

HOW DO EXPENDITURE RULES AFFECT FISCAL BEHAVIOUR?

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This paper investigates the effects of self-enforced expenditure rules on fiscal behaviour. According to theory, such rules can restrain spending biases if the political and institutional costs of non-compliance are sufficiently large. The empirical analysis indicates that the institutional design of the rules reflects political willingness to address high expenditure to GDP ratios. Through this effect, well-designed expenditure rules have a restraining impact on expenditure outcomes, and also mitigate the effect of shocks on expenditure developments.

1 Introduction

According to the literature, the effectiveness of fiscal rules may depend on the political support for the rule, the design of the rule (e.g. Inman, 1996) and the whether the rule fits the national political/institutional setting (e.g. von Hagen, 2006). The main difficulty in testing the effect of fiscal rules and institutions and fiscal outcomes is that rules may be endogenous to underlying political preferences. Existing studies on the effects of rules and institutions address this issue by arguing that rules and institutions are rather constant over time, so that they can be taken as exogenous for the period under consideration, or make a case that adequate instrumental variables are not available. This paper takes a fresh look at these issues by focusing on a specific type of rule (expenditure rule) within its specific institutional context. The focus on expenditure rules is motivated by the fact that during the 1990s several EU countries introduced national expenditure rules as a central institutional arrangement in their budgetary management.

Even if the effectiveness of fiscal rules has been highly controversial, the empirical evidence shows that fiscal rules are here to stay. In the European Union, the use of national rules has increased strongly over the past fifteen years, from around 30 in 1990 towards around 60 in 2005 (European Commission, 2006). Many fiscal policy debates now centre on the (non) respect of fiscal rules. This is the case at national level, where debates in many countries concentrate on, *inter alia*, (non) compliance with national expenditure ceilings, debt rules or fiscal targets for lower

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levels of government, as well as at European level, where policy discussions take place in the context of a yearly cycle of fiscal surveillance.

Over the past two years, research on the interaction between national fiscal rules and fiscal outcomes has been facilitated by increased data availability. Wierts (2005a) proposed to measure the institutional design of national rules in EU countries on the basis of the so-called Inman criteria (1996), and to include these measures in augmented fiscal reaction functions. Studies that subsequently adopted this approach confirmed that the effectiveness of national expenditure rules depends on their design (Deroose *et al.*, 2006), that the presence, coverage and design of fiscal rules all matter for explaining fiscal policy outcomes (European Commission, 2006, and Ayuso *et al.*, 2007) and that the effect of fiscal rules on fiscal outcomes is no longer statistically significant once fiscal rules are instrumented in order to overcome issues of reverse causality (Debrun and Kumar, 2007).

This paper intends to take the debate forward by addressing issues concerning enforcement (why would policy makers comply with the rule?) and causality, as raised by Debrun and Kumar (2007) and others. Focusing on a specific type of fiscal rule instead of the broad index of all types of fiscal rules may be helpful in this respect. It allows being specific about the underlying theoretical base, the incentives for (non) compliance and the choice of instrumental variables in overcoming problems of reverse causality. At the same time, drawbacks of a focus on a specific type of rule are that results cannot be generalised to other types of fiscal rules and that data availability is limited. In this respect, the analysis in this paper can be seen as complementary to the analysis in which all types of national fiscal rules are aggregated into a single time-varying index, as in European Commission (2006) and Ayuso *et al.* (2007).

Results show that countries with higher initial expenditure to GDP have introduced stricter expenditure rules. These rules, in turn, restrain expenditure outcomes in the expected way, and also mitigate the effect of shocks on expenditure developments. The rest of the paper is organised as follows. Section 2 contains the model, Section 3 presents the empirical estimations and Section 4 concludes.

2 The Model

2.1 Institutional setting

In the fiscal rules literature a question arises whether to build the approach on theories of the common pool problem, deficit bias or both (e.g., Krogstrup and Wyplosz, 2007). An advantage of focusing specifically on the expenditure side of the budget is that it facilitates the choice of the theoretical basis. First, the original aim theories of common pool and political fragmentation has been to explain expenditure biases (as in Shepsle and Weingast, 1981) while theories of the deficit bias focus on the budget balance. Second, empirical studies have found convincing support for the impact of political fragmentation on expenditure outcomes (e.g., Perotti and Kontopoulos, 2002, and Ricciuti, 2004).

In common pool models, expenditure outcomes are determined, first, by the degree of political fragmentation, and, second, by the rules that govern the decision-making process. The version of von Hagen and Harden (1994) concentrates on the role of individual spending ministers in reaching the expenditure objectives of their respective ministries. Their model is extended here to analyse the effects of expenditure rules. The common pool problem arises as in the original model; the new elements concern the way expenditure rules counterbalance spending biases and the inclusion of fiscal shocks on the revenue side. Section 2.2 contains the standard arguments that fiscal rules may only be effective if backed by sufficiently strong enforcement, as highlighted by Inman (1996) and formalised by Milesi-Feretti (2003). Section 2.3 models the case that seems more realistic in the context of the EU, where the effectiveness of the rules depends on the political and institutional costs of non-compliance.

2.2 Compliance due to enforcement and sanctions

In the model of von Hagen and Harden (1994), a spending bias arises due to the common pool problem in which each individual spending minister maximises its own utility function. The crucial assumption according to the tragedy of the commons is that the tax burden is distributed evenly over all spending ministers (reflecting different constituencies in society) so that each spending minister internalises only a fraction of $1/n$ of its own spending bids (where n is the total number of spending ministers). In other words: each spending minister takes the spending bids of his/her colleagues as exogenous, so that he/she only internalises the additional tax burden that is caused by his/her own spending bids. In order to counterbalance the spending bias that arises, we include a fiscal rule in the loss function that punishes expenditure above a threshold as set by the rule.

Given that the common pool problem arises in a static setting, we can restrict the analysis at this point to a one period model. Each spending minister minimises a convex loss function that is increasing in deviations of spending G from its overall desired level G^* and in the overall tax level T divided by the number of spending ministers (reflecting the pre-existing distortion caused by decentralised choice). An underlying assumption is that expenditure (in money terms) translates one-to-one into the expenditure objectives of society through the production function of the government. The spending distortion is addressed through an expenditure rule which applies a penalty (assumed to be quadratic here) when spending is above the threshold t . The variable I indicates whether expenditure is above or below the threshold so that the rule is binding ($I=1$) or not ($I=0$) while p denotes the probability of enforcement. As a result, the loss function of each individual spending minister (denoted by subscript i) is:

$$LF(SM_i) = \frac{1}{2}(G_i - G_i^*)^2 + \frac{1}{2}\left(\frac{T_i}{n}\right)^2 + pI(G_i - t)^2 \quad (1)$$

Subject to the budget constraint:

$$R_i = G_i \quad (2)$$

$$R_i = T_i + \varepsilon \quad (3)$$

where R is the revenue obtained by the government, which is a function of the tax rate T times structural GDP (normalised at 1) and an economic shock that is normally distributed with mean zero and variance one. This captures the reality that the largest impact of economic shocks is on the revenue side of the budget.

Minimising with respect to G_i gives:

$$G_i = \frac{\varepsilon + G_i^* n^2 + 2n^2 pI}{n^2 + 2n^2 pI + 1} \quad (4)$$

The implications are shown graphically in Figure 1 and Figure 2.

Figure 1 shows the impact of the degree of fragmentation (*i.e.* the number of spending ministers) and the probability of enforcement of the rule on expenditure, keeping other variables constant.¹ Expenditure is increasing in political fragmentation and decreasing in the strength of enforcement of the rule. For high n , expenditure reaches G^* (normalised at 1) asymptotically, while expenditure approaches the threshold set by the rule (here set at 0.5)² for high p .

Figure 2 shows the combined impact of economic shocks and the probability of enforcement on expenditure. Expenditure increases in positive shocks to the revenue side of the budget while the effect of these shocks is offset for higher values of p . Overall, the implication is that expenditure is increasing in fragmentation and positive revenue shocks, and decreasing in the threshold established by the rule as well as the enforcement of the rule.

2.3 Compliance due to political and institutional costs

The approach to fiscal rules as outlined above has given rise to criticism. As will be shown in greater detail in the next section, expenditure rules in EU are usually enforced by the same authority that decides on expenditure decisions, *i.e.* the Ministry of Finance. A question then arises why policy makers would stick to such self-enforced rules instead of following their own biased incentives. See for example Debrun and Kumar (2007): “Institutions matter only to the extent that it is intrinsically costlier to ignore them (and adopt biased policies) than to stick to optimal plans. However, most existing theories of fiscal institutions fail to establish this, and would appear thereby to be incomplete”.

¹ Setting shocks ε at zero, target expenditure at 1, the threshold at 0.5, and $I=1$.

² This corresponds to the socially optimal solution, which can be calculated by solving the loss function while assuming the existence of a social planner, no expenditure bias and no fiscal rule.

Figure 1

Expenditure as a Function of Fragmentation (n) and the Probability of Enforcement of the Rule (p)

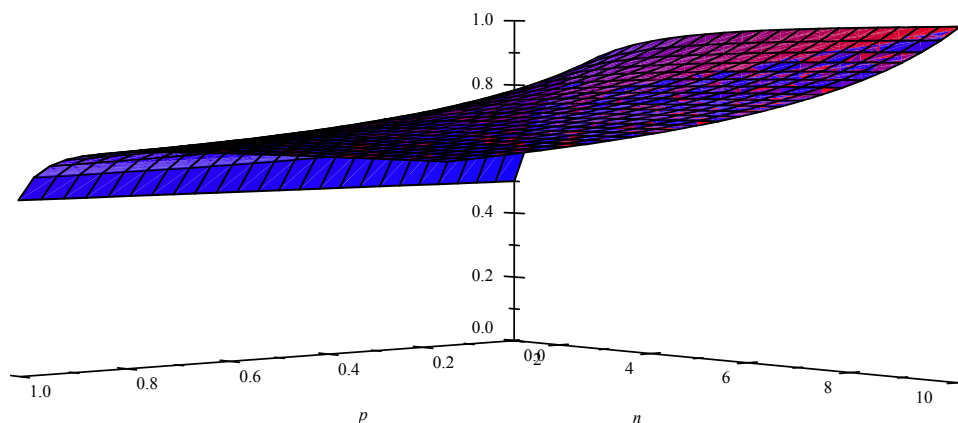
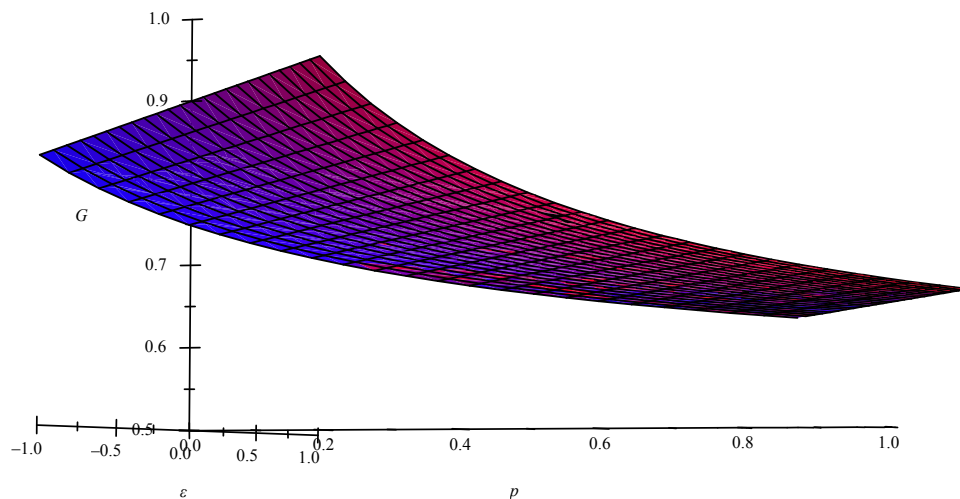


Figure 2

Expenditure as a Function of Shocks (ε) and Probability of Enforcement of the Rule (p)



A first part of the reply to the critique has already been given in Hallerberg, Strauch and von Hagen (2007): "... the threat to break up the coalition is an effective one for enforcing budget targets in ideologically dispersed multi-party governments". The argument is that in the EU expenditure rules are often based on coalition agreements by multi-party governments. Non-compliance by individual spending ministers may then give rise to political costs given that the minister of finance attaches strong political weight to compliance with the agreement.

The argument here is that the effectiveness of expenditure rules may depend on the national institutional setting in yet another way, which concerns the effect of reforms of performance budgeting on expenditure management. Performance budgeting can be seen as a deal between the ministry of finance and the spending ministries. Spending ministries are given more autonomy in achieving policy objectives that have been specified *ex ante*. In return, they are held accountable for achieving these public objectives within the budget constraint (Schick, 2003). Within this setting, a tight budget constraint is a precondition for performance budgeting to work since increased flexibility requires certainty over the funds that are available to reach the stated targets (Diamond, 2003). Hence, in the context of performance budgeting, each spending ministry knows that continued non-respect of the expenditure rule may imply losing part of its autonomy in carrying out decentralised policies. This link between devolution of spending authority and expenditure limits is of practical relevance in EU countries: the available empirical data indicate that EU countries that are more advanced in introducing institutional reforms related to performance budgeting also introduced expenditure rules (Wierds, 2005b).

The essence of these arguments is that overspending relative to the threshold may have repercussions in the next period, given that the coalition may fall or given that spending ministries may become subject to intensified fiscal scrutiny by the ministry of finance. We therefore include a feedback mechanism in the loss function of each spending minister: the higher is the degree of overspending the rule in period 1, the lower is spending in period 2. Achieving expenditure objectives in period 1 thus involves a trade-off with achieving expenditure objectives in the next period. The loss function for individual spending ministers now becomes as in (5) below, where the variable a reflects the perception about the extent to which overspending may have repercussions.

$$LF(SM_i) = \frac{1}{2}(G_{1,i} - G_i^*)^2 + \frac{1}{2}\left(\frac{T_{1,i}}{n}\right)^2 + \frac{1}{2}(G_{2,i} - aI(G_{1,i} - t) - G_i^*)^2 + \frac{1}{2}\left(\frac{T_{2,i}}{n}\right)^2 \quad (5)$$

Subject to:

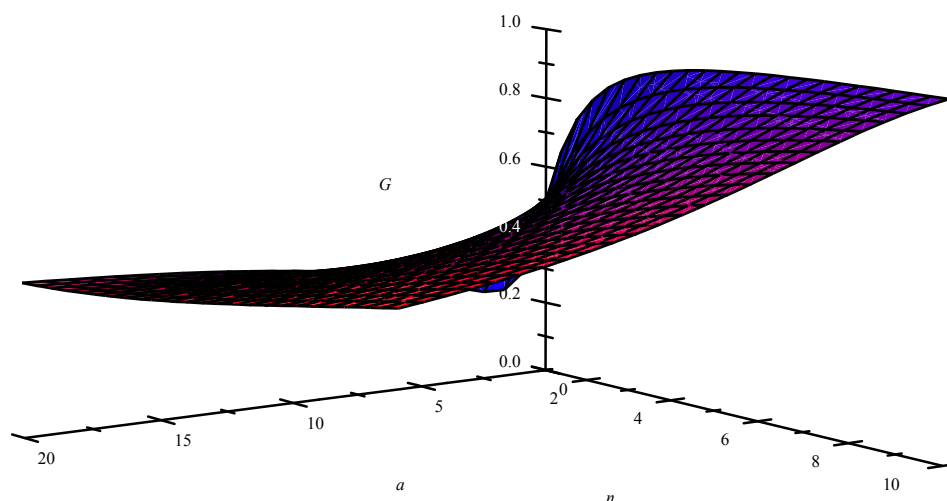
$$R_{1,i} + R_{2,i} = G_{1,i} + G_{2,i} \quad (6)$$

and

$$R_{1,i} = T_{1,i} + \varepsilon_1; \quad R_{2,i} = T_{2,i} + \varepsilon_2 \quad (7)$$

Figure 3

**Expenditure as a Function of Fragmentation (n) and
Political/Institutional Repercussions of Non-compliance (a)**



Minimising (5) with respect to (6) and (7) and solving for the choice variables G_{1i} , G_{2i} and T_{1i} gives the solution:

$$G_{1,i} = \frac{\varepsilon_1 + \varepsilon_2 + 2n^2 G_i^* + a^2 t I^2 + atI + a\varepsilon_1 I + a\varepsilon_2 I - aIG_i^*}{a^2 I^2 + 2aI + 2n^2 + 2} \quad (8)$$

As with the model in the previous section, the implication is that expenditure is increasing in fragmentation and positive revenue shocks, and decreasing in the repercussive effects of excess spending as well as the threshold established by the fiscal rule.

Figure 3 visualises the effect of fragmentation and the political/institutional repercussions of overspending on expenditure in period 1.

3 Empirical estimations

This section investigates the main implications of the model as presented in the previous section. Section 3.1 takes a first look at expenditure rules in place in EU

countries. Section 3.2 presents baseline results. Section 3.3 present results from a two-stage regression in which expenditure rules are endogenous to political, institutional and initial fiscal variables.

3.1 *Expenditure rules in EU countries*

Studies that have analysed the institutional design of national expenditure rules in EU countries include European Commission (2003), Deroose *et al.* (2006) and European Commission (2006). This paper draws on the dataset collected by European Commission (2006). For the purposes of this paper, expenditure rules were included only when they apply to the central or general government and when they have been in force for several years, in order to ensure sufficiently long time series. Table 1 summarises the institutional design of the six countries rules that have been included in the survey. Overall, the data confirm that the rules are self-enforced: they are mostly based on political agreement while external enforcement is lacking.

At the same time, the overview in Table 1 also shows relevant differences in institutional design concerning the definitions of the expenditure rule and on monitoring and enforcement. For example, for some countries no predefined enforcement mechanisms are in force while for others there is an obligation for corrective action. These differences are reflected in the index scores for the institutional design of the rules based on the methodology as outlined in Deroose *et al.* (2006) and European Commission (2006). Table 2 shows these index values on the basis of the following criteria: (1) statutory base; (2) monitoring body; (3) enforcement body; (4) enforcement mechanisms and (5) media visibility of the rule. The first column shows the index on the basis of all criteria, while the second column weighs this index number by the percentage of total expenditure that is subject to the rule. As expected the difference is relevant for the Nordic countries that are more fiscally decentralized (*i.e.* a relatively large part of public expenditure falls under the responsibility of lower levels of government). Both indices will be used in the empirical estimations so that the robustness of the results to alternative indices is immediately tested.

3.2 *Data and baseline results*

In addition to the data on the expenditure rule index, empirical estimations in this section use the dataset on national budgetary plans and outcomes from Moulin and Wierts (2006), as updated by European Commission (2007). This database contains data for national fiscal plans and outcomes on (primary) expenditure, revenue and the budget balance, as well as macro-economic variables up to three years into the future. This dataset is particularly suitable for analyzing the effects of expenditure rules given that it includes expenditure objectives as formulated by the countries themselves, so that heterogeneity in political preferences across countries

Table 1

Expenditure Rules in EU Countries, 1990-2005

Country	Rule in Operation (Year of Introduction)	Definition of the Rule (Aggregate Targeted)	Sector(s) covered	Time Frame	Statutory Base	Body in Charge of Monitoring	Enforcement (Body & Actions in Case of Non-compliance)
Denmark	1994	Real expenditure growth rate	General government	Multiannual	Political agreement	Government (Ministry of Finance)	Government (Ministry of Finance) No pre-defined action
Finland	1999	Real expenditure ceiling	Central government	Multiannual (5 years)	Political agreement	Government (Ministry of Finance)	Governmental structure proposes corrective measures
France	1998	Real expenditure growth rate	Central government	Annual	Political agreement	Independent (Court of Auditors) and National Parliament	No pre-defined action
Germany	Before 1990	Nominal expenditure growth rate	Central and regional governments	Multiannual (5 years)	Political agreement between central and regional governments	Governmental structure (Financial Planning Council with central, regional and local members)	None (Financial Planning Council can criticise rule violations and deviations)
The Netherlands	1994	Real expenditure ceiling	General government	Multiannual (4 years)	Coalition agreement	Government (Ministry of Finance)	Government (Ministry of Finance) proposes corrective measures
Sweden	1996	Nominal expenditure ceiling	Central government	Multiannual (3 years)	Legal act	Independent (Court of Auditors) and National Parliament	Government, Obligation to correct by appropriate actions

Source: adapted by the author on the basis of data from European Commission (2006).

Note: only national expenditure rules applying to the central/general government are included.

Table 2

Values of the Expenditure Rule Index

Country	Expenditure Rule Index	
	ERA	ERAC
Denmark	0.84	0.38
Finland	0.56	0.17
France	0.55	0.22
Germany	0.67	0.34
The Netherlands	0.75	0.75
Sweden	0.95	0.62

Source: European Commission (2006).

ERA measures the index on the basis of the criteria only, while ERAC also includes the coverage of the rule.

can be taken into account. The dependent variable in the regressions therefore measures expenditure bias as the difference between planned and observed changes in primary expenditure. Moreover, the medium-term time frame of the dataset matches with the multi-annual time-frame of national expenditure rules as shown in Table 1.

In testing the effects of expenditure rules on expenditure outcomes, the main econometric issues to be addressed are that: (i) the index for the expenditure rules does not show time variability so that it is highly collinear with the fixed-effects in panel regressions; and (ii) the argument that the rules may be endogenous to fiscal outcomes so that the expenditure rule index should be instrumented. These issues are related: if the second issue can be addressed, a time varying index of expenditure rules can be estimated, which can then be included in a fixed-effects regression. This is the approach that will be taken in the next section; this section starts by addressing the first issue while using the original index that does not show time variation.

One possibility for including the original index would be to leave out the fixed effects. Such a solution is not feasible here, however, given that an F-test shows that the fixed effects are jointly highly significant, even if many control variables are included in the regression. Another possibility is to leave out the expenditure rule index itself (as indicated, it will however be included in the next section) and to concentrate on the question of whether expenditure rules condition the response to different types of shocks (see Milesi-Ferretti *et al.*, 2002, and Fabrizio and Mody, 2006, for applications of this approach on the effects of institutions on fiscal outcomes).³ In this respect, the model in Section 2 indicated that, apart from having a direct effect on expenditure outcomes, expenditure rules

³ The original contribution in this field is Blanchard and Wolfers (2000).

may also mitigate the increase in expenditure outcomes, measured relative to expenditure objectives, to revenue shocks and fragmentation. Hence, the following equation is estimated:

$$FE_{i,t,h} = \alpha_i + t_t + h_h + (1 + \gamma(ER_i - \overline{ER}))(\beta NSM_i + \phi FErev_{i,t,h} + \delta FEgrowth_{i,t,h}) + x'_{i,t,h} \phi + \varepsilon_{i,t,h} \quad (9)$$

where FE denotes the forecast error in primary expenditure, measured as the difference between observed changes in expenditure and planned changes in expenditure (*i.e.* positive numbers indicate overspending relative to objective). Subscript i refers to country, t to year and h to planning horizons in medium-term budgetary plans from one to three years. NSM indicates the number of spending ministers, $FErev$ differences between observed and planned changes in revenue, $FEgrowth$ is forecast errors in real growth, x a vector of control variables and ε the usual error term.

In (9), the expenditure rule index ER is measured as the difference with its average value. The coefficients β , ϕ and δ on the variables that interact with ER therefore measure the effect of these variables when the expenditure rule index is at its average value. This effect is conditioned by the interaction effect with the expenditure rule index. For example, the overall effect of the forecast error in revenue on the forecast error in expenditure is the partial derivative of FE with respect to $FErev$:

$$\frac{dFE_{i,t,h}}{dFErev_{i,t,h}} = \phi + \gamma\phi(ER_i - \overline{ER}) \quad (10)$$

Results for equation (9) are reported in Table 3. Coefficients have the expected signs and are mostly statistically significant. Fragmentation, positive revenue shocks and negative GDP-shocks increase expenditure relative to plan, while the expenditure bias also increases with the forecast horizon. The initial level of public expenditure has a restraining effect, which seems to indicate that countries with already high public sectors attach stronger weight to restraining expenditure pressures.

The interaction with revenue developments shows that expenditure rules mitigate the effect of positive revenue shocks on expenditure developments. The magnitude of this effect according to equation (9) is given in the rows MIN MAX in Table 3, which represent the range of effects for the countries with the strongest and weakest expenditure rules in place. In a similar way, results show that expenditure rules mitigate the increase in expenditure following negative GDP shock (while keeping revenue constant). Finally, the interaction of expenditure rules with NSM was not statistically significant. This variable was therefore dropped in order to increase the efficiency of the other estimations.

Table 3

Baseline Results

	Forecast Error Primary Expenditure (Ratio to GDP)	
	(1)	(2)
<i>ERA</i> * <i>FE</i> revenue ratio	-1.71 (-2.4)**	
<i>ERA</i> * <i>FE</i> real growth	0.68 (1.6)	
<i>ERAC</i> * <i>FE</i> revenue ratio		-1.13 (-1.6)
<i>ERAC</i> * <i>FE</i> real growth		0.98 (3.9)***
<i>NSM</i>	0.00096 (1.0)	0.0018 (2.0)*
<i>FE</i> revenue ratio (to GDP)	0.25 (2.3)**	0.16 (1.5)
<i>FE</i> real growth	-0.51 (-2.1)**	-0.64 (2.7)**
Initial level pr. expenditure	-0.51 (-2.9)***	-0.40 (-2.4)**
<i>DU</i> <i>t</i> =2	0.0058 (2.2)**	0.0054 (2.1)**
<i>DU</i> <i>t</i> =3	0.012 (3.7)***	0.010 (3.4)***
	Conditioning effect of <i>FE</i> revenue ratio:	Conditioning effect of <i>FE</i> real growth:
Min	0.54	-0.88
Max	-0.14	-0.31
Range	-0.68	0.57
Time dummies	Y	Y
Country dummies	Y	Y
Observations	69	69
<i>R</i> -squared	0.38	0.52

Note: The estimation method is fixed effects panel regression with robust standard errors; *t*-statistics are in parenthesis; ***, ** and * indicate statistical significance at 1, 5 and 10 per cent level. Countries included are DE, DK, FI, FR, NL and SE. The time period under consideration is 1999-2004.

Table 4

Endogenous Expenditure Rules		
	<i>ERA</i>	<i>ERAC</i>
Performance Budgeting	0.13 (4.3) ***	0.21 (2.3) **
Starting Ratio Primary Expenditure	3.89 (9.7) ***	2.10 (2.1) **
<i>NSM</i>	-0.020 (-11.4) ***	-0.016 (-5.6) ***
Constant	-0.92 (-5.6) ***	-0.52 (-1.3)
Observations	69	69
<i>R</i> -squared	0.77	0.34

Note: The estimation method is OLS with robust standard errors; ***, ** and * indicate statistical significance at 1, 5 and 10 per cent level. *t*-values are indicated in brackets. Countries included are DE, DK, FI, FR, NL and SE. The time period under consideration is 1999-2004.

3.3 Two-stage regression

We now address the argument that rules may be endogenous to fiscal outcomes. The argument has come in different forms. In most models, the role of fiscal rules is to counter deficit and spending biases, so that rules may have been introduced as a result of dissatisfaction with fiscal outcomes (e.g. high initial expenditure ratios). Debrun and Kumar (2007) explain rules as mechanisms to signal competence, so that governments that are intrinsically more disciplined are more likely to use stringent fiscal rules. Inman (1996) argues that both rules and outcomes may be driven by a third variable of political preferences.

The focus of this paper on a specific fiscal rule (expenditure rule) within a specific theoretical context helps the choice of explanatory variables for the design of the rules themselves. According to the discussion so far, three variables could be used: (1) the reliance on performance information in the budget⁴ (given that more autonomy for spending ministers may go hand in hand with tight expenditure limits); (2) the starting point for public expenditure (the higher the initial level of expenditure, the larger the need for a strong expenditure rule); and (3) the degree of fragmentation (the larger the spending bias, the larger the need for a rule). Results as shown in Table 4 confirm the expected impact of the first two variables, but not of

⁴ Data on the degree of performance information in the budget are taken from European Commission (2004). The underlying source is the OECD/World Bank database on budgetary institutions. The variable measures the percentage of the budgetary programmes for which performance information is included in the budget (ranging from zero to one).

Table 5

Regression Results with Fitted Values of the Expenditure Rules Index

	Forecast Error Primary Expenditure (Ratio to GDP)	
	(1)	(2)
ERA-fitted	-0.12 (-2.7)***	
ERA-fitted* FE revenue ratio	-2.45 (-2.9)***	
ERA-fitted * FE real growth	1.29 (2.2)**	
ERAC-fitted		-0.22 (-2.7)**
ERAC-fitted* FE revenue ratio		-2.71 (-2.3)**
ERAC-fitted * FE real growth		0.99 (1.6)
NSM	-0.0017 (-1.15)	-0.0030 (-1.6)
FE revenue ratio (to GDP)	2.00 (3.18)***	1.29 (2.6)**
FE real growth	-2.62 (-2.7)**	-1.35 (-2.3)**
Initial level pr. expenditure	(dropped)	(dropped)
DU t=2	0.0051 (1.9)**	0.0058 (2.15)**
DU t=3	0.011 (3.1)***	0.012 (3.4)***
	Conditioning effect of FE revenue ratio	Conditioning effect of FE revenue ratio
Min	2.41	1.77
Max	1.56	0.95
Range	-0.85	-0.82
Time dummies	Y	Y
Country dummies	Y	Y
Observations	69	69
R-squared	0.39	0.31

Note: The estimation method is fixed effects panel regression with robust standard errors; *t*-statistics are in parenthesis; ***, ** and * indicate statistical significance at 1, 5 and 10 per cent level. Countries included are DE, DK, FI, FR, NL and SE. The time period under consideration is 1999-2004.

the third (*NSM*). Moreover, the fit for the index with all criteria (*ERA*) is much better than the one that is weighed by the percentage of expenditure covered by the rule (*ERAC*). This may reflect that the latter index is artificially low for the Nordic countries, which complement expenditure rules for the central government with budget balance restrictions for the lower levels of government (which are not included in the index reported here).

The fitted values of the expenditure rules index now show some time variation so that they can be included directly in the fixed effects regression, in addition to the interacted variables. Results as reported in Table 5 show that the fitted expenditure rule index is by itself statistically significant with the expected sign, while the interaction effect is also still confirmed. At the same time, the initial level of primary expenditure is now dropped from the regression, given that it is collinear with the expenditure rule index. In econometric terms, this arises since there is not enough information in the dataset to estimate the effect of expenditure rules on expenditure outcomes, while keeping the starting level of primary expenditure constant (as the two variables move together). This finding that countries with the highest expenditure ratios have introduced the strongest rules suggests that these rules reflect a political consensus that primary expenditure ratios should not rise further or decrease. Such a finding is consistent with the theoretical underpinning of Section 2.2 that expenditure rules may be effective if the political costs of non-compliance are sufficiently large. Overall, results from the regression show that both the expenditure rule itself and the conditioning effect on shocks are statistically significant.

4 Conclusions

This paper has investigated the effects of self-enforced expenditure rules on expenditure outcomes. According to theory, such rules can restrain expenditure biases if the political and institutional costs of non-compliance are sufficiently high. Econometric results show that it is not possible to distinguish between the *ceteris paribus* effect of initial primary expenditure ratios and the effect of expenditure rules on expenditure outcomes, as both variables are highly correlated. It seems therefore that the institutional design of expenditure rules reflects political willingness to address high ratios of expenditure to GDP. Expenditure rules then restrain expenditure, and also mitigate the effect of shocks on expenditure developments. Finally, it should be noted that this paper has not addressed the degree to which expenditure rules may be circumvented by tax expenditure. There are some preliminary indications that countries with stricter expenditure rules (*i.e.* The Netherlands and Sweden) have at times experienced increases in tax expenditure in order to circumvent the expenditure rules (see van Ende *et al.*, 2004, on the Dutch experience and Boijje and Fischer, 2007, on the Swedish experience). This would be a fruitful area for further research; a major challenge in bringing this research forward would be to improve the availability of internationally comparable data on tax expenditure.

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