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Working Paper

Do budgetary institutions mitigate the common pool problem? New empirical evidence for the EU

KOF Working Papers, No. 303

Provided in Cooperation with:
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Suggested Citation: de Haan, Jakob; Jong-A-Pin, Richard; Mierau, Jochen O. (2012) : Do budgetary institutions mitigate the common pool problem? New empirical evidence for the EU, KOF Working Papers, No. 303, ETH Zurich, KOF Swiss Economic Institute, Zurich, https://doi.org/10.3929/ethz-a-007250003

This Version is available at:
https://hdl.handle.net/10419/80820

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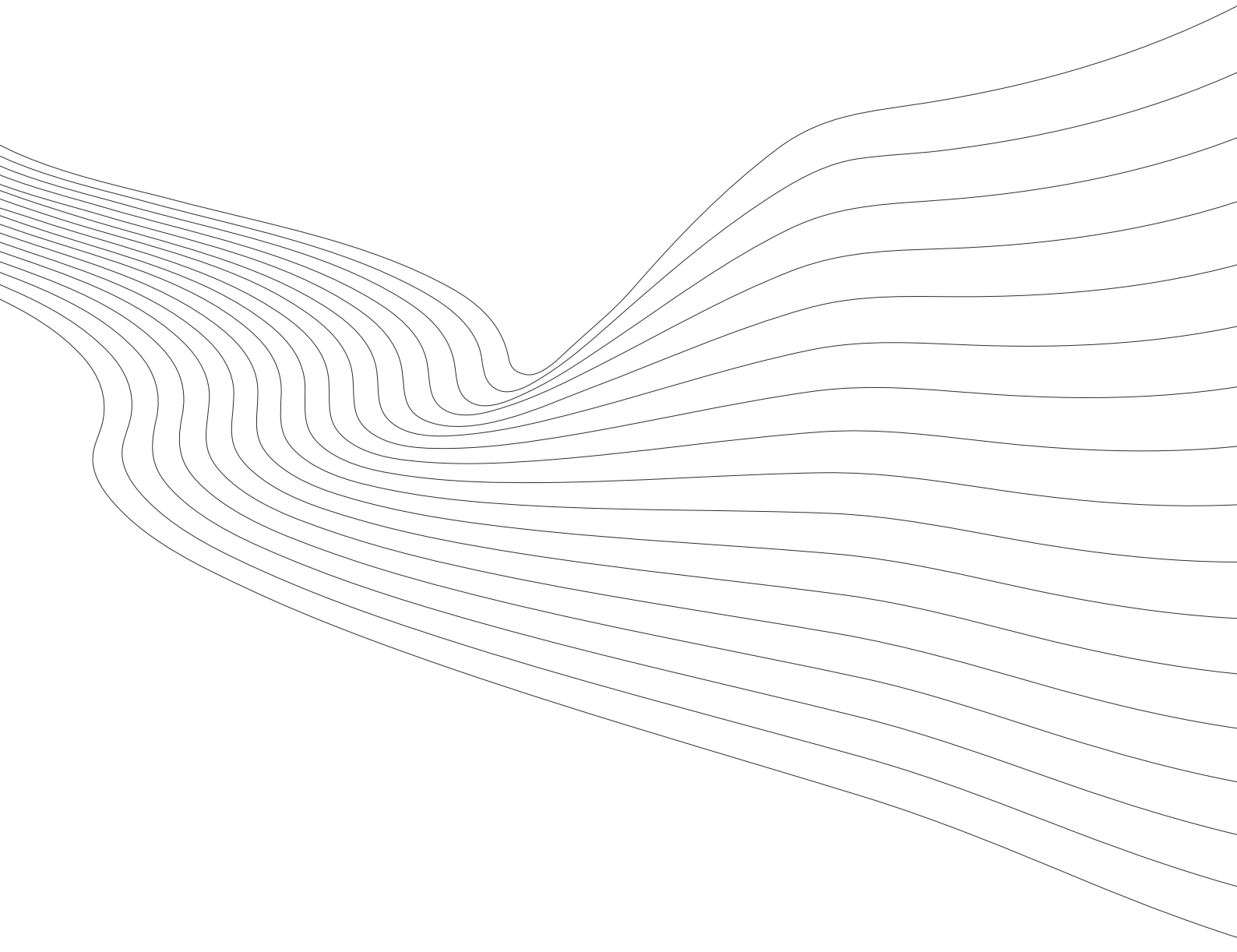

No. 303
May 2012

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Do Budgetary Institutions Mitigate the common Pool Problem? New Empirical Evidence for the EU

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Accepted version, May 2012

Abstract

We analyze how budgetary institutions affect government budget deficits in member states of the European Union during 1984-2003 employing new indicators provided by Hallerberg et al. (2009). Using panel fixed effects models, we examine whether the impact of budgetary institutions on budget deficits is conditioned by political fragmentation (i.e., ideological differences among parties in government) and size fragmentation (i.e., the effective number of parties in government or the number of spending ministers). Our results suggest that strong budgetary institutions, no matter whether they are based on delegation to a strong minister of finance or on fiscal contracts, reduce the deficit bias in case of strong ideological fragmentation. In contrast, the impact of budgetary institutions is not conditioned by size fragmentation.

Key words: budgetary institutions, fiscal policy, political fragmentation, size fragmentation
JEL code: H62

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1 Introduction

Fiscal policies of the member states of the European Union (EU) diverge substantially. Whereas, for instance, gross debt ratios in Belgium and Italy exceeded 100% of GDP in 2008, the debt-to-GDP ratio of Denmark amounted to 40% (source: OECD 2009). There is a broad consensus that the variation in fiscal performance across countries cannot be fully explained by differences in the economic environment. Numerous studies therefore examined the extent to which institutional and political factors might explain these differences in fiscal policy outcomes. One such factor is budgetary institutions, i.e., the formal and informal rules governing budgetary decisions of the executive and legislative branches of government (Hallerberg et al. 2009). Various studies have attempted to measure the quality of budgetary institutions by defining quantitative indices and to examine their effect on fiscal performance.

An important reason why budgetary institutions may matter for fiscal policy is the so-called common pool problem. Individual politicians (or parties) will support increases in targeted spending that provide their constituencies with more public services. As this spending will be financed by general taxes, their constituencies only pay a fraction of the total costs, resulting in a spending and deficit bias (Velasco 2000). Indeed, there is evidence suggesting that so-called size fragmentation (i.e., the effective number of parties in government or the number of spending ministers) affects fiscal policy (cf. Perotti and Kontopoulos 2002). Budgetary institutions may impose fiscal discipline, thereby reducing the spending and deficit bias due to the common pool problem.

Another reason why budgetary institutions may affect fiscal policy outcomes is that by providing the 'rules of the game' they can mitigate the impact of ideological differences within governments. For instance, if political parties forming a coalition government have different ideologies, budgetary institutions offer a framework for policymaking that can reduce the potentially negative impact of political fragmentation. (Volkerink and De Haan 2001).

According to Hallerberg et al. (2007, 2009), there are two ideal forms of budgetary institutions, namely delegation and contracts. Under delegation, the finance minister is vested with significant decision-making powers, while under contracts political parties enter an agreement to commit themselves strictly to budgetary targets set for one or several years. Both ideal forms of fiscal governance centralize the budget process, but the effectiveness of these budgetary institutions depends on the characteristics of the political system. Delegation to a strong finance minister arguably works best in case of one-party majority governments or coalition governments with parties that are close to one another ideologically. In contrast, contracts are expected to be most effective in coalition governments in which parties have

very different ideologies as such parties are generally not willing to delegate fiscal powers to a strong finance minister who is from a different party.[1]

Whereas most previous studies analyzing the impact of budgetary institutions on fiscal policy outcomes focus on the direct effect of budgetary institutions, we examine whether the impact of budgetary institutions on government budget deficits is conditioned by size fragmentation and political fragmentation. As we use the indicators of budgetary institutions as constructed by Hallerberg et al. (2009), our analysis is restricted to the 'old' EU member states (except Luxembourg) over the period 1984-2003. Our main findings are that budgetary institutions, no matter whether they are based on delegation to a strong minister of finance or on fiscal contracts, become effective in case of strong ideological fragmentation. In contrast, the impact of budgetary institutions on the government's budget deficit is not conditioned by size fragmentation.

The remainder of the paper is structured as follows. Section 2 offers a brief review of the literature and section 3 formulates our hypotheses. Section 4 describes the data used, while Sect. 5 contains our empirical results. Section 6 presents a sensitivity analysis. The final section offers some concluding comments.

2 Literature review[2]

According to the so-called common pool problem, the financing of a specific type of government expenditure is often shared among different interest groups. Therefore, each interest group has an incentive to free-ride on each other's contributions. This creates a bias towards overspending. Whereas Shepsle and Weingast (1981) highlight geographically dispersed benefits of public spending, von Hagen and Harden (1995) focus on individual spending ministers. Each minister has an interest in increasing spending, while spreading the cost to others. A similar argument can be made for the parties in a coalition: each member of the coalition will support initiatives to raise spending on items favoring their own constituencies (Perotti and Kontopoulos 2002). These static applications explain expenditure pressures, but not necessarily a tendency towards budget deficits. Using a dynamic model,

[1] However, delegation and contracts are not mutually exclusive. Following Bernheim and Whinston (1986) we can interpret delegation to a strong minister of finance as a common agency problem in which multiple principals (the other ministers) delegate fiscal policy to a single agent (the minister of finance). The principals will try to influence the agent such that he pursues the policy most beneficial to the principal in question. In a cabinet context, these rent-seeking activities will lead to inefficient use of government resources by the principals. In order to alleviate the inefficiencies arising from rent-seeking competition Dixit et al. (1997) suggest that it is optimal to back up delegation to a single agent with an agreement between the principals. In a fiscal policy context this can be done by means of a fiscal contract.

[2] The first part of this section heavily draws upon Wierts (2008).

Velasco (1999, 2000) shows how the common pool problem may lead to deficits. In his model, the common pool of tax resources expands to include future generations. The incumbent government can use these resources by running deficits.[3] Various studies report evidence that size fragmentation leads to higher budget deficits (Kontopulos and Perotti 2002, Woo 2003) and higher spending (Schaltegger and Feld 2009).

As pointed out by Franzese (2000), political fragmentation within governments also may lead to deficits. War of attrition models (like Alesina and Drazen 1991) suggest that governing parties will try to shift the burden of a necessary fiscal adjustment even if they agree that current debt-levels or persistent deficits require control. Adjustment plans will be harder to find the more politically fragmented the coalition is. So, given uncertainty among political parties over how long others will tolerate steadily rising debt, before capitulating to stabilization plans having distributional implications they dislike, politically fragmented governments will have a tendency to delay stabilization.[4]

To what extent can budgetary institutions reduce the deficit bias? Various studies have addressed this issue for EU countries. Older studies using indicators of budgetary institutions had to rely on cross-sectional data (see, e.g., von Hagen and Harden 1995, De Haan and Sturm 1994).[5] However, a few recent studies have examined whether budgetary institutions affect fiscal policy outcomes in EU member states using indicators of such institutions that also vary over time.

The first study having a longitudinal element is Hallerberg (2004), who reports that countries having a so-called fiefdom system end up with larger budget deficits than countries with delegation, contracts, or a mixed system. Under fiefdom, the decision-making process is fragmented and ministers dictate their own budgets. In contrast, Tujala and Wolswijk (2007), who use Hallerberg's typology, do not find that budgetary institutions affect budget deficits for their sample of 22 countries over the period 1970-2002.

[3] Using a variant of the common pool problem, Tornell and Lane (1999) explain the speedy disappearance of budgetary surpluses (see also Lane 2003). When the government budget balance is in surplus, the incentive to act prudently is weak within a fragmented political system, as each party knows that if it refrains from using the surplus to implement its desired policy, competing parties will do so.

[4] A third explanation for a deficit bias that will not be dealt with in the present paper refers to the limited time horizon of politicians (cf. Debrun et al. 2008). Politicians can try winning electoral support by implementing popular fiscal decisions now (extra spending, lower taxes) while shifting the burden to the future. Buchanan and Wagner (1977) assume that this is possible because the public does not fully understand the nature of the intertemporal budget constraint ('fiscal illusion'). However, also in models assuming rational expectations, a similar deficit bias may exist (cf. Tabellini and Alesina 1990).

[5] There are also numerous studies on the impact of fiscal institutions in US states (see Besley and Case 2003, for a survey, and Fatás and Mihov 2006 for a more recent contribution). A few studies refer to non-industrial countries (e.g., Alesina et al. 1999). Recently, Dabla-Norris et al. (2010) constructed multi-dimensional indices of the quality of budget institutions for 72 low-income and middle-income countries. They provide evidence that sound budget institutions promote fiscal discipline, as measured by larger primary balances and smaller debt.

Annett (2006) estimates a model for a sample of annual data from 1980 to 2004 for all EU members except Luxembourg, including dummy variables for budgetary institutions based on delegation and contracts drawn from Hallerberg (2004). The author reports that, relative to fiefdom, contracts contribute to superior fiscal performance across the sample, but the same does not hold for delegation. Annett concludes that his finding is at odds with the claim that both commitment and delegation can be used to internalize the externality associated with the common pool problem in fiscal policy.

Using data for EU members states over 1985-2004, Hallerberg et al. (2009) find that delegation matters most for expected delegation states (i.e., countries governed by one-party governments or politically homogeneous coalitions) and contracts the most for expected contract states (i.e., countries governed by politically heterogeneous coalitions). Furthermore, case studies suggest that the effectiveness of those institutions can be undermined by political changes. Institutions promoting a strong role for the finance minister work when there is a one-party government but become increasingly ineffective as policy differences among coalition partners increase. Similarly, contracts have little impact if they are in place and a one-party government supplants a preexisting multiparty coalition government.[6]

Whereas most previous studies analyzing the impact of budgetary institutions on fiscal policy outcomes focus on the direct of effect of budgetary institutions, we examine whether the impact of budgetary institutions is conditioned by size fragmentation and political fragmentation. In other words: our analysis does not focus solely on the question whether budgetary institutions work, but (more importantly) under which political circumstances budgetary institutions work. The next section specifies our hypotheses in detail.

3 Hypotheses

As pointed out before, the effectiveness of budgetary institutions arguably depends on size fragmentation. Theoretically, size fragmentation matters for fiscal policy because of the common-pool problem according to which competing political groups vie for government expenditures that are financed using broad-based tax revenues. A one-party government will be more inclined to delegate power to a minister of finance who is from the same political party. In contrast, a coalition government will not be inclined to delegate powers to a strong

[6] There is a related line of research focusing on the impact of numerical fiscal rules on fiscal policy outcomes in EU member states. These numerical rules set targets and ceilings for fiscal aggregates or set benchmarks for the conduct of fiscal policy. Ayuso et al. (2007) and Debrun et al. (2008) report that a more extensive use of numerical rules and rules with a more effective design reduce the size of deficits.

minister of finance as the parties in the coalition will not be willing to delegate strong powers to a member of one of the other coalition parties. For the same reasons, delegation is expected to be less effective in a coalition government than in a one-party government. So our first hypothesis is:

H1: The larger the number of parties in government, the lower (higher) the effectiveness of delegation (contracts) in the budgetary process will be.

Apart from the number of parties in government, Perotti and Kontopoulos (2002) also take the number of spending ministers as an indicator of size fragmentation, arguing that spending ministers will try to raise their department's budget as much as they can, while spreading the costs to the taxpayers. Arguably, the budgetary institutions in place will determine whether they succeed. Therefore we have as our second hypothesis:

H2: The larger the number of spending ministers in government, the lower (higher) the effectiveness of delegation (contracts) in the budgetary process will be.

If political parties disagree on various basic policy issues, they are unlikely to delegate important responsibilities to a finance minister as he could use his position to advance his own party's interests at the expense of other parties. Hallerberg et al. (2009) argue that strengthening the formal powers of a finance minister when there are large ideological differences among the coalition parties that are all needed to approve the budget will have little practical effect. In contrast, contracts arguably work well if there are large ideological differences among coalition parties as they make the terms of the budgetary agreement explicit. The role of the finance minister is in that case reduced to enforcing the contract. Our third hypothesis therefore is:

H3: The greater the political fragmentation of government, the lower (higher) the effectiveness of delegation (contracts) in the budgetary process will be.

4 Data and model

4.1 The model

Our dependent variable is the cyclically adjusted primary budget balance as percentage of GDP (source: OECD). This variable is denoted as *Bal* and is stationary according to most panel unit root tests, which are reported in Table 1.

Table 1 Panel unit root tests on the dependent variable

Method	Statistic	Prob.**	Countries	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.59	0.06	14	386
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.70	0.00	14	386
ADF - Fisher Chi-square	51.69	0.00	14	386
PP - Fisher Chi-square	45.58	0.02	14	392
Null: No unit root (assumes common unit root process)				
Hadri Z-stat	7.22	0.00	14	406

** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.

We estimate similar models to those of Debrun et al. (2008) and Hallerberg et al. (2009):

$$Bal_{i,t} = \beta_0 + \beta_1 Bal_{i,t-1} + \beta_2 Bud_{i,t} + \beta_3 Bud_{i,t} * Pol_{i,t} + \sum_j \beta_j X_{j,i,t} + \varepsilon_{i,t} \,, \quad (1)$$

where *Bud* are the indicators of budgetary governance of Hallerberg et al. (2009), *Pol* are the political variables that will be described below, and X_j are control variables. As indicated, the model contains an interaction effect between the variable measuring budgetary institutions and political variables. This implies that we are able to examine the effect of budget institutions conditional on political variables. Our examination focuses on the question of the levels of political and size fragmentation under which budgetary institutions work. Therefore, we focus on the marginal effect of budget institutions for different levels of political and size fragmentation. Below, we explain how the marginal effect of budget institutions is calculated.

Following previous studies, the level of debt (as percentage of GDP), GDP growth, the rate of inflation and a dummy for the Stability and Growth Pact (SGP) are included as economic control variables. Data for economic control variables have also been taken from the OECD. As suggested by one of the referees, we have also included a dummy capturing the

collapse of communism. In addition, we include a proxy for the quality of the institutions in the countries in our sample.

The control variables can be motivated as follows. In general, if a country has a high debt level this will put pressure on governments to reduce deficits (Annett 2006, Hallerberg et al. 2009). The growth rate of real Gross Domestic Product is included to control for the effect of the business cycle. Countries with slow growth are expected to experience a deterioration of their budget balances as automatic stabilizers kick in (Hallerberg et al. 2009). However, as we use cyclically adjusted fiscal data, GDP growth may be insignificant. Inflation may affect government receipts and expenditures through nominal progression in tax rates and tax brackets, and through price-indexation of receipts and expenditures. On the other hand, unexpected inflation erodes the real value of nominal government debt so that the overall effect of inflation on the budget balance is not clear a priori (Mink and De Haan 2006).[7] To capture the possible impact of the introduction of the Stability and Growth Pact, we use a dummy variable, which is one after the start of the SGP (1999) and zero otherwise. The dummy capturing the fall of communism is zero until 1989 and one thereafter. Countries with strong overall government institutions may exhibit greater fiscal discipline. Finally, it is possible that these other institutions and not strong budgetary procedures really drive fiscal performance. Failure to control for this could overstate the effect of budget institutions on fiscal policy outcomes. To tackle this problem, we include a broad indicator of institutional quality in the baseline regression. This variable is based on information provided by the Fraser Institute. A higher value of this measure indicates better institutions.[8]

A problem that always potentially affects analyses like the one presented here is endogeneity—the possibility that fiscal outcomes influence the evolution of budget institutions, rather than the other way around (Hallerberg et al. 2009). As we will show below, budgetary institutions have changed in some countries in our sample and De Haan et al. (1999) argue that in some European countries improvements in budget institutions have been part of a larger package of fiscal consolidation. Likewise, Hallerberg et al. (2009) show that a fiscal crisis has led to changes in budgetary institutions. However, in line with the working assumption in earlier papers, we maintain that budget institutions are relatively costly to

[7] For our sample of countries there is no reason to worry about reverse causality, i.e., excessive deficits cause inflation. For instance, Fischer et al. (2002) show that fiscal policy leads to inflation only if deficits are above some critical threshold, which the countries in our sample do not surpass.

[8] See: http://www.freetheworld.com. To be precise, we take the area 2 scores of the Economic Freedom index reflecting institutional quality, i.e., judicial independence, impartial courts, protection of property rights, military interference with the rule of law and the political process, integrity of the legal system, legal enforcement of contracts, and regulatory restrictions on the sale of real property. The index ranges between zero (poor institutions) to ten (good institutions).

change and are stable over at least the short to medium term, as fiscal performance cannot quickly feed back into altering institutions.

A second source of endogeneity can be due to the inclusion of both country specific effects and a lagged dependent variable in our model, as the lagged dependent variable is correlated with the error term (see Nickell 1981). This endogeneity holds particularly for samples with a small time dimension (T). Although in our case T=20 and therefore the Nickell bias is probably minor, we will also use GMM to check whether our results are robust for endogeneity (see Sect. 5).

4.2 Budgetary institutions

Drawing heavily on Hallerberg et al. (2009), we first describe the underlying information and then describe how this has been used to construct the Delegation Index and the Contracts Index.

Hallerberg et al. (2009) have conducted various surveys of finance ministries, central banks, and staff members of the budget committee in parliament to quantify the quality of budgetary institutions in EU member states. They distinguish four dimensions: fiscal targets, government negotiations, the parliamentary stage, and the execution phase. The maximum score possible for each component is four, while the lowest possible score is zero.

The first dimension measures the extent to which a country uses multi-year budget plans and comprises four components: 1. Is there is a multi-annual target, and, if so, what form does that target take? Countries with no targets receive the lowest, those that focus on either total expenditures or total taxes receive a medium, and those that have total budget size as their target receive the highest score. 2. The time horizon of the plan, with a five-year plan receiving the highest score. 3. The nature of budget forecasts (are they ad hoc or regularly updated and based on a consistent macroeconomic model?). 4. Commitment to multi-annual targets, where targets for internal orientation only receive a low score, while strong political commitment receives the highest score.

The second dimension measures how the government prepares the budget submitted to parliament. Again, there are four components: 1. Is there a general constraint on the budget before the cabinet considers it? The tighter this constraint, the higher the score will be for a given country. 2. The agenda setting power of the finance minister in government, where the lowest score is given if the minister simply collects bids from spending ministers, while the highest score is given if the finance minister (or prime minister) determines the budget parameters for the spending ministers. 3. The scope of budget norms in the setting of the

agenda, where a country earns the lowest score if the norm concerns either expenditures or the deficit only, while the country receives the highest score if the scope is broad. 4. The involvement of the finance minister in the structure of budget negotiations. A country earns the lowest score if all ministers are involved in budget negotiations, and receives the highest score if the negotiations take place bilaterally between a spending minister and the minister of finance.

The third dimension measures the role of the parliament. There are five components: 1. If parliamentary amendments to the government's budget are limited, the country receives the highest score, while if amendments are not limited the country gets the lowest score. 2. If amendments must be offsetting, that is, if any increase in spending requires a concomitant increase in revenues or decrease in spending in another field, the country is assigned the highest score, while if the amendments are not required to be offsetting the score is lowest. 3. If an amendment can cause the fall of the government, the country receives the highest score, while if an amendment cannot lead to a fall in government the score is lowest. 4. Does the parliament first vote on the total size of the budget before it considers individual items in the budget, or not? 5. Is there a global vote on total budget size?

The final dimension is the execution stage and here Hallerberg et al. (2009) focus on six components: 1. Whether or not the finance minister has the power to block expenditures, where an affirmative answer receives the highest score and a negative answer the lowest score. 2. Are spending ministers subject to cash limits? If so, the country receives the highest score. 3. Is disbursement approval required by the finance minister? 4. Are transfers of funds between chapters possible? Countries with unrestricted transfers receive the lowest score, while countries where the transfers can only be within departments, and even then are subject to the finance minister's consent, receive a top mark. 5. How easily can the government change the existing budget law? If the government can make changes at its discretion, the country receives the lowest score, while if changes to the budget law fall under the same regulations as the ordinary budget the country receives the maximum score. 6. Carryover provisions to the following year; if the unused funds have no restrictions on their carryover, the country receives the lowest score, while it receives the highest score if carryovers are not possible.

The Delegation Index aggregates the cabinet, parliamentary, and implementation scores, while the Contracts Index is the sum of the first dimension (multi-year budget plans) and two parts of the implementation dimension – the ability of the finance minister to block changes to spending during implementation and the ability to transfer funds. Table 2 shows

the indicators summarizing the ideal types of delegation (*DELEGATION*) and contracts (*CONTRACTS*) at various points in time from Hallerberg et al. (2009). The indices are normalized such that their values range from 0, indicating that a country has none of the attributes, to 1, indicating that the country has all of the attributes. The Contracts Index, for instance, is constructed by taking the weighted average of whether the finance minister can block a proposal, whether funds can be transferred between departments and whether the budget plan takes a long-run view, where the first two items get a weight of 25% and the third a weight of 50%. The weighted average is dived by 4 (its theoretical maximum) to create the index value reported in the table. For instance, in the case of Austria in 2004 the finance minister could block all proposals (score 4), funds could not be transferred between departments (score 4) and there was a substantial long-term outlook (score 3.25). Aggregating the weighted scores and dividing by four gives the value in the table.

Table 2 Budgetary Indicators (standardized)

Country	Delegation Index			Contracts Index		
	1991	2000	2004	1991	2000	2004
Austria	0.38	0.62	0.62	0.59	0.91	0.91
Belgium	0.23	0.44	0.51	0.12	0.75	0.75
Denmark	0.59	0.58	0.58	0.37	0.66	0.66
Finland	0.37	0.52	0.52	0.59	0.69	0.69
France	0.9	0.81	0.77	0.46	0.78	0.78
Germany	0.58	0.62	0.62	0.77	0.73	0.73
Greece	0.23	0.75	0.75	0.49	0.75	0.75
Ireland	0.35	0.77	0.77	0.58	0.75	0.75
Italy	0.27	0.73	0.69	0.34	0.66	0.66
Luxembourg	0.53	0.64	0.64	0.25	1	1
Netherlands	0.56	0.47	0.47	0.44	0.49	0.67
Portugal	0.49	0.54	0.60	0.19	0.69	0.69
Spain	0.27	0.58	0.58	0.23	0.53	0.53
Sweden	0.32	0.71	0.71	0.03	0.69	0.69
UK	0.74	0.87	0.87	0.52	0.74	0.74
Average	0.45	0.64	0.65	0.40	0.73	0.74

Source: Hallerberg et al. (2009).

Table 2 shows that budgetary institutions have changed over time. The table also reveals much cross-country diversity. So our data have sufficient variation to enable testing the hypotheses outlined in the previous section. Table 2 also shows that one potential objection against our analysis, namely that countries may have those budgetary institutions that are most effective in view of their political institutions, is not warranted. Take, for instance, the case of the United Kingdom. Even though the United Kingdom until recently had one-party majoritarian governments and according to Hallerberg et al. (2009) is therefore expected to rely on delegation, the score for the Contracts Index is 0.74, only slightly below the score for the Delegation Index. This may reflect changes, such as the Golden Rule, introduced under the administration of Tony Blair. Another case in point is Germany, which is generally governed by coalition governments, but has quite a high score for the Delegation Index. This may reflect that until the mid 1990s, German governments typically consisted of a senior and a junior partner that were closely aligned.[9]

4.3 Political variables

We rely on the work of Mierau et al. (2007) to compile our political data, unless indicated otherwise (all data are available on request). To test our first hypothesis we use an indicator of *size fragmentation of government*, i.e., the effective number of political parties in government (see, Volkerink and de Haan 2001), and interact this variable with our budgetary institution variables. To test our second hypothesis, we use an alternative indicator of size fragmentation, namely the *number of spending ministers*, and again interact this variable with our budgetary institution variables. This variable is calculated as the total size of the cabinet minus the minister(s) of finance.

As an indicator of ideological differences among parties in government, we use the degree of *political fragmentation of the government* that is defined as:

$$\sum_j \left[\frac{NMIN_j}{NMIN} \times (IDEOLOGY_j - PC)^2 \right], \tag{2}$$

where $NMIN_j$ are the number of ministers from party j, whilst $NMIN$ refers to the number of ministers in government. $IDEOLOGY$ indicates the ideological complexion of party j and PC refers to the ideological position of the entire government. This indicator has been suggested by Volkerink and De Haan (2001) as a proxy for political fragmentation. As an alternative, we also employ the *maximum ideological distance* between the parties forming a government.

[9] We thank one of the referees for pointing this out.

To test our third hypothesis, we focus on the interaction between the political fragmentation variables and the two types of budgetary institutions. As both political variables are proxies for political fragmentation and are highly correlated, they are not included simultaneously in the model.

Table 3 shows the correlation matrix of the variables used in our analysis. Note that both budgetary indicators have a significant positive correlation of 0.47. The correlation between the variables reflecting political fragmentation also is quite high, which is not surprising as they are both proxies for ideological differences within government. However, the two measures reflecting size fragmentation hardly correlate. As expected all explanatory variables show at least a moderate correlation with the dependent variable.

Table 3 Correlation matrix

	budget balance	government fragmentation	max. ideological distance	effective number of parties	# spending ministers	economic growth	government debt	inflation	security of property rights (EF)	end of communism (dummy)	stability and growth pact (dummy)
budget balance	1										
government fragmentation	0.2498	1									
max. ideological distance	0.2879	0.8287	1								
effective number of parties	0.319	0.6407	0.7997	1							
# spending ministers	-0.2865	-0.2311	-0.2101	-0.1266	1						
economic growth	0.152	0.0667	0.0612	-0.1392	-0.1441	1					
government debt	0.3357	0.0738	0.1844	0.4374	-0.0108	-0.0266	1				
inflation	-0.414	-0.1294	-0.2433	-0.2309	0.2606	-0.1375	-0.1076	1			
security of property rights (EF)	0.1955	0.2217	0.3048	0.1939	-0.3747	0.0849	-0.2711	-0.5516	1		
end of communism (dummy)	0.1948	0.01	-0.0091	-0.0229	-0.0962	-0.0993	0.1214	-0.3043	0.3297	1	
stability and growth pact (dummy)	0.2876	0.1822	0.1815	0.1276	-0.1051	0.0069	0.2869	-0.177	-0.0836	0.5771	1

4 Results

Tables 4 and 5 show the estimation results of the models examining the impact of delegation and fiscal contracts, respectively. The estimates are based on a panel data model including country fixed effects.[10] The sample includes all old 'EU' members apart from Luxembourg

[10] Time effects are excluded, as they are generally insignificant throughout all specifications. We use a fixed effects model despite the inclusion of a lagged dependent variable. Since the time dimension of the sample is relatively large (T=20), the so-called Nickell bias is likely to be small. In the next section, we also provide results using the Blundell-Bond system GMM estimator. This does not alter our main findings.

and covers the time span 1984-2003.[11] We enter each of the political variables and its interaction with our budgetary indicators to test our hypotheses. To evaluate the marginal effect of budgetary institutions on the budget balance, we calculate point estimates and standard errors for every value of the political variables as suggested by Brambor et al. (2006). These are shown in Figures 1-3.

Both tables show that the significant control variables have the expected sign. The lagged budget balance, the level of public debt, the SGP dummy, the fall of communism dummy, and the institutional quality measure are generally significant in the different model specifications, while growth and inflation are not significant.

To interpret the effect of the budgetary institutions on the budget balance, we present in Figures 1-3 so-called marginal effect plots, following Brambor et al. (2006). These plots examine whether the effect of budgetary institutions is conditioned by political variables and show for every value of the conditioning variable the point estimate as well as the 95% confidence interval of the impact of the budgetary institution. The marginal effects, ME, and the standard errors, $\hat{\sigma}$, are calculated as follows:

$$ME = \frac{\partial Bal}{\partial Bud} = \hat{\beta}_2 + \hat{\beta}_3 * Pol\,, \tag{3a}$$

$$\hat{\sigma} = \sqrt{\text{var}(\hat{\beta}_2) + \text{var}(\hat{\beta}_3) + 2 * Pol * \text{cov}(\hat{\beta}_2, \hat{\beta}_3)}\,, \tag{3b}$$

where hats indicate the sample estimates.

Figure 1 shows the plots related to hypotheses 1 and 2, i.e., the conditioning effect of size fragmentation on the impact of budgetary institutions on the government's budget balance. The point estimates are generally increasing when size fragmentation is proxied by the effective number of parties in government. However, in contrast to what we expected, we find that both delegation and contracts become effective when the number of parties in government increases. Therefore, Hypothesis 1 is (partly) rejected. Furthermore, the number of spending ministers does not condition the impact of both budgetary institutions, as the

[11] Unfortunately, there is not sufficient variation in terms of newer versus older EU member nations in our sample to make a meaningful comparison between them. In our sample, only three countries became part of the EU, i.e., Spain, Portugal and Sweden. The first two countries entered the EU in 1986, right after our sample period starts, so that the only effective change was the entry of Sweden in 1995.

marginal effect never becomes significant (the lower confidence line is always below zero, while the upper confidence line is always above zero) which leads us to reject Hypothesis 2.

Table 4 The impact of delegation on the budget balance

	(1)	(2)	(3)	(4)
Lagged dependent variable	0.698***	0.692***	0.679***	0.667***
	(14.93)	(15.05)	(14.63)	(14.64)
Delegation	1.083	0.615	0.454	-2.526
	(1.063)	(0.525)	(0.300)	(-1.109)
Government fragmentation	-0.381			
	(-1.250)			
Government fragmentation*Delegation	0.444			
	(0.807)			
Maximum ideological distance		-0.525*		
		(-1.965)		
Maximum ideological distance*Delegation		0.600		
		(1.323)		
Effective number of parties			-0.753**	
			(-2.010)	
Effective number of parties*Delegation			0.554	
			(0.978)	
Number of spending ministers				-0.261***
				(-2.894)
Number of spending ministers*Delegation				0.188
				(1.388)
Economic growth	0.00221	0.00505	-0.00619	0.0161
	(0.0439)	(0.100)	(-0.129)	(0.327)
Government debt	0.0292***	0.0288***	0.0313***	0.0282***
	(3.964)	(3.876)	(4.193)	(3.713)
Inflation	0.0707	0.0580	0.0652	0.0633
	(1.227)	(0.970)	(1.113)	(1.143)
Stability and Growth Pact	1.335***	1.309***	1.358***	1.315***
	(4.155)	(4.001)	(4.137)	(4.079)
Fall of communism	-1.056***	-1.054***	-1.137***	-1.146***
	(-3.520)	(-3.564)	(-3.781)	(-3.778)
Institutional quality	0.398**	0.406**	0.487**	0.532***
	(2.137)	(2.215)	(2.536)	(2.943)
Constant	-5.468***	-4.988**	-5.067***	-1.927
	(-2.901)	(-2.575)	(-2.686)	(-0.828)
Observations	252	252	252	252
Within R-squared	0.719	0.722	0.725	0.728
Countries	14	14	14	14

Notes: Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 The impact of contracts on the budget balance

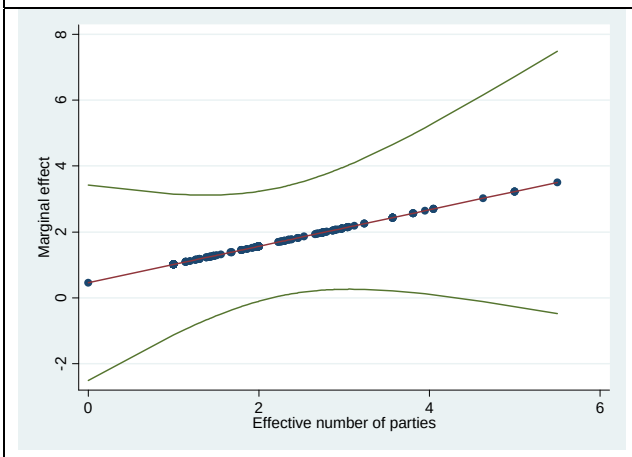
	(1)	(2)	(3)	(4)
Lagged dependent variable	0.689***	0.675***	0.682***	0.664***
	(14.70)	(13.93)	(14.35)	(14.27)
Contracts	0.411	-0.179	-0.159	1.105
	(0.590)	(-0.222)	(-0.140)	(0.691)
Government fragmentation	-1.095**			
	(-2.392)			
Government fragmentation*Contract	1.500**			
	(2.229)			
Maximum ideological distance		-0.870***		
		(-3.150)		
Maximum ideological distance*Contract		1.100***		
		(2.696)		
Effective number of parties			-0.671**	
			(-2.414)	
Effective number of parties*Contract			0.524	
			(1.333)	
Number of spending ministers				-0.157**
				(-2.020)
Number of spending ministers*Contract				-0.00414
				(-0.0403)
Economic growth	-0.00211	0.00621	0.00207	0.0158
	(-0.0434)	(0.129)	(0.0425)	(0.322)
Government debt	0.0307***	0.0314***	0.0317***	0.0319***
	(4.229)	(4.429)	(4.391)	(4.341)
Inflation	0.0529	0.0368	0.0455	0.0626
	(1.025)	(0.708)	(0.850)	(1.211)
Stability and Growth Pact	1.336***	1.255***	1.361***	1.334***
	(4.154)	(3.893)	(4.140)	(4.145)
Fall of communism	-1.168***	-1.171***	-1.210***	-1.232***
	(-3.704)	(-3.709)	(-3.713)	(-3.818)
Institutional quality	0.466**	0.511***	0.519**	0.504***
	(2.453)	(2.643)	(2.586)	(2.728)
Constant	-5.556***	-5.371***	-5.095***	-3.861*
	(-3.125)	(-3.024)	(-2.848)	(-1.741)
Observations	252	252	252	252
Within R-squared	0.727	0.732	0.726	0.729
Countries	14	14	14	14

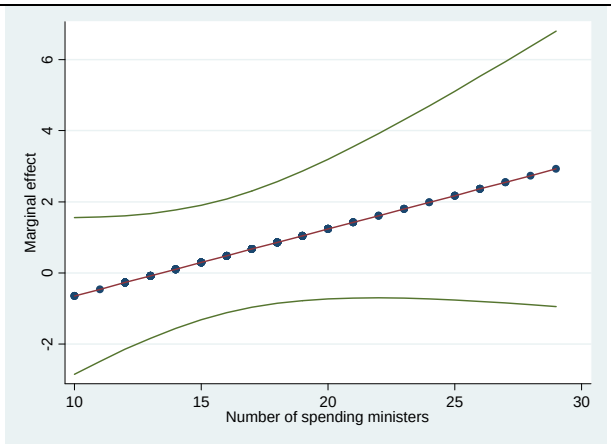
Notes: Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 2 shows the impact of our budgetary indicators on the government's budget balance, conditional on our two proxies for political fragmentation. In contrast to Hypothesis 3, no matter whether fiscal governance is based on delegation to a strong minister of finance or on fiscal contracts, the marginal effect lines are upward sloping and the effect is significant (except for the figure in the upper left quadrant) in case of strong ideological fragmentation. This implies that the impact of budgetary institutions (contract and delegation) on the budget balance becomes stronger in the presence of greater political fragmentation. This result shows up for both indicators of ideological differences within government. These findings are in line with the view of Dixit et al. (1997) that both forms of budgetary institutions can complement each other.

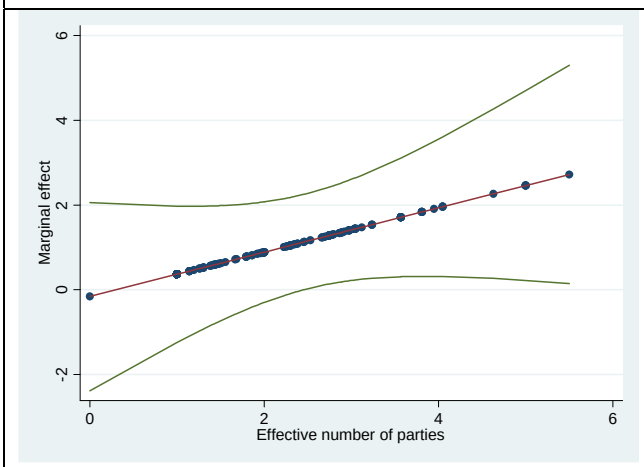
Fig. 1 The effect of budgetary institutions on the budget balance (hypotheses 1 and 2)

The impact of delegation on the budget balance conditional on size fragmentation





The impact of contracts on the budget balance conditional on size fragmentation



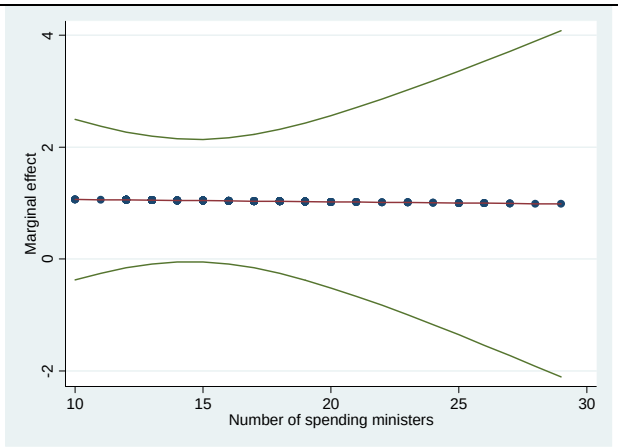
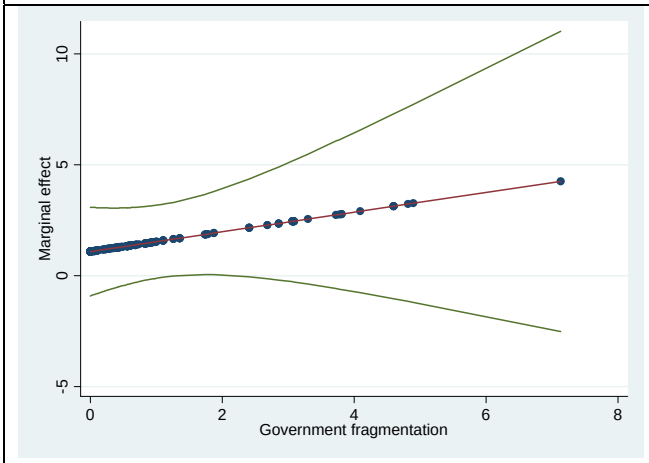
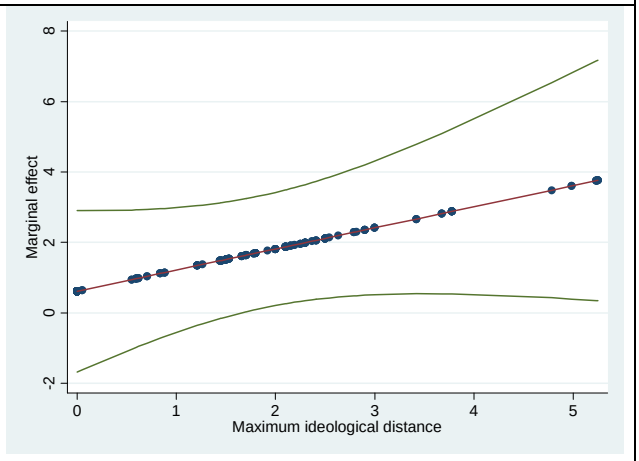


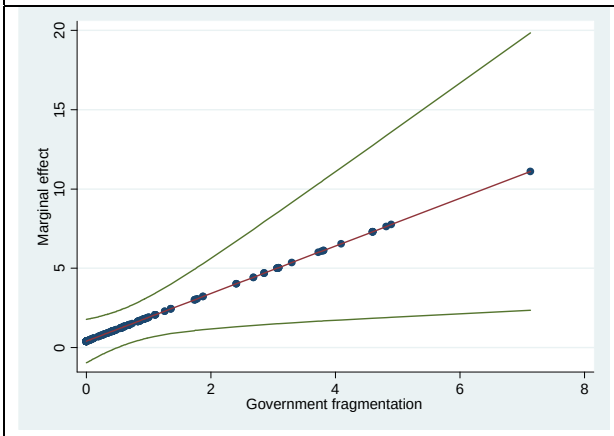
Fig. 2 The effect of budgetary institutions on the budget balance (hypothesis 3)

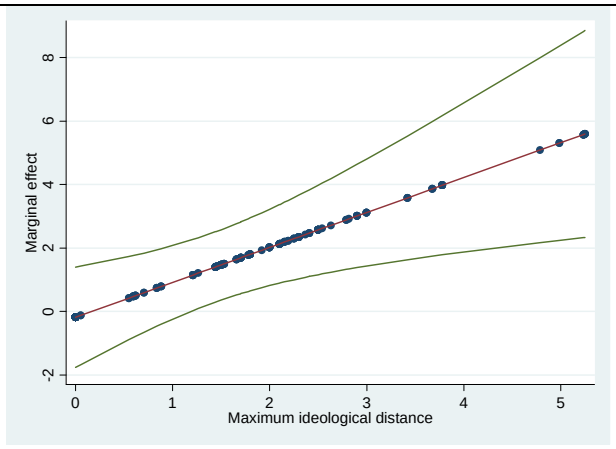
The impact of delegation on the budget balance conditional on political fragmentation





The impact of contracts on the budget balance conditional on political fragmentation





5 Sensitivity analysis

To examine the robustness of our results, we estimated our model also using the Blundell and Bond (1998) dynamic panel system GMM estimator. Although the time dimension of our sample is relatively long, a small bias might arise due to the inclusion of a lagged dependent variable and country specific effects. To minimize the number of instruments, we collapse them as suggested by Roodman (2009) and restrict the number of lagged instruments to two. All specifications were tested on the presence of autocorrelation using the Arellano and Bond AR(1) test. These tests did not indicate autocorrelation. The models also passed the Sargan test and the Hansen test of over-identifying restrictions. Finally, the standard errors are calculated using the Windmeijer (2005) finite sample correction.

As shown by Figures 3 and 4, the main results are very similar to the results reported above. Budgetary institutions, no matter whether they are based on delegation to a strong minister of finance or on fiscal contracts, become significant in case of strong ideological fragmentation, thereby mitigating the impact of political fragmentation. In contrast, the impact of budgetary institutions is not conditioned by size fragmentation. Although the marginal effect lines are upward sloping in three cases, the effect does not become significant, nor does it if size fragmentation is proxied by the number of parties in government.

6 Concluding comments

In this paper we analyze how budgetary institutions affect fiscal policy outcomes in member states of the European Union over the period 1985-2004 using new indicators provided by Hallerberg et al. (2009). According to Hallerberg et al. (2009), there are two ideal forms of fiscal governance that can effectively deal with the common pool problem, namely delegation and contracts. Under delegation the finance minister is vested with significant decision-making powers, while under contracts political parties enter an agreement to commit themselves strictly to budgetary targets set for one or several years. Both ideal forms of fiscal governance centralize the budget process, but the effectiveness of these budgetary institutions may depend on the characteristics of the political system. Using panel fixed effects models, we examine whether the impact of budgetary institutions on the government budget balance is conditioned by size and political fragmentation. Our main findings are that budgetary institutions, no matter whether they are based on delegation to a strong minister of finance or on fiscal contracts, become significant and decrease budget deficits when ideological fragmentation is strong. In contrast, the impact of budgetary institutions is not conditioned by size fragmentation, no matter whether size fragmentation is measured by the number of parties in a coalition or the number of spending ministers. So our findings suggest that better budgetary institutions may help improve fiscal discipline in EU member states that are governed by coalitions that are highly fragmented politically.

The purpose of our paper is not to examine the political economy drivers of changes in budgetary institutions. Still, our results suggest that better budgetary institutions may help maintain fiscal discipline so that it is an important issue for future research to examine the conditions under which reform of budgetary institutions will be introduced. Perhaps the external pressure due to the debt crisis in the euro area will provide the right incentives for improvements, as crises are known to be important impetuses for reform (Hallerberg et al.

2009). Likewise, international policy diffusion may stimulate reforms as well (cf. Pitlik 2007). Finally, as more information increases support for reform (Boeri and Tabellini 2012), the results of our research may strengthen support for the reform of budgetary institutions.

Acknowledgements

A large part of this project has been done when Jong-A-Pin was working at the KOF Swiss Economic Institute of the ETH Zürich, Zürich, Switzerland. The views expressed do not necessarily reflect the views of DNB. We like to thank two referees, participants in the 2009 and 2010 European Public Choice Meetings and a seminar in the Government Department of Essex University for their comments on a previous version of this paper. We thank Mark Hallerberg for providing the budgetary indicators used.

Fig. 3 The effect of budgetary institutions on the budget balance using GMM (hypotheses 1 and 2)

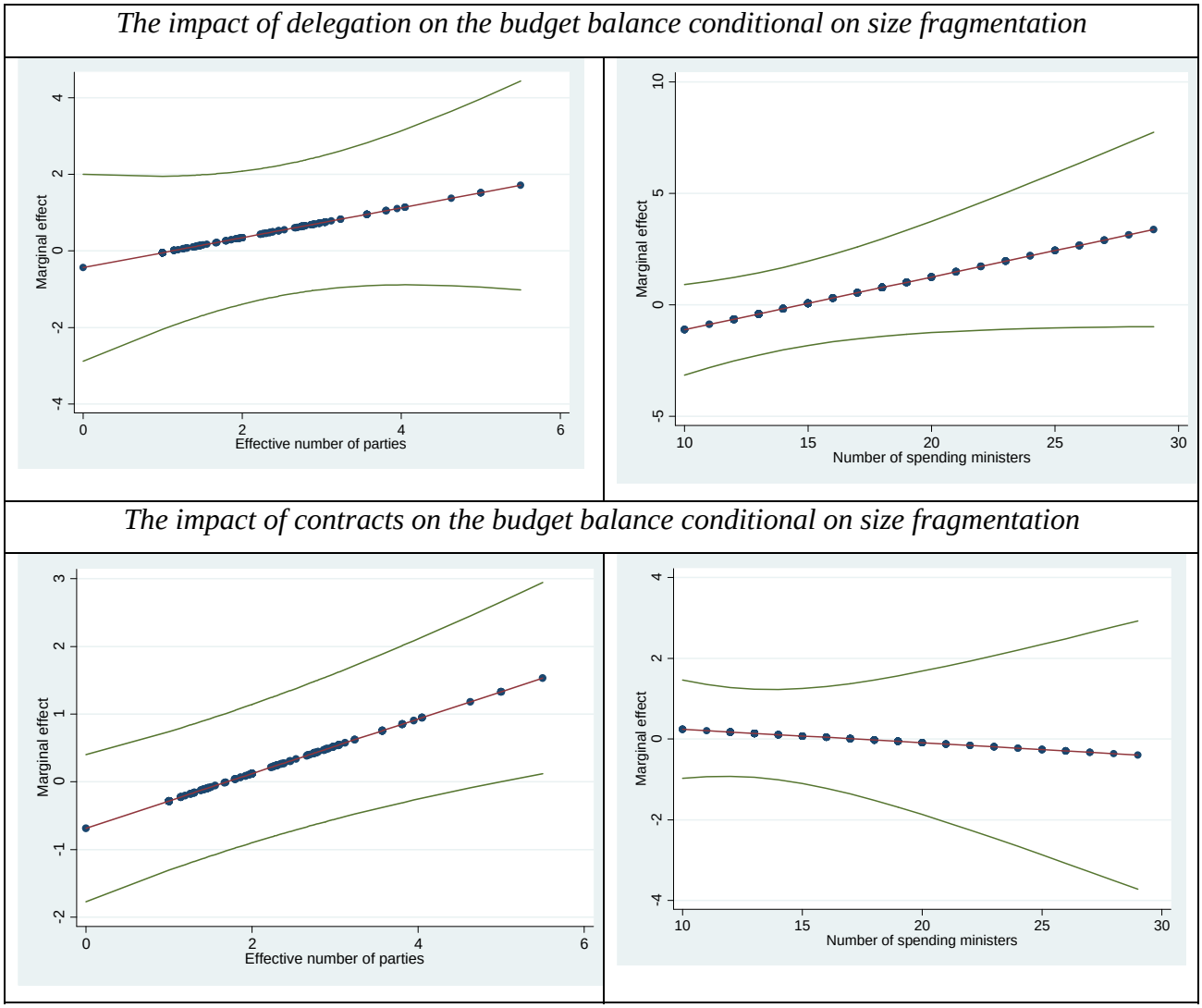
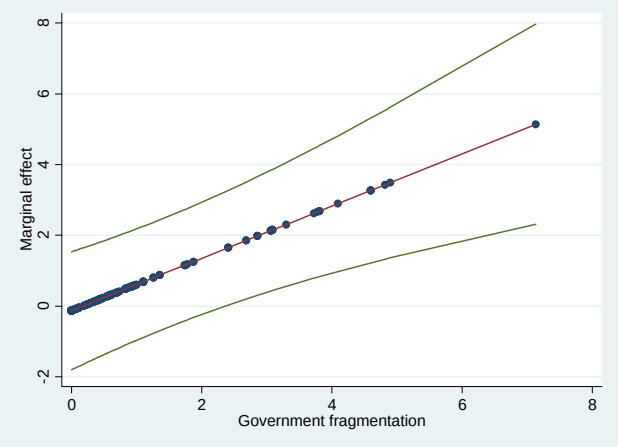
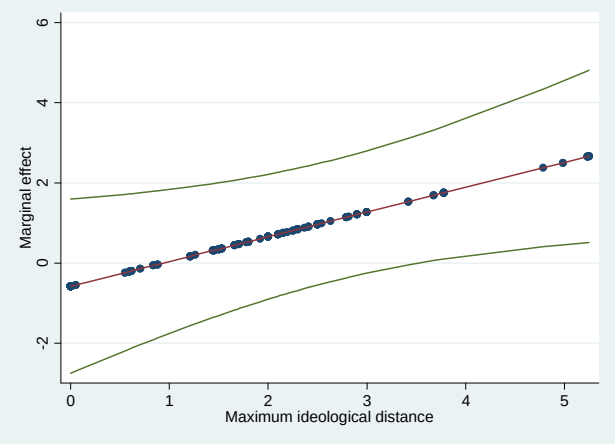


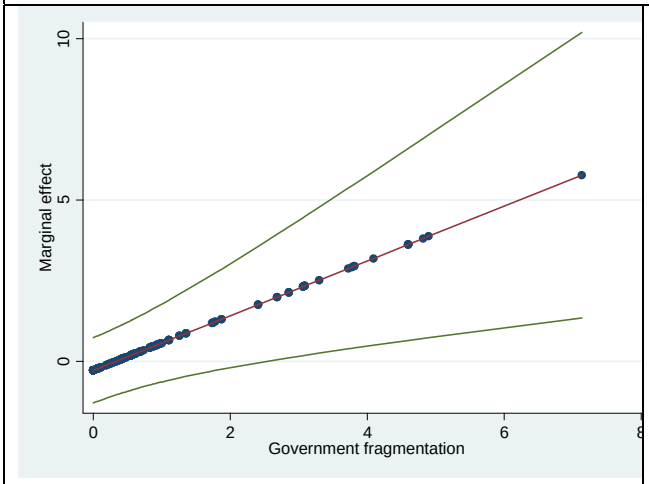
Fig. 4 The effect of budgetary institutions on the budget balance using GMM (Hypothesis 3)

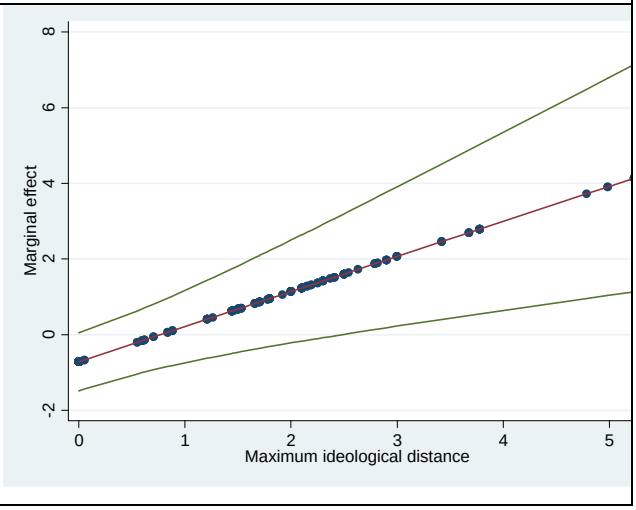
The impact of delegation on the budget balance conditional on political fragmentation





The impact of contracts on the budget balance conditional on political fragmentation





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