo (2007), and Jochimsen and Nuscheler (2011) who find that centralization of the budget process is positively associated to (some) measures of fiscal performance.

the politicians and bureaucrats responsible for specific fields will continue to pursue their own agendas, unless they are restricted from doing so. Though this point has been acknowledged in previous research (e.g. von Hagen and Harden, 1995; von Hagen, 1998; Hallerberg and von Hagen, 1999), empirical analyses typically incorporate budget institutions related to the implementation stage in index measures capturing features of the whole budget process. This makes it impossible to disentangle the effect of institutions specifically related to the implementation stage. Second, as budget institutions should be more important for fiscal performance when there is a conflict for them to solve, analyses failing to control for the degree of conflict may underestimate the importance of budget institutions. However, few empirical studies have tried to measure the severity of conflicts of interest.³

To address these problems, we construct a survey and collect a unique dataset covering 265 out of 290 municipalities. The large cross-section allows us to study institutions related to the planning and implementation stages separately. Roughly half of the survey respondents state that there is substantial disagreement between the central and local levels regarding the importance of fiscal discipline. We take these conflicts into account in our empirical analysis of whether a set of budget institutions are associated with better fiscal performance (operationalized by the size of the fiscal surplus, i.e. operating revenues net of costs).

With regards to the planning stage of the budget process, we measure the degree of involvement and bargaining power of the local level during the drafting of the budget. This institution is closely linked to the theoretical concept of a centralized planning stage described by von Hagen and Harden (1995). Like many previous studies, we find indications that a centralized planning stage is associated with a larger fiscal surplus. When it comes to the implementation stage, our results indicate that both surplus and deficit carry-over rules are positively associated with the fiscal surplus, at least when combined with a centralized planning stage. The two carry-over rules appear to work differently depending on the severity of conflicts of interests though: surplus carry-over rules have a positive influence in municipalities with relatively large conflicts, while the deficit rule is beneficial in settings with smaller

³To the best of our knowledge, none have done so using field data. Serritzlew (2005) and Ehrhart et al (2007) tests predictions of the Ferejohn and Krehbiel (1987) model of top-down and bottom-up budgeting in laboratory experiments, and show that there is no straightforward relationship between the sequence of the budget decisions and the size of the budget; the outcome also depends on the preferences of players.

conflicts. Importantly, these estimates do not support the commonly held view that flexibility to transfer funds between fiscal years in general should be avoided (von Hagen and Harden, 1996; Fabrizio and Mody, 2006). We further find that the fiscal surplus is higher in municipalities where the management of the bureaucracy face a tangible risk of being dismissed following systematic budget deficits.⁴ A final and important result of our analysis is that the institutional framework of both the planning stage and the implementation stage matter for the fiscal surplus. Specifically, municipalities that combine a centralized planning stage with incentive-aligning institutions at the implementation stage have larger surpluses than municipalities that do not employ any of the proposed institutions, or only employ institutions related to one of the stages.

Our cross-sectional analysis is obviously an insufficient basis for causal conclusions. Nonetheless, the results suggest some fruitful directions for future empirical research in other contexts, as well as for theoretical developments.

The next section gives an introduction to the Swedish municipalities. In Section 3, we describe our hypotheses about the relation between institutions, conflicts of interest and the fiscal surplus. Section 4 describes the survey and data, while Section 5 describes our empirical strategy. Our results are presented in Section 6, while Section 7 discusses identification issues and concludes.

2 The Swedish municipalities

Sweden is divided into 290 municipalities: geographically separated units for local government. Municipal expenditures accounted for approximately 14 percent of Swedish GDP in 2010, almost half of the public sector's total expenditures for final consumption and investments (Statistics Sweden, 2011). All municipalities have the same fundamental responsibilities, e.g. the pre- to upper secondary school system, elderly care, social services, build-

⁴An earlier unpublished study by Dahlberg et al (2005) find no correlation between result carry-over rules and fiscal performance in the Swedish municipalities. Liebman and Mahoney (2013) find that procurement spending is unusually high, and project quality lower, at the very end of the year in US government agencies, which typically cannot transfer surpluses. To the best of our knowledge, threats of dismissal have not been studied before in the context of local governments.

ing and planning issues, environmental protection, and fire department services (Brorström et al, 1999). Nonetheless, the principle of municipal self-government, written into Sweden's constitutional laws, implies considerable freedom to choose how activities should be organized and financed (Berlin and Carlström, 2003).

In 2010, revenue from income taxes made up approximately 65 percent of total municipal revenues, fees 21 percent, and government grants from an equalization system 12 percent (Statistics Sweden, 2011). The size of the transfer from (or to, in some cases) the equalization system is wholly determined by factors such as demography and tax base size, i.e. factors that are difficult for a municipality to manipulate. Ideological concerns play a minimal role in the equalization system; there have been no major changes of the system since 2005, despite the majority change at the national political level in 2006 (Statskontoret, 2013). Tax and fee rates are set freely by each municipality. The decisions about tax and fee rates are taken in conjunction with the approval of the budget, i.e. in the autumn preceding the fiscal year. The realized amount of revenues during the fiscal year is thus a function of the realized tax base and service demands, factors which are largely out of the municipality's control in the short run.

Swedish law stipulates that each municipality must have a council and an executive committee. The council is appointed through general elections, held every four years at the same time as national elections, and the executive committee is appointed by the council (Brorström and Siverbo, 2001). Together, the council and the executive committee constitute the central level of the municipality. In most municipalities, the council chooses to delegate the responsibility for different services to a lower hierarchical level consisting of several political committees, generally defined by function (e.g. schools, social services) and/or by geography (e.g. a district). The representatives of these local committees are appointed by the council, normally after each election. While these politicians are not necessarily directly elected (they may be if they also have seats in the municipal council), they are certainly affected by electoral concerns as party rankings and nominations for national and regional elections are determined partly by the perception of popularity and how politicians perform in local committees. Administrative units with employed civil servants are connected to each local committee.

The municipalities are obliged to specify an annual budget, which should contain a plan for the coming year, and a long-term budget for the subsequent two years. The balanced budget law, enacted in 2000, moreover states that

a budget deficit one year must be followed by an equally large surplus over the next three years. Nevertheless, the law allows for exceptions⁵ and is not enforced by any sanctions.

According to the bills preparing the legislation, the balanced budget requirement should be regarded as a minimal demand (Swedish Government, 2004). Empirically, nearly all municipalities have formulated more ambitious financial targets; a common target is to aim for a surplus of 1-2 percent of total tax and grant revenues (Dahlberg et al, 2005; Brorström et al, 2009). The main reason to strive for surpluses is that the municipalities have separate operating and capital budgets. Investments in capital generate expenditures immediately, but they only become costs in the form of write-offs. As investment expenditures normally are higher than write-offs, municipalities need to run surpluses to be able to finance investments without taking on more debt.

3 Theoretical framework

This section draws on the most relevant earlier literature to construct a motivating framework for our empirical investigation of what institutions, and what combinations of these are conducive to fiscal performance in situations characterized by conflicts of interest.⁶ Following North (1990; 2005), we identify institutions with the (formal and informal) rules and enforcement characteristics of this game. In the online appendix, we show that the hypotheses derived from the informal reasoning presented here can also be derived from a formal game-theoretical model of the budget process.

We see the budget process as being mainly a game with two types of players, central and local. Translated to the context of Swedish municipalities, the central player corresponds to the council and the executive committee and its administrative units, while local players corresponds to operating branches, for example the committee and administration of public schools.⁷

⁵E.g. if the deficit is caused by unconverted losses in stocks and bonds, or if the municipality has previously amassed large amounts of wealth (Swedish Government, 2004).

⁶We focus on budget institutions and thus disregard the large and related literature emanating from Roubini and Sachs (1989), that examines the effect of weak governments on fiscal performance. See e.g. Ashworth et al (2005) for a review of the (mixed) results of this literature. We do however acknowledge strength of government in the empirical analysis, see section 4.

⁷Treating the central and local levels as unitary players abstracts from the possibility

We direct our attention to two stages of the budget process: the planning stage, during which the budget is drafted and approved, and the implementation stage, during which it is executed.⁸ Previous research, as well as the features of the two stages, suggests that each stage has its own crucial institutional features. At the planning stage, the degree of *centralization* of the drafting and approval process is a crucial feature. At the implementation stage, the prevalence (or absence) of *incentive-aligning institutions* that restrain the spending of the local level are important.

3.1 The planning stage

Bargaining over the budget draft is a key feature of the planning stage. Weingast et al (1981) were the first to suggest that excessively high (and Pareto-dominated) levels of spending can be explained by a common-pool problem present at the planning stage. von Hagen and Harden (1995) show that this problem can be addressed by changing the balance of bargaining power in favor of a centrally appointed player (e.g. a finance minister), who, in contrast to ministers with specific portfolios, takes the full costs of each proposal into account.⁹ In our context, the central level has a similar role as a finance minister, while the committees and administrations at the local level are only responsible for their respective service area. Although it seems reasonable to assume that the local level is relatively relatively spending-

that politicians and civil servants within each level have different preferences. For the purposes of this paper, we think that central-local conflicts of interests are more important.

⁸This choice precludes a theoretical treatment of the transparency of the budget process, suggested to be important by e.g. Alt and Lassen (2006) and Eslava (2011), and of how voter preferences and mobility affect the choice of institutions and the intensity of conflicts of interest. Though it is possible that mobile voters (and politicians) would eliminate differences in institutions and conflict intensity over time, we are not able to address these issues with our current data (see section 7.1 for a discussion of the limitations of our empirical results). In this regard, it is interesting to note that there is substantial variation in the institutional set-up and conflicts of interest in the Swedish municipalities according to our survey data.

⁹Empirically, positive associations of centralization with fiscal performance have been found in the EU (von Hagen and Harden, 1995), Asia (Lao-Karaya, 1997), Latin America (Alesina et al, 1999; Stein et al, 1999), Africa (Gollwitzer, 2010), American states (Strauch and von Hagen, 2001), and in Norwegian municipalities (Hagen and Vabo, 2005; Tovmo, 2007). However, Dahlberg et al (2005) and Perotti and Kontopoulos (2002) find no significance of centralization-type institutions in Swedish municipalities and OECD countries, respectively.

prone compared to the central level, the local level's spending is not likely to be completely unrestrained. Wildavsky (1975, p. 6-8) argues that there must be an element of cooperation and a shared understanding of the limits for budgetary proposals if an organization is to be able to function at all. Thus, the local committees may but need not be budget maximizers as the bureaus in for example Niskanen (1968).

Following von Hagen and Harden (1995), we call the planning stage *centralized* when the bargaining power of the local level is constrained in some way, for example by restrictions on the share of resources bargained over, or on the possibilities of proposing amendments.¹⁰ That the possibility of making proposals is correlated to bargaining power can be rationalized by the fact that budget proposals of local committees are typically made publicly known through the media in Swedish municipalities. Thus, popular proposals are costly to decline for the central level.

3.2 The implementation stage

If the fiscal preferences of players at the central level differ from those of agents at the local level, who take the actual spending decisions, incentive-aligning institutions at the implementation stage are necessary to prevent the local level from spending in excess of the budget (Hallerberg and von Hagen, 1999). Balanced budget rules and other numerical targets are examples of institutions intended to constrain agents. Poterba (1996) and Eslava (2011), who review the literature on numerical targets, underline that, although several studies find a positive correlation to fiscal performance, rules are only effective if enforced. Bohn and Inman (1996) find that balanced budget rules in American states that are enforced by the state supreme court have a positive impact on fiscal performance, and that the rule is more binding in appointed, as opposed to elected, supreme courts. The results in Debrun et al (2008) for the countries in the European Union suggest that features such as statutory basis, independent monitoring and enforcement, automatic correction mechanisms, and media coverage are all important.

Note that neither centralization nor incentive-aligning institutions ought to be necessary if the central and local level are in complete agreement over the desired level of spending and fiscal surplus. In this case, it should be pos-

¹⁰Agenda-setting is often associated with bargaining power in political economy-models (e.g. Persson and Tabellini, 2000; Tovmo, 2007).

sible to agree on a budget and all deviations from this budget ought to reflect that spending cannot always be perfectly controlled by local committees.

In sum, if there are conflicts of interest, then we expect that the fiscal surplus will be higher if *i*) the planning stage is relatively centralized, or *ii*) the municipality uses incentive-aligning institutions at the implementation stage. The need for strong institutions increases when conflicts of interests over spending increase. Furthermore, *iii*) there are reasons to expect the fiscal surplus to be higher if the planning stage is centralized *and* there are incentive-aligning institutions, than if only one of these institutions are in place. If the local levels have enough bargaining power in the planning stage, they can force the central level to determine a budget in line with their own preferences; a budget that they can simply comply with in the implementation stage. As the central level is unlikely to punish the local level for complying with the budget, incentive-aligning institutions make no difference in this case. Similarly, if incentive-aligning institutions are sufficiently weak, the local committees can simply disregard the budget and implement their own preferred level of spending, regardless of their bargaining power in the planning stage.

4 Data

For the empirical investigation we need measures of conflicts of interest, the degree of centralization, and candidates for incentive-aligning institutions. To obtain such data, we constructed a survey that was sent to all 290 Swedish municipalities in June 2010 (see the online appendix for a translation of the survey questions). The electronic survey was addressed to the civil servant in charge of planning and implementing the overall budget, i.e. the budget manager. Respondents were promised confidentiality.

We modelled the survey after a similar survey conducted by the Swedish Association of Local Authorities and Regions (SALAR) in 2004 (Dahlberg et al, 2005). Our survey differs from the 2004 survey in important respects though; for example, the older survey does not record whether there are conflicts of interest between the central and local levels. To validate the survey questions, we discussed them with the budget manager and one of his close co-workers in the municipality of Helsingborg (the 9th largest municipality), and with representatives of SALAR.

As many as 265 of the municipalities responded to the survey (91 per-

cent). With regards to representativeness, it can be noted that the 25 non-responding municipalities are significantly smaller and have higher tax rates, smaller income tax bases and lower net revenues than the responding municipalities. For individual survey questions, the response rates are often lower than 91 percent (we analyze the differences in response rates between questions in the online appendix). This implies that our estimation sample consists of fewer than 265 observations.

Data on fiscal surplus and additional control variables are obtained from Statistics Sweden (2011).

4.1 Measuring conflicts of interest

To measure conflicts of interests over fiscal matters between the central and local levels, the budget managers were asked to indicate the situation that best describes their municipality:¹¹

1. the executive committee and the municipal council are more concerned about fiscal discipline than local committees;
2. the executive committee, the municipal council and the local committees do not differ significantly in their concerns about fiscal discipline;
3. local committees are more concerned about fiscal discipline than the executive committee and the municipal council.

The survey answers are translated into the dummy variable ci , which equals 1 if the executive committee/municipal council are more concerned about fiscal discipline (alternative 1) and 0 otherwise.¹² 56 percent of the 239 municipalities that responded to the question chose alternative 1, i.e. the budget manager estimated that there were conflicts of interest of some substance.

We are confident that the budget manager is the most suitable person to judge the situation, as the manager has a coordinating role in the budget process and closely follows the local committees throughout the budget year.

¹¹The translation of the Swedish survey question into English is not perfect, the question uses an idiom (“en ekonomi i balans”) in use in the municipalities, which does not literally translate as “fiscal discipline”. We think that fiscal discipline conveys the meaning of the idiom better than the literal translation (“a balanced economy”).

¹²Only two municipalities indicated alternative 3. The results are not affected by putting them in the same category as those who chose alternative 2.

It is moreover important to note that the budget manager has little interest in stating a certain response in order to look better her-/himself, the question regards the committee politicians.

The variable is a crude measure of the degree of conflicts though, as respondents' individual cut-off points for choosing one alternative over another are subjective and likely to differ. Therefore, some municipalities that according to an objective measure would be categorized as having substantial conflicts may choose alternative 2, and vice versa. Such mis-categorizations decrease the difference between the groups in terms of real conflicts of interest, which makes it more difficult to empirically detect between-group differences in how budget institutions work.

The concern for fiscal discipline likely differs somewhat between the two levels even in municipalities that chose alternative 2, as each local committee is responsible for only one part of the municipality's services and moreover partly functions as advocate for its own area. For the empirical analysis, this implies that the expected difference in the workings of the budget institutions becomes a matter of degree; effective institutions are not unthinkable in municipalities that chose alternative 2, but we expect them to be less important.

4.2 Centralization of the budget process

We use three survey questions to measure the degree of centralization during the planning stage of the budget process. The first asks whether the budget process is initiated by the executive committee or by the local committees. If the executive committee initiates the process, a follow-up question asks whether the local committees have large, limited, or no possibilities of proposing adjustments to the executive committee's budget proposal. The third question asks whether demographic factors and pre-set unit costs (e.g. schooling costs per pupil) govern the resource allocation to a large extent, to some extent or to a small extent. This question is an attempt to measure the size of the resources that are bargained over (if bargaining possibilities exist). The possibility of making budget proposals should make little difference for the local committees, if they only bargain over a negligible share of total resources.

We divide the municipalities into four categories, ordered from most centralized (1) to least (4), which are summarized in Table 1. As an example, category 4, the most decentralized category, contains municipalities where

Table 1: Classification of degrees of centralization

Budget initiation	Adjustment proposal	Scope for bargaining	Centralization category
Central	Large	Large	4
Central	Large	Some	3
Central	Large	Small	1
Central	Limited	Large	3
Central	Limited	Some	2
Central	Limited	Small	1
Central	None	Large	1
Central	None	Some	1
Central	None	Small	1
Local	N.A.	Large	4
Local	N.A.	Some	3
Local	N.A.	Small	1

a large share of total resources is bargained over and either the local committees initiate the budget process, or the executive committee initiates the budget process but local committees have large possibilities of making adjustment proposals. Of the 249 responding municipalities, 18 percent are in category 1, 14 percent in category 2, 45 percent in category 3, and 23 percent in category 4.¹³

4.3 Incentive-aligning institutions

Incentive-aligning institutions can take various shapes empirically. Monetary bonus schemes readily come to mind, but such schemes are virtually non-existent in Swedish municipalities.¹⁴ We therefore examine a set of other institutions, to see whether they possess incentive-aligning properties.

As a first candidate, we consider *result carry-over rules*: rules stating that

¹³Our measure of centralization is not directly comparable to any measure in the 2004 survey. The first two questions are similar to those used to measure centralization in Tovmo (2007). Tovmo does not include any measure of the share of resources that are bargained over though.

¹⁴Only one municipality in our survey reports the use of bonus schemes related to surpluses, despite the nearly universal prevalence of surplus targets.

local level surpluses/deficits are to be transferred to the next budget year. Note that we do not mean rules regarding whether deficits are at all *allowed* or not on the municipal level, which is a common use of the term (see Alt and Lowry (1994) for a discussion of this in relation to US states). Result carry-over rules in our sense of the term have been hypothesized to decrease the fiscal performance of national governments (e.g. von Hagen and Harden, 1996; Fabrizio and Mody, 2006), but there are several reasons why we rather think such rules would restrain local-level spending within municipalities. A surplus carry-over rule reduces the local level’s incentives to spend its entire budget each year, as unspent resources one year does not equal “wasted money” if it can be carried over to the next year’s budget (Liebman and Mahoney, 2013). The reward of forwarding a surplus increases the autonomy of the local level, as it implies greater possibilities of allocating its resources as it sees fit over time.¹⁵ The surplus rule moreover sends a signal of trust and thus of respect.¹⁶ Given that there is a binding budget restriction at least in the long run, the deficit carry-over rule may create incentives not to run deficits by introducing a trade-off between spending in the current year and the coming years.

The variables *keep surplus* and *keep deficit* indicate the presence of either carry-over rule. *Keep surplus* equals 1 if the local committees/administrations carry over surpluses (wholly or partly) from one fiscal year to another, and 0 otherwise. *Keep deficit* equals 1 if the local committees/administrations carry deficits over to subsequent fiscal years, and 0 otherwise.

A second way to punish non-complying committees and managers is to replace them. For example, the municipal council has the authority to dissolve or reorganize a local committee, or change its responsibilities. Two dummy variables measure the risk of dismissal: *committee risk* and *manager risk*. To construct *committee risk*, we ask respondents whether a scenario of non-incident and repeated deficits would constitute a sufficient reason to replace the members of the largest local committee.¹⁷ A positive answer

¹⁵Wilson (1989, pp. 179-195) argues that public organizations often value autonomy as much as, or more than, additional resources.

¹⁶See e.g. Ellingsen and Johannesson (2007) and the references therein for how esteem and respect may align interests between principals and agents.

¹⁷The “largest” administration/committee refers to the one with the highest level of spending. As spending levels vary greatly among the different local committees/administrations in a municipality, there is substantial heterogeneity in their impacts on the overall fiscal surplus, and it is therefore unlikely that all committees/administrations

implies a value of 1 on the variable, which otherwise is coded as 0. *Manager risk* is constructed in a slightly different way.¹⁸ We first ask whether a scenario of non-incident and repeated deficits would constitute a sufficient, or a conducive but not sufficient, reason to replace the manager of the largest local administration. Respondents who answer that such a situation could be a conducive but not a sufficient reason are presented with a similar scenario, with the modification that the administration has made efforts to reduce the deficit. *Manager risk* equals 1 for those municipalities who answered that either of the two scenarios would constitute a sufficient reason to replace the manager, and 0 for the others.

Table 2 shows descriptive features of our candidate incentive-aligning institutions. 45 percent employ a surplus carry-over rule, while one out of three municipalities employs the corresponding rule for deficits. The correlation between the two rules is quite high, $\rho = 0.64$. It can moreover be noted that the regulations of surpluses and deficits have changed in 25 (surplus rule) and 28 percent (deficit rule) of the responding municipalities between the 2004 and 2010 surveys.

68 percent of the respondents state that systematic deficits increase the risk that a local committee will be replaced. The risk is even higher for local managers – 78 percent of the respondents indicate the presence of such a risk. The two institutions are moreover highly correlated, $\rho = 0.68$. As seen in the table, the questions making up *committee risk* and *manager risk* have relatively low response rates (66 and 72 percent, respectively). Non-respondents are significantly different from respondents in some respects; for example, they have larger surpluses. There were no corresponding questions about risk of replacement in the 2004 survey.

4.4 Dependent variable

As our dependent variable, we use the *fiscal surplus*, defined as the per capita operating revenues net of costs. This and all other economic variables are measured in 2010 prices. We focus on surpluses/deficits rather than balance

are treated similarly with respect to deficits/surpluses. We restrict attention to the largest committee as the question would be difficult to answer if framed in a more general way, due to the heterogeneity.

¹⁸We would have preferred to construct the two variables in this way, but to limit the number of survey questions, we specified *committee risk* – which we ex ante believed to be less effective – in a simpler way.

Table 2: Incentive-aligning institutions

Variable	N	Mean	S.d.	Min	Max
<i>keep surplus</i>	255	0.45	0.50	0	1
<i>keep deficit</i>	256	0.33	0.47	0	1
<i>committee risk</i>	174	0.68	0.47	0	1
<i>manager risk</i>	191	0.78	0.42	0	1

sheet measures such as debt per capita or the equity ratio because our institutions are only indirectly connected to the balance sheet through the level of the fiscal surplus. A surplus increases equity, and decreases the need to borrow so there is a clear relationship also to the change in the debt level. Moreover, as stock measures, debts and equity ratios are heavily influenced by extraordinary historical events (e.g. sales of large public companies) and can thus be misleading in a cross-sectional setting.

The mean of per capita fiscal surplus in 2010 is 1 360 SEK per capita (approximately 160 EUR). This is about 2.9 percent of average tax and grant revenues and may seem high, but recall from section 2 that surplus targets are the norm due to separate operating and capital budgets. Moreover, to dampen the consequences of the concurrent recession, the central government made extra inter-governmental transfers (of the same per capita size for all municipalities) in 2009 and 2010; therefore, the recession did not have a large impact on revenues these years. As many municipalities had already decided on the 2010 budget when the transfers were announced, revenues often became higher than what was expected in the budget. Notably though, despite the balanced budget law, 6 percent of the municipalities ran deficits in 2010. This is somewhat below the average share running deficits during 2003-2009, which is 18 percent.

The fiscal surplus measure does not include so-called *extraordinary revenues/costs*.¹⁹ This suits our purposes well, as we want to capture systematic components of the municipalities' fiscal performance, rather than large exogenous shocks. In order not to classify municipalities that temporarily run deficits to reduce previous high surpluses as irresponsible, we moreover in-

¹⁹Note that the extra transfer from the central government is *not* counted as extraordinary. Generally, almost all revenues and costs are regarded as ordinary; extraordinary is reserved for e.g. natural disasters and sales of firms owned by the municipality (Council for Municipal Accounting, 2006).

clude the equity ratio and mean net revenues over the period 2000-2007 in the estimations (the chosen period corresponds approximately to the latest completed business cycle in Sweden).

A drawback of our approach is that the surplus is not an unambiguous measure of better fiscal performance in a normative sense; municipalities are supposed to provide adequate services in a fiscally responsible way, not to maximize profits.²⁰ One way to circumvent this problem would be to relate the actual fiscal surplus of each municipality to the level specified in the budget (assuming that the budgeted level represents a fiscally sustainable level). We have manually collected information on the budgeted level of surplus from the 2010 annual reports of almost all municipalities in our sample. It turns out that the average difference between actual and budgeted level of net revenues is very large, 898 SEK per capita (66 percent of the average actual fiscal surplus). This large difference likely reflects the extra transfers from the central government, which also suggests that many municipalities did not adjust their budgeted level of expenditures, which was typically low given the bad economic outlooks, after the transfer was announced.

The difference may also reflect factors such as bad forecasting, caution, or a desire to surpass expectations, and may therefore not be strongly related to a fiscally sustainable level. It is moreover conceivable that the budgeted level depends on what is deemed feasible given the set of budget institutions and the degree of conflict of interests. Because of these issues, we do not include the budgeted level in our baseline specifications, though a specification including this variable is shown in the online appendix. Including the budgeted level does not change our conclusions regarding the budget institutions.

4.5 Control variables

Some municipalities may be more likely to employ budget institutions than others. In our case, the carry-over rules are more common and the budget process more centralized the larger, richer (in terms of personal income), younger, better educated and more right-wing the population (significant at

²⁰In short run analyses, this argument applies with even greater force to the debt level and the equity ratio (and changes in these). For example, investments in e.g. housing and roads increases the debt level and lowers the equity ratio, but it may of course be fiscally sound to invest in infrastructure.

10 percent level in t-tests).²¹ Although these municipalities have a relatively strong income tax base, their per capita total municipal revenues are significantly lower. This is explained by the intergovernmental equalization system, which favours municipalities with smaller income tax bases and unfavourable demography. Nonetheless, the municipalities using carry-over rules and/or a centralized budget process have higher equity ratios than other municipalities. The prevalence of *manager risk* and *committee risk* is higher in the same type of municipality, although there are no statistically significant differences in the share of right-wing voters, and the differences with regard to economic or political control variables are smaller and often statistically insignificant.

As these background variables are also likely to be correlated with the fiscal surplus, we control for them in the analysis. Definitions of the control variables, as well as some structural controls, are found in Table 3, while Table 4 shows descriptive statistics for 2010.

Because of high collinearity, we cannot simultaneously include *total revenues* and *income tax base* in the analysis. In the choice between the two, we settle for the former, which should increase precision. One may argue that revenues, in contrast to the income tax base, are endogenously determined. However, almost all discretionary parameters (i.e. tax and fee rates) are fixed in the budget before the start of the fiscal year and the revenues from the equalization system are exogenous; during the fiscal year, local committees/administrations have little influence over revenues and mainly affect the fiscal surplus through their spending decisions. We show in the online appendix that our estimates are similar in magnitude, but somewhat less precise, when we include the income tax base and equalization grants as controls instead of *total revenues*.

We also include *fixed asset revenues* and *financial costs* as control variables, not because we believe that these are related to the institutional structure, but to reduce variation in the dependent variable that stems from rare events, which do not say much about how budget institutions influence fiscal performance.

Importantly, the five budget institutions are more common in municipalities where the *long-term budget* is viewed as important according to the survey. As *long-term budget* is a plausible proxy for central level fiscal am-

²¹As the education level is highly collinear to the population size, we do not include the education level among the control variables.

Table 3: Description of control variables

Variable	Type	Description
<i>total revenues</i>	Economic	Per capita total revenues (KSEK)
<i>relative change in total revenues</i>	Economic	Change, tot. rev. between t and $t - 1$ (%)
<i>fixed asset revenues</i>	Economic	Realization of fixed assets (% of tot. rev.)
<i>financial costs</i>	Economic	Interest, asset write-downs etc. (per capita)
<i>equity ratio</i>	Economic	Private equity/total assets in $t - 1$
<i>mean net rev. 00-07</i>	Economic	Mean net revenues 2000-2007 (KSEK)
<i>share right-wing parties</i>	Political	Right-wing seats in municipal council (%)
<i>herfindahl</i>	Political	$h = \sum_i (\text{vote share of party } i)^2$
<i>long-term budget</i>	Political	LTB viewed as important
<i>population</i>	Demographic	Population (log)
<i>population 20-79</i>	Demographic	Population share in ages 20-79 (%)
<i>cities</i>	Structural	Dummy for larger cities
<i>rural</i>	Structural	Rural location
<i>suburb/commuter/manufacturing</i>	Structural	Municipality either suburban, or large share commuters/manufacturing industries

Table 4: Descriptive statistics, dependent and control variables

Variable	Mean	Std. Dev.	Min.	Max.	N
<i>fiscal surplus</i> ^a	1.36	1.62	-11.78	16.13	265
<i>total revenues</i> ^a	59.63	7.42	43.23	88.41	265
<i>relative change in total revenues</i>	2.32	2.82	-9.44	31.17	265
<i>fixed asset revenues</i> ^a	2.34	8.61	0	90.0	265
<i>financial costs</i> ^a	0.41	0.58	-0.09	6.32	265
<i>equity ratio</i>	50.08	17.72	-13.69	81.83	265
<i>mean net revenues 00-07</i> ^a	0.53	0.53	-1.29	2.58	265
<i>share right-wing parties</i>	44.92	11.64	6.45	88.89	265
<i>herfindahl</i>	0.25	0.05	0.16	0.43	265
<i>long-term budget</i>	0.53	0.5	0	1	257
<i>population (log)</i>	9.87	0.95	7.81	13.65	265
<i>population 20-79</i>	70.80	1.62	64.44	77.17	265
<i>cities</i>	0.11	0.31	0	1	265
<i>rural</i>	0.13	0.34	0	1	265
<i>suburb/commuter/manufacturing</i>	0.41	0.49	0	1	265

^aIn thousands of SEK per capita

All data from 2010, except for *equity ratio* (2009).

bitions, we include it in the empirical specification to partly deal with the problem that budget institutions and the fiscal surplus may be simultaneously determined by such ambitions (Bohn and Inman, 1996; Eslava, 2011). Notably, *long-term budget* is the only significant variable in a similar analysis performed in Dahlberg et al (2005). As *mean fiscal net revenues 00-07* and *equity ratio* too reflect the central level’s fiscal ambitions, the inclusion of these variables also addresses this omitted variables problem to some extent. We use the value in 2009 for *equity ratio*, as the ratio in 2010 year is directly affected by the net revenues the same year. It can lastly be noted that the variable capturing conflicts of interests, *ci*, shows no strong pairwise correlation to the mentioned background variables (although Ellegård (2013) shows that conflicts are slightly more common in smaller municipalities). We discuss issues of endogeneity and identification more in-depth in section 7.1.

5 Empirical strategy

In Section 6.1, we explore whether the fiscal surplus is positively correlated to any of our candidate incentive-aligning institutions (*keep surplus*, *keep deficit*, *manager risk* and *committee risk*), and to our measure of *centralization*.²² Recalling that our estimates may be overly conservative if we omit the degree of conflicts of interest from the analysis, we interact each institution with the indicator for a substantial conflict of interest over fiscal discipline (*ci*) and thus estimate

$$fiscal\ surplus_i = \alpha + \mathbf{institution}'_i \boldsymbol{\beta}_0 + (ci_i \times \mathbf{institution}_i)' \boldsymbol{\beta}_1 + \beta_2 ci_i + \mathbf{x}'_i \boldsymbol{\gamma} + \varepsilon_i \quad (1)$$

where **institution** is a 5×1 vector including the four potentially incentive-aligning institutions and the centralization variable, **x** is the vector of control variables, and ε is a random error term. $\boldsymbol{\beta}_0$ and $\boldsymbol{\beta}_1$ are 5×1 vectors of parameters for the institutional variables and their interactions with *ci*. In the following, we refer to β_n^j , $n = 0, 1$ and $j = ks, kd, mr, cr, c$, when discussing the parameter estimates for *keep surplus*, *keep deficit*, *manager risk*, *committee risk* and *centralization*, respectively.

²²As previously noted, non-response is relatively high for the two *risk* variables. Instead of dropping these observations and lose efficiency, we include dummies for non-response to the *risk* questions. The results are qualitatively similar if we exclude the non-responding municipalities (see the online appendix for results).

After having estimated Eq. (1) to identify (in a very tentative sense) effective institutions, Section 6.2 addresses the theoretical suggestion that the strength of the institutional framework affects the surplus. We start by checking whether municipalities with a larger number of institutions (*NofInst*) tend to have higher surpluses.²³

$$fiscal\ surplus_i = \alpha + NofInst'_i\beta_0 + (ci_i \times NofInst_i)'\beta_1 + \beta_2 ci_i + \mathbf{x}'_i\gamma + \varepsilon_i \quad (2)$$

We then go beyond this quantitative definition of institutional strength to explore whether municipalities employing both centralization *and* incentive-aligning institutions perform better than municipalities employing only centralization, only incentive-aligning institutions, or neither. The econometric specification of this estimation depends on findings from the estimation of Eq. (1) and is therefore described in Section 6.2.

There are some influential observations (Cook’s distance $> 4/n$), typically characterized by extreme values in terms of the fiscal surplus. By investigating the annual financial report of each outlier, we detect whether their extreme outcomes can be explained by rare events and/or book-keeping technicalities. As this is not the kind of behavior we seek to explain, we estimate each model twice: first including and then excluding the outliers whose extreme outcomes can be explained by such factors (3 in 2010). Note however that rare events and book-keeping technicalities can be hidden behind the more “modest” surpluses of other municipalities as well. That is, the real basis for exclusion of the outliers is not the extreme events in themselves, but the fact that they result in overall extreme outcomes. Thus, the sample excluding the outliers is not unambiguously a more valid basis for conclusions.

6 Results

6.1 Exploring specific institutions

Table 5 shows our estimates of the relation between each of our candidate institutions and the fiscal surplus. To illustrate how the degree of conflict (*ci*) influences the estimates, the first two columns report estimates from a

²³We thank a referee for pointing us in this direction.

model without interaction terms between ci and the institutional variables, while the last two columns show estimates for the interaction model specified in Equation 1. The three outliers are included in the estimations reported in odd-numbered columns and excluded from the even-numbered columns.

It can first be noted that municipalities with substantial conflicts of interests have somewhat lower net revenues than municipalities with smaller conflicts, which is reassuring with regards to the reliability of the survey measure. Though the estimates from the model without interactions are small and statistically insignificant, the coefficient of ci in the interaction specifications indicates that the surplus is about 500 SEK per capita smaller in municipalities with a substantial conflict of interest and weak institutions. This is a large difference in relation to the average net revenues (1 360 SEK).

The question is whether budget institutions help to close this gap. The estimates give some support to the idea that being allowed to carry surpluses over to the next fiscal year increases the overall surplus, as the coefficient on *keep surplus* (ks) is positive and significant in column (1). Considering instead the interaction specification in (3), we note that the positive and significant incremental effect derives from the group of municipalities that report substantial conflicts of interest. That is, β_0^{ks} is not significantly different from zero but $\beta_0^{ks} + \beta_1^{ks} > 0$ (see lower part of table). This is in line with our expectation that the institution should only make a difference where there is a problem to be solved. However, columns (2) and (4) reveal that the magnitude as well as the statistical significance is partly driven by the three outliers. This calls for caution in drawing conclusions regarding the surplus rule – though the results in Section 6.2 below indicate that there is more than an outlier effect.

We find no significance of the corresponding carry-over rule for deficits (*keep deficit*, kd) in the specifications without interactions. The interaction specifications entail a challenge for our theoretical framework, as we find the reversed result from what we expect: *keep deficit* is significantly and positively related to the fiscal surplus (with large magnitude, 480-600 SEK per capita), but not in municipalities with a substantial conflict of interest. For them, the incremental effect ($\beta_0^{kd} + \beta_1^{kd}$) is not distinguishable from zero in any specification. One possible interpretation is that where there are major conflicts, the employment of a punishment rule sends out a signal that reinforces the conflict and increases non-compliance, while where conflicts are small, the rule simply serves its restraining purpose.

The coefficient of *manager risk* (mr) is large and positively related to

Table 5: Exploring specific institutions, OLS on 2010 sample

Variables	(1)	(2) Ex. outliers	(3)	(4) Ex. outliers
<i>keep surplus (ks)</i>	0.463** (0.195)	0.168 (0.164)	0.249 (0.280)	-0.063 (0.236)
<i>ci</i> × <i>keep surplus</i>			0.353 (0.341)	0.332 (0.306)
<i>keep deficit (kd)</i>	0.240 (0.188)	0.266 (0.169)	0.481* (0.290)	0.602** (0.252)
<i>ci</i> × <i>keep deficit</i>			-0.390 (0.374)	-0.545 (0.332)
<i>manager risk (mr)</i>	0.424* (0.253)	0.407* (0.225)	0.243 (0.398)	0.349 (0.345)
<i>ci</i> × <i>manager risk</i>			0.357 (0.406)	0.105 (0.363)
<i>committee risk (cr)</i>	-0.005 (0.258)	-0.113 (0.220)	0.012 (0.397)	-0.164 (0.346)
<i>ci</i> × <i>committee risk</i>			-0.037 (0.407)	0.101 (0.360)
<i>cent123 (c)</i>	0.194 (0.164)	0.220 (0.157)	0.054 (0.240)	-0.021 (0.233)
<i>ci</i> × <i>cent123</i>			0.225 (0.339)	0.410 (0.313)
<i>ci</i>	-0.118 (0.138)	-0.110 (0.124)	-0.507* (0.289)	-0.499* (0.285)
Constant	-6.382* (3.598)	-6.427** (3.197)	-6.227* (3.615)	-6.536** (3.248)
Incremental effects of institutions for municipalities where $ci = 1$				
$\beta_0^{ks} + \beta_1^{ks}$			0.602**	0.269
$\beta_0^{kd} + \beta_1^{kd}$			0.091	0.058
$\beta_0^{mr} + \beta_1^{mr}$			0.599**	0.454*
$\beta_0^{cr} + \beta_1^{cr}$			-0.025	-0.063
$\beta_0^c + \beta_1^c$			0.278	0.389*
Controls	Yes	Yes	Yes	Yes
Observations	225	222	225	222
R ²	0.567	0.256	0.574	0.275
F	4.300	3.710	3.661	3.294

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table 2 in the online appendix for control variable estimates. The number of observations is lower than 265 due to non-response to individual survey questions.

net revenues according to the specification without interactions in columns (1) and (2). Moving to the interaction specification reveals that the results for *manager risk* are in line with our expectations: the incremental effect is insignificant for municipalities that do not report substantial conflicts of interests, but positive and significant for municipalities with a substantial conflict ($\beta_0^{mr} + \beta_1^{mr} > 0$). A credible threat that local managers who misbehave will be replaced is associated with approximately 450-600 SEK higher per capita fiscal surplus, which implies substantial economic significance.

By contrast, none of the estimations suggest that *committee risk* (*cr*) is useful, as the coefficient for this variable is insignificant in all specifications. Thus, we find no support for the idea that the threat of replacement deters politicians of local boards from overspending. Multicollinearity with *manager risk* may cause the insignificance, but we also see another plausible explanation: the risk is connected to more severe consequences for the managers, for whom the risk applies to their main occupation, than to local politicians, who usually only have part time commissions or devote leisure time to politics.

The *centralization* variable enter the regressions as a dummy variable with category 4 as reference. This decision is guided by the results of a Wald test suggesting that the coefficients on category 1, 2 and 3 are indistinguishable from each other.²⁴ The coefficient of *cent123* (*c*) is insignificant in all samples, so, according to expectations, there is no evidence that a centralized process influences outcomes in municipalities where central and local levels agree on the importance of fiscal discipline. However, the incremental effect of centralization is positive and significant for municipalities that report substantial conflicts of interest in the sample excluding outliers ($\beta_0^c + \beta_1^c > 0$; the coefficients imply 275-390 SEK per capita higher net revenues). Thus, although not as clear as in other studies, we do find indications of a beneficial effect of centralization in circumstances where it should make a difference.

The online appendix shows that we get similar results when checking the sensitivity of the model to 1) using per capita *costs of services* as the dependent variable; 2) removing and adding control variables; 3) using alternative revenue measures; 4) including budgeted net revenues as control variable; and 5) other categorizations of the centralization variable.

²⁴We examine a less broad classification in the online appendix.

6.2 Are more institutions better? Combinations of budget institutions

We next construct an index of institutional strength, *NofInst*, counting the number of institutions used by each municipality (excluding *committee risk*, which is never significant above), and estimate the model specified in Eq. (2).²⁵ The index approach has two virtues. *First*, though Table 5 suggest that all institutions except *committee risk* may increase the surplus, only *manager risk* is statistically significant in all specifications. Given that the correlations between the different institutions are quite high, the imprecision of the other estimates may be related to low power. As only 8 municipalities use none of our institutions, the index estimation indirectly tells us something about the importance of the other institutions, in a setting with higher statistical power. *Second*, the index estimation relates to our theoretical framework, which suggests that municipalities with a stronger institutional setting – here interpreted as more institutions – should be able to attain higher surpluses.

The estimation of Eq. (2) indeed yield a positive effect of adding more institutions (columns (1)-(2) of Table 6). The estimated coefficient on *NofInst* indicates that one additional institution is associated with 200-300 SEK larger surplus per capita. The interaction between *NofInst* and *ci* is insignificant (but positive); i.e., we do not have to condition on the underlying degree of conflict to obtain a positive effect of *NofInst*.²⁶

Another interesting question is whether the *type* of added institutions matter. As the institution relating to the planning stage (*centralization*) and the incentive-aligning institutions relating to the implementation stage (*keep surplus, keep deficit and manager risk*) address different problems, it is for instance plausible that municipalities with institutions related to both stages of the budget process fare better than municipalities whose institutions address only one, or even none, of the stages.

To examine this hypothesis, we use the results from Table 5 to partition the municipalities into four groups – *A, B, C* and *D* – as follows. Groups *A* (76 municipalities) and *D* (24 municipalities) contain the municipalities where *ci*=1; group *A* consists of those who employ both *cent123* and at least

²⁵A specification including the first principal component of the mentioned institutions yield the same results, as the principal component and *NofInst* are highly correlated ($\rho = 0.96$).

²⁶The results are robust to the same robustness checks as before (see the online appendix).

one of *keep surplus* and *manager risk*, and group *D* consists of the complementary subset that employs at most one type of institution (centralization or incentive-aligning). Similarly, groups *B* (24 municipalities) and *C* (50 municipalities) contain the municipalities where $ci=0$; group *B* consists of those who employ both *cent123* and *keep deficit*, while group *C* consists of those who employ at most one of these two institutions.

Columns (3)-(4) of Table 6 shows the results for this group estimation. Using group *D* as the reference category, well-performing municipalities are overrepresented in the groups that use institutions related to both stages of the budget process (*A* and *B*). The difference between groups *A* and *D*, which is economically and statistically significant (430-540 SEK larger surplus per capita), supports the idea that it is better to have institutions related to both the planning and implementation stage of the budget process than to at most one of the stages. Interestingly, the significant difference between groups *B* and *C* (lower part of table) suggests that the hypothesis holds also for municipalities with smaller conflicts of interests, despite that centralization was insignificant for municipalities with $ci=0$ in Table 5. However, the significance of the difference between *B* and *C* is sensitive to some of the specification changes in our robustness checks (see the online appendix).

Given the relatively large estimates for *manager risk* and the somewhat shaky results for *keep surplus* in Table 5, it is interesting to examine whether the results for group *A* are driven by municipalities with $manager\ risk=1$. We therefore create another group *a*, containing the municipalities that report a substantial conflict of interest ($ci = 1$) and employ both *cent123* and *keep surplus*. Columns (5)-(6) of Table 6 (where we include *manager risk* as a control variable) show that the coefficient on group *a* is large, positive and significant, regardless of whether outliers are included or not. These estimates thus strengthen our belief in the importance of the surplus rule.

In the theoretical framework, we suggested that a centralized budget process increases the fiscal surplus more in the presence of incentive-aligning institutions and vice versa. In a specification with *manager risk* interacted with *cent123*, there is no evidence of a positive interaction effect between the two variables (not shown). We cannot address the same question for the combination of carry-over rules and centralization, as a very large share of municipalities that employ carry-over rules also have a centralized budget process.²⁷ This data restriction prevents us from estimating a meaningful

²⁷Only 12 (13) municipalities employ *keep surplus* (*keep deficit*) and are centralized to

Table 6: Combinations of institutions

	(1)	(2)	(3)	(4)	(5)	(6)
		Ex. outliers		Ex. outliers		Ex. outliers
<i>NofInst</i> (β_0)	0.256*** (0.0979)	0.190** (0.0895)				
$ci \times NofInst$ (β_1)	0.0569 (0.129)	0.0103 (0.119)				
<i>ci</i>	-0.126 (0.333)	-0.0605 (0.307)				
<i>A</i>			0.540** (0.240)	0.432** (0.213)		
<i>B</i>			0.712** (0.275)	0.650** (0.256)	0.681** (0.293)	0.556** (0.243)
<i>C</i>			0.196 (0.219)	0.186 (0.208)	0.150 (0.198)	0.0878 (0.179)
<i>a</i>					0.717*** (0.236)	0.432** (0.209)
<i>manager risk</i>					0.435** (0.174)	0.327* (0.169)
Constant	-5.743 (4.551)	-7.729* (4.082)	-6.347 (4.875)	-8.333** (4.189)	-6.880 (4.585)	-8.358** (4.108)
Test $\beta_0 + \beta_1=0$	$p=0.001$	$p=0.0184$				
Test $B \neq C$			$p=0.040$	$p=0.036$	$p=0.049$	$p=0.044$
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	176	173	176	173	176	173
R ²	0.632	0.336	0.620	0.335	0.641	0.350
F	8.225	7.280	7.842	6.931	8.336	7.065

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The number of observations is lower than in Table 5 because we cannot include observations with missing values on *manager risk* in the these specifications.

Group *A*: $ci=1$, $cent123=1$ and either $keep\ surplus=1$ or $manager\ risk=1$, or both.

Group *B*: $ci=0$, $cent123=1$ and $keep\ deficit=1$.

Group *C*: $ci=0$, at most one of $cent123$ and $keep\ deficit = 1$.

Group *a*: $ci=1$, $cent123=1$ and $keep\ surplus=1$.

Group *D*: reference category.

interaction model; moreover, it implies that our estimates for the carry-over rules by and large capture their influence conditional on the planning stage being relatively centralized.

7 Discussion and conclusions

7.1 Causality and identification

It is inherently difficult to identify the causal effect of institutions that are self-imposed by an organization. In the current context, a key concern is that different municipalities may have different ambitions for the level of fiscal surplus. As such differences are unobserved, we have an omitted variable problem: municipalities whose central politicians aim for high surpluses may be more prone to install budget institutions believed (rightly or not) to promote budget discipline, and simultaneously be more likely to hire staff that voluntarily respect their budget restrictions. Prominent endogeneity concerns in the previous literature, such as voter preferences over fiscal performance (e.g. Poterba, 1996; Eslava, 2011), the transparency of the budget process (e.g. Alt and Lassen, 2006), and earlier fiscal performance (i.e. reverse causality) (e.g. Fabrizio and Mody, 2010), are all possible sources of differences in fiscal ambition.

In fact, even if budget institutions were randomly distributed over municipalities, the fiscal ambition of the municipalities' central politicians would be intrinsically connected to the enforceability of institutions. For instance, *manager risk* can only function as a threat if someone with authority to replace managers cares about fiscal performance. Thus, causal claims about the effectiveness of institutions are more credible in settings with super-imposed and externally enforced budget institutions – e.g. fiscal rules imposed on local governments by the national government, as in Foremny (2014) and Grembi et al (2013) – than in settings like ours where local governments themselves choose whether to install and enforce certain institutions.²⁸

the lowest degree ($cent123 = 0$).

²⁸Note that the few studies finding positive correlations between institutions and fiscal performance when using fixed effects, e.g. Fabrizio and Mody (2006) and Debrun et al (2008), do not fully circumvent the omitted variables problem. Since politicians and party majorities change over time, fiscal ambition cannot plausibly be considered a time-invariant variable. Attempts to solve the endogeneity problem using lags of the institutional structure as instrumental variables (Hallerberg et al, 2007; Debrun et al, 2008) on

While we to some extent mitigate the problem by including proxies for fiscal ambition as control variables (*long-term budget*, *mean net revenues 00-07*, and *equity ratio*; note also that we at least partly control for voter preferences), there may still be unobserved components left. As a constructive way forward, we use a method proposed by Oster (2014) (building on Altonji et al, 2005) to illustrate how likely it is that the estimated coefficients reflect causal effects under different assumptions about the importance of the omitted variables.

Oster’s method decomposes the data-generating process (DGP) of the variable of interest (here, the institutional setup) into two parts: one explained by the observed control variables and one explained by the omitted variables, and examines how much more important the omitted variables would have to be in this DGP to discard the estimated relationship between institutions and fiscal surplus as completely driven by the omitted variables. In our case, we find that the omitted variables would have to be at least as important – often considerably more important – determinants of the institutional setup than the actually included control variables in order to nullify the estimates in Table 6 (Appendix A details the method and results). Given that we already include a set of plausible proxies for fiscal ambition in our set of control variables, the results from this exercise suggests that our estimates are quite robust. However, while this indicates that there may be causal components of the association between budget institutions and fiscal performance, we still view our cross-sectional regressions as an insufficient basis for firm conclusions about causality.

7.2 Concluding remarks

Our analysis suggests that institutions pertaining to both the planning stage and the implementation stage of the budget process are important for fiscal performance. The fiscal surplus is higher in municipalities that have centralized their budget process to some degree, and where local committees are allowed to carry over surpluses or forced to carry over deficits between fiscal years. These findings run counter to the argument that carry-over rules, by allowing for greater flexibility, undermine fiscal performance. The associations between carry-over rules and performance however differ between

the other hand rest on the unrealistic assumption that fiscal ambition show no persistence at all. See Acemoglu (2005) for an enlightening discussion of the feasibility of IV in the analysis of institutions.

municipalities with different degrees of conflicts of interests, suggesting that further investigation is needed to understand the incentives given by these rules.

We further find that the fiscal surplus is higher in municipalities where managers face a relatively high risk of dismissal as a consequence of budget deficits. Clearly, the enforcement of this informal institution requires that the central level of the municipality is committed to the task of establishing decent fiscal performance. Such commitment may also affect other unobserved determinants of fiscal performance, which implies that our findings, like most empirical research in this area, should not be viewed as causal evidence. Nonetheless, our analysis suggests that the examined institutions, as well as the interplay between institutions and conflicts of interest, ought to be considered possible determinants of fiscal performance in future research.

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A Sensitivity to omitted variables

Oster (2014) develops an approach that allows us to examine the sensitivity of the estimates to omitted variables. Oster shows that if the relationship between the variable of interest and the observed control variables is proportional to the relationship between the variable of interest and the omitted variables (*proportional selection*), then the magnitudes of changes in the coefficient of interest and the R^2 value after including control variables are informative about the size of the omitted variable bias. Formally, let the true model be written as

$$Y = \beta X + W_1 + W_2 + \epsilon, \quad (3)$$

where X and β respectively denote the variable and coefficient of interest (here, the institutional setup and its true causal effect), the vector W_1 is a linear combination of observed control variables multiplied by their true coefficients, W_2 is a similar vector of unobserved control variables multiplied by their true coefficients, and ϵ is a random error term. Denote the R^2 from this regression R_{max}^2 , and note that $R_{max}^2 < 1$ if Y is measured with error or there are components of the variation in Y that are orthogonal to X , W_1 , and W_2 . Assume furthermore that $Cov(W_1, W_2) = 0$, $Cov(W_1, \epsilon) = 0$, $Cov(W_2, \epsilon) = 0$, and $Cov(X, \epsilon) = 0$. The proportional selection assumption can be written as:

$$\delta \frac{Cov(W_1, X)}{Var(W_1)} = \frac{Cov(W_2, X)}{Var(W_2)}. \quad (4)$$

If this assumption holds for some coefficient of proportionality $\delta > 0$, Oster shows that it is possible to estimate the true coefficient β by using: (1) the coefficients on X with and without controls for observed variables; (2) the R^2 values from controlled and uncontrolled regressions; (3) an assumption about the R^2 of a (hypothetical) regression which control for X and both observed and unobserved variables (R_{max}^2); and (4) a value for the degree of proportionality, δ . As δ is typically unknown in practice, Oster suggests calculating bounding values for β given assumptions on R_{max}^2 and δ . Another useful heuristic is to calculate the value of δ for which the true effect equals zero, given an assumption on R_{max}^2 . To get a sense for the size of δ , it can be noted that a value of $\delta = 1$ implies that the controls and the omitted variables are equally important determinants of the institutional setup (X); $\delta < 1$ implies that the controls are more important and $\delta > 1$ that the omitted variables are more important.

We use Oster’s Stata program *psacalc* to perform the analysis for our main variables of interest (corresponding to X): *NofInst*, A , and B . When contrasting groups (e.g. A to D etc.), only the groups being compared enter the estimation sample. This implies a slight change of specification from what was reported in Table 6, but is the best we can do given that we otherwise would change the comparison group between the regressions including and excluding controls. W_1 should include observed variables with related unobserved components. As we cannot rule out that any of our of control variables has a relationship with fiscal ambition (or some other unobserved variable), we include all controls in W_1 . Based on performing the analysis for estimates from randomized experiments, Oster suggests using values of $\delta \in [0, 1]$ and $R_{max}^2 \in [2.2\tilde{R}^2, 1]$, where \tilde{R}^2 is the R^2 from the regression including all controls. If the bounds on β excludes zero for these values, this implies robustness in the range of what would be seen if the treatment was randomized. For our estimates, this implies $R_{max}^2 = 1$ in some cases, which is the most conservative choice possible and a choice Oster considers too strict most of the time. To keep the comparisons between our estimates simple and because we cannot rule out that it would be possible to explain all variation, we assume $R_{max}^2 = 1$ in the analysis for all our estimates. We furthermore assume $\delta = 1$ when we calculate bounds on our estimates, which is also in the conservative end of the interval suggested by Oster.

The intervals in brackets in Table A (first and third row) show that none of the bounds for our estimates include zero, although the estimates for

Table 7: Bounds on β and δ (Oster, 2014)

	(1)	(2)	(3)	(4)
	<i>NoInst</i>	<i>A vs D</i>	<i>B vs C</i>	<i>B vs D</i>
<i>Incl outliers</i>	[0.208, 0.256]	[0.432, 0.450]	[0.354, 0.486]	[0.246, 0.394]
	4.98	21.20	2.95	2.34
<i>Excl outliers</i>	[0.106, 0.190]	[0.425, 0.467]	[0.006, 0.472]	[0.054, 0.485]
	2.20	-7.70	1.01	1.09

The bounds on β are shown in brackets and the value of δ such that β would be zero in the row below. The assumed $R_{max}^2 = 1$ in all cases, while the assumed $\delta = 1$ in the calculation of bounds for β .

group *B* when outliers are excluded is rather close. For comparison, Oster analyzes a sample of articles published between 2008 and 2013 in the *American Economic Review*, *Journal of Political Economy*, *Quarterly Journal of Economics* and *Econometrica*, which report a coefficient stability heuristic. About 60 percent of the bounds for the estimates in these articles includes zero with the same assumptions on R_{max}^2 and δ as we use. The values of δ for which β would be zero (second and fourth row of Table A) furthermore suggest that the omitted variables in all cases would have to be more important, and for most of our estimates considerably more important, determinants of the institutional set up than the control variables to completely rule out a positive causal effect.

Note though that δ is negative in the sample excluding outliers for the estimate on group *A*, which means that the method is uninformative about the size of the bias. The reason why the δ value becomes negative is that the addition of control variables leads to an increase in the estimated coefficient on *A* in this sample (if the sign of the covariance between observed variables and *A* is the same as between unobserved variables and *A*, the coefficient on *A* should be attenuated when we add controls). The negative δ should not be interpreted as the coefficient on *A* being unstable; on the contrary, the coefficient is very stable: the estimate changes from 0.404 in the uncontrolled regression to 0.425 when adding the controls. As a comparison, when outliers are included the coefficient instead decreases from 0.457 to 0.449. Thus,

the coefficient movements are small and adding controls does not affect the estimate much in either case, while there is a large increase in R^2 when adding controls in both cases (from 0.036 to 0.328 including outliers and from 0.036 to 0.362 excluding outliers).