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# Determinants of Fiscal Rules\*

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## Abstract

This paper empirically assesses determinants of countries' fiscal rules suggested by the political science, sociology, and economics literature. We find several of these variables to be related to the stringency of fiscal rules, providing indirect evidence for the relevance of governments' deficit bias. These determinants may also serve as instruments in models with (endogenous) fiscal rules as explanatory variable.

**JEL Codes:** E62 · H30 · H60

**Keywords:** Fiscal Rules · Deficit bias · Instrumental Variables

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# 1 Introduction

The recent strengthening of fiscal frameworks, both at the national and supranational level has spurred the debate on the costs and benefits of fiscal rules. Providing an empirical perspective on this debate is aggravated by the fact that – in most empirical models of interest – fiscal rules have to be considered endogenous (Poterba, 1994).

The present paper addresses this issue by identifying key determinants of fiscal rules, thereby suggesting instruments for empirical models of fiscal and macroeconomic performance including fiscal rules as explanatory variable. Moreover, evidence on the determinants of fiscal rules is of interest in itself and indicative of the empirical relevance (of alternative theories) of governments’ deficit bias.

So far, there are only a few empirical studies on the existence or stringency of fiscal rules (e.g. IMF, 2009; Calderón and Schmidt-Hebbel, 2008). These studies use dummy variables or composite indicators of fiscal rules, a narrow set of explanatory variables, and cross-sections or relatively small (panel data) sets of countries.

This study analyzes a comprehensive set of potential determinants of fiscal rules suggested by the political science, sociology, and economics literature for a large panel of 81 countries from 1985-2012. For measurement of fiscal rules we draw on a novel data set by Badinger and Reuter (2015), who use partially ordered set (POSET) theory to construct measures of fiscal rules. This approach is an attractive alternative to composite indices by taking the ordinal nature of the data seriously and reducing the need for subjective choice to a minimum.

Our fractional logit panel data estimates point to several determinants of fiscal rules, which are related to theoretical rationales for governments’ deficit bias or the state of the economy. Several of these variables can be expected to serve as relevant and valid instruments in models with (endogenous) fiscal rules as dependent variable.

## 2 Determinants of Fiscal Rules

There are five main arguments for constraining fiscal policy by fiscal rules, related to incentive structures creating a deficit bias of governments:<sup>1</sup>

(i) Common pool theory: The more decision makers, each of them depending on (lobbied by) specific interest groups, are involved in the budgetary process, the larger the likelihood of spending and large deficits (e.g. Roubini and Sachs, 1989). Hence, we consider *District Magnitude*, *Parliamentary Dispersion* and *Government Fragmentation* as explanatory variables. Furthermore, we include the *Age Dependency* ratio, following Calderón and Schmidt-Hebbel (2008) who argue that a large share of the population depending on government programs makes it harder for governments to introduce or strengthen fiscal rules.

(ii) Information asymmetry: According to Stratmann and Aparicio-Castillo (2006), voters with lower average *Education* have less interest in constraining the actions of officials and parties. A tight system of political *Checks and Balances* (other than fiscal), may be viewed as implicit contract between governments and voters (Debrun and Kumar, 2007), reducing the need for (further) fiscal rules. Finally, Persson et al. (1997) describe stringent rules as consequence of an incomplete contract, which suggests including governments’ *Accountability*.

(iii) Impatience and short-sightedness of governments and political competition: Governments tend to discount future events at a higher rate (e.g., Woo, 2005). Moreover, governments anticipating the possibility of being replaced in the future, have an incentive to reduce the room for fiscal maneuver for future governments by accumulating debt (Persson and Svensson, 1989). Thus, we consider *Government Stability* and the *Political Regime*.

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<sup>1</sup> Variables in italics, detailed definitions and data sources are given in Appendix A1.

(iv) Spillovers and outside pressure: On the sub-national government level or in fiscal or *Monetary Unions*, governments may fail to internalize all spillover costs (Von Hagen and Eichengreen, 1996). Moreover, fiscal policy can interfere with and lead to sub-optimal outcomes of monetary policy, e.g., in *Inflation Targeting* regimes (e.g. Combes et al., 2014). De Mello (2000) shows that fiscal *Decentralization* leads to a stronger deficit bias.

Apart from these reasons related to governments' deficit bias, fiscal rules may be introduced (or strengthened) in response to general economic and fiscal conditions. According to IMF (2009), fiscal rules may be used to change or preserve current or past fiscal or economic outcomes. They find that usually the public demands rules constraining fiscal policy in 'favourable times', i.e., in periods of low *Inflation* and strong *GDP Growth*.

### 3 The Empirical Model

We consider panel data models of the form

$$R_{i,t}^{\ell} = \mathbf{x}_{i,t}\beta + \mu_i + \varepsilon_{i,t}. \quad (1)$$

The dependent variable  $R_{i,t}^{\ell}$  measures the stringency of fiscal rules in country  $i$  in year  $t$ , the vector  $\mathbf{x}_{i,t}$  includes potential determinants of fiscal rules motivated in Section 2,  $\mu_i$  denotes country-fixed effects, and  $\varepsilon_{i,t}$  is an idiosyncratic error term that is assumed to be independently though not necessarily identically distributed. The panel comprises 81 countries and ranges from 1985-2012.

We use three alternative measures of fiscal rules ( $R_{i,t}^{\ell}$ ), which are taken from a novel data set by Badinger and Reuter (2015): i) balanced budget rules ( $R^{BR}$ ), ii) debt rules ( $R^{DR}$ ), and iii) an index of the general fiscal framework ( $R^G$ ).<sup>2</sup> Each index ranges from 0 to 1 and is increasing in stringency, broadly defined in terms of hierarchy of the legal basis, coverage, transparency, and accountability. For more details, see Badinger and Reuter (2015).

For estimation, it has to be taken into account that our dependent variables can only take values from zero to one and that there is a non-negligible share of zeros (around 50% country-year observations with no fiscal rule in place), ruling out the use of standard logit or beta models (Papke and Wooldridge, 1996). Moreover, least squares estimates are inefficient and the estimates of the marginal effects possibly biased. The use of two-step methods (such as Tobit, hurdle, zero-one-inflated beta, Heckit models) would have to assume that there are two different data generating processes for the introduction and the stringency of fiscal rules respectively. This is likely to be violated in the present context.

Hence, we opt for the fractional logit method introduced in Papke and Wooldridge (1996), which uses a quasi-maximum likelihood approach that takes the constrained range of the fiscal rule variables (due to construction rather than censoring) into account, is able to predict values at the limits of the interval (which are assumed to be generated by the same process as the stringency of the fiscal rules) and offers a 'robust estimator of the conditional mean parameters with satisfactory efficiency properties' (Papke and Wooldridge, 2008, p.122).

Notice that our dependent variable in equation (1) reflects fiscal rules already in effect. Given the time required to put new fiscal rules into force, all explanatory variables are lagged by two years in the regressions.<sup>3</sup>

<sup>2</sup> The general fiscal framework index, among others, accounts for the existence of multi-year frameworks, independent fiscal bodies and transparency and accountability laws.

<sup>3</sup> We emphasize that our results are qualitatively unchanged if we use one-year or three-year time lags of the explanatory variables, though the fit of the empirical models becomes worse.

## 4 Results

In a first step of our specification search strategy, we consider – for each fiscal rules index – the set of explanatory variables associated with one particular rationale underlying the deficit bias separately. The resulting model includes only those explanatory variables that turn out significant both individually and when included jointly.

In a second step, we combine the sets of variables obtained, i.e., we include all variables obtained in the first step, and employ a general-to-specific approach, subsequently excluding the variables that turn out insignificant.<sup>4</sup>

Finally, we check the robustness of the model, using a specific-to-general approach: We include (sets of) variables that have been excluded before, test for their significance, and check whether some of the variables in the preferred model are affected by their inclusion. Fortunately, this does not turn out to be the case; also, the order in which the variables are included in the specific-to-general strategy is immaterial for the ultimate set of determinants obtained.

– Table 1 –

Table 1 reports the final models for each fiscal rule index ( $R^{BR}$ ,  $R^{DR}$ , and  $R^G$ ). All four groups of rationales for the deficit bias as well as economic and fiscal conditions turn out relevant and enter the final model with at least one variable. Moreover, for the three fiscal rules indices, we end up with the same set of determinants, indicating a large need for fiscal rules or an environment with low inflation and growth.

Countries have more stringent fiscal rules if their government is more fragmented and the population is less dependent on the government, indicating that (the deficit bias and thus) the need for fiscal rules is stronger the more (or larger) interest groups lobby the decision making process (*common pool theory*). Fiscal rules are also more stringent in countries with a weaker system of checks and balances other than fiscal institutions (*information asymmetry*). The finding that government's term length has a positive effect on the stringency of fiscal rules points to a larger need for institutional constraints, if politicians are less frequently 'threatened' by parliamentary elections (*impatience, short-sightedness*). Moreover, as suggested by theory, countries that are part of a monetary union and/or have a central bank that follows an inflation targeting regime, have more stringent fiscal rules in place to reduce negative spillovers to other union members or monetary policy (*spillovers*).

Regarding the economic circumstances we only partially confirm the preliminary empirical findings in the literature that fiscal rules are typically strengthened in favorable times. Since higher inflation rates (and larger increases in public expenditures) might make it harder for governments to comply with fiscal rules, the finding that fiscal rules are strengthened in years with lower inflation rates are plausible. Finally, we find that a deterioration of GDP growth triggers the introduction or strengthening of fiscal rules, possibly to facilitate the implementation of consolidation policies.

We add that these findings are robust with respect to the estimation method, e.g., when compared to a standard Tobit estimation or the zero-one-inflated beta regression model. Furthermore our results also hold up for alternative time periods, excluding the most recent years after the financial crisis (1985-2008) or the first years of our sample (1995-2012).

## 5 Conclusions

This paper investigates empirically the determinants of (the stringency) of fiscal rules, using a wide range of variables suggested by the political science, economics and sociology literature. Thereby, it

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<sup>4</sup> Using a general-to-specific approach including all variables, would result in the same set of variables.

provides evidence on the relevance of alternative theories of governments' deficit bias and suggests a set of instrumental variables, which can be used in empirical models on the relation between (endogeneous) fiscal rules and fiscal and macroeconomic performance.

Our fractional logit estimates for a sample of 81 countries from 1985-2013 suggest that fiscal rules are more stringent in countries with higher government fragmentation, government stability, a parliamentary political regime, having an inflation targeting regime or being part of a monetary union, a lower dependency ratio, less checks and balances, a low inflation rate and low GDP growth.

All these variables are strongly associated with the stringency of fiscal rules and can be considered as relevant and - depending on the empirical context - as valid instruments. Moreover, the results provide indirect evidence on the importance of (variables related to) common pool problems, information asymmetry, short-sightedness of governments and spillover costs as drivers of governments' deficit bias, and that fiscal rules are more stringent in countries having a higher need for them.

## References

- Badinger, H. and Reuter, W. (2015), ‘Measurement of fiscal rules: Introducing the application of partially ordered set (POSET) theory’, *Journal of Macroeconomics* **43**, 108–123.
- Calderón, C. and Schmidt-Hebbel, K. (2008), The Choice of Fiscal Regime in the World. Central Bank of Chile Working Paper.
- Combes, J., X. Debrun, A. and Tapsoba, R. (2014), ‘Inflation Targeting and Fiscal Rules: Do Interactions and Sequencing Matter?’, *IMF Working Paper* **14/89**.
- De Mello, L. R. (2000), ‘Fiscal decentralization and intergovernmental fiscal relations: a cross-country analysis’, *World development* **28**(2), 365–380.
- Debrun, X. and Kumar, M. S. (2007), ‘The Discipline-Enhancing Role of Fiscal Institutions: Theory and Empirical Evidence’, *IMF Working Paper* **07/171**.
- Hammond, G. (2012), *State of the Art of Inflation Targeting - 2012*, CCBS Handbook No. 29, Bank of England.
- IMF (2009), Fiscal Rules Anchoring Expectations for Sustainable Public Finances. International Monetary Fund (FAD).
- Papke, L. E. and Wooldridge, J. M. (1996), ‘Econometric methods for fractional response variables with an application to 401(k) plan participation rates’, *Journal of Applied Econometrics* **11**(6), 619–632.
- Papke, L. E. and Wooldridge, J. M. (2008), ‘Panel data methods for fractional response variables with an application to test pass rates’, *Journal of Econometrics* **145**(1-2), 121–133.
- Persson, T., Roland, G. and Tabellini, G. (1997), ‘Separation of Powers and Political Accountability’, *Quarterly Journal of Economics* **112**, 1163–1202.
- Persson, T. and Svensson, L. (1989), ‘Why a Stubborn conservative would run a deficit: policy with time-inconsistent preferences’, *Quarterly Journal of Economics* **104**, 325–45.
- Poterba, J. (1994), ‘State responses to fiscal crises: The effects of budgetary institutions and politics’, *Journal of Political Economy* **102**, 799–821.
- Roubini, N. and Sachs, J. (1989), ‘Political and Economic Determinants of Budget Deficits in Industrial Democracies’, *European Economic Review* **33**, 903–938.
- Stratmann, T. and Aparicio-Castillo, F. (2006), ‘Competition policy for elections: Do campaign contribution limits matter?’, *Public Choice* **127**(1), 177–206.
- Von Hagen, J. and Eichengreen, B. (1996), ‘Federalism, Fiscal Restraints, and European Monetary Union’, *American Economic Review* **86**(2), 134–38.
- Woo, J. (2005), ‘Social polarization, fiscal instability and growth’, *European Economic Review* **49**(6), 1451–1477.

# A Appendix

**Table A1:** *Explanatory Variables - Data Sources*

Variable	Description	Range	Source
Age Dependency	Population aged below 15 or above 64 (% of total)	[24.21,52.80] $\mu$ 37.69, $\sigma$ 6.40 N=77, (1985-2011)	WB-WDI
Checks and Balances	Measure of the institutional constraints faced by authorities	[1,9] $\mu$ 3.37, $\sigma$ 1.46 N=75, (1985-2012)	WB-DPI
Debt-to-GDP ratio	General government gross debt (% of GDP)	[0.7, 270.2] $\mu$ 59.67, $\sigma$ 39.54 N=79, (1985-2012)	IMF-WEO
Decentralization	Share of local and regional government expenditures of general government expenditures	[0.02, 0.77] $\mu$ 0.38, $\sigma$ 0.18 N=56, (1985-2012)	IMF-GFS
District Magnitude	Number of legislators elected in the average district	[0.72,450] $\mu$ 15.06, $\sigma$ 37.01 N=75, (1985-2012)	WB-DPI
Education	Education of population	[0.07,1] $\mu$ 0.66, $\sigma$ 0.21 N=80, (1985-2011)	UNDP
Fiscal Balance	Surplus of general government (% of GDP)	[-34.51, 40.34] $\mu$ -2.31, $\sigma$ 4.99 N= 81, (1985-2012)	IMF-WEO
GDP Growth	Real Growth of GDP (%)	[-27.155, 63.38] $\mu$ 3.51, $\sigma$ 5.67 N=81, (1985-2012)	IMF-WEO
Government Accountability	Citizen participation in selecting government, freedom of expression, association, media	[-1.90, 1.83] $\mu$ 0.49, $\sigma$ 0.89 N=81, (1996-2012)	WB-WGI
Government Fragmentation	Fractionalisation index $1 - \sum_{i=1}^N p_i^2$ where $p_i$ = seats share and $N$ = no. of gov. parties	[0, 0.99] $\mu$ 0.67, $\sigma$ 0.26 N=75, (1985-2012)	Own w. WB-DPI
Government Stability	Term length of governments (years)	[3,8] $\mu$ 4.72, $\sigma$ 0.88 N=75, (1985-2012)	Own w. WB-DPI
Inflation	Inflation rate, average consumer prices, percentage change	[-17.64, 748.17] $\mu$ 27.46, $\sigma$ 261.64 N=81, (1985-2012)	IMF-WEO
Inflation Targeting	1 if central bank operates with inflation targeting, 0 otherwise	[0;1] $\mu$ 0.13, $\sigma$ 0.33 N=81, (1985-2012)	Hammond (2012)
Monetary Union	1 if in currency union, 0 otherwise	[0;1] $\mu$ 0.34, $\sigma$ 0.48 N=81, (1985-2012)	Authors input
Parliamentary Dispersion	Herfindahl Index (sum of squared seat fractions of parties in parliament)	[0.02,1] $\mu$ 0.41, $\sigma$ 0.23 N=75, (1985-2012)	Own w. WB-DPI
Political Regime	Parliamentary (2), Assembly-elected President (1), Presidential (0)	[0;2] $\mu$ 1.01, $\sigma$ 0.97 N=75, (1985-2012)	WB-DPI

*Notes:*  $\mu$  ... Mean,  $\sigma$  ... Standard Deviation; N ... Number of countries; WB-DPI ... Worldbank - Database of Political Institutions 2012; WB-WDI ... Worldbank - World Development Indicators; WB-WGI ... Worldbank - World Governance Indicators; IMF-GFS ... International Monetary Fund - Government Finance Statistics; IMF-WEO ... International Monetary Fund - World Economic Outlook; UNDP ... UNDP International Human Development Indicators.



**Table 1: Estimation Results for Equation (1)**

<i>Dependent Variable</i>	$R^{BR}$	$R^{DR}$	$R^G$
<i>Common pool theory</i>			
Government Fragmentation	3.564*** (1.159)	0.297*** (0.047)	0.208*** (0.057)
Age Dependency	-0.684*** (0.066)	-0.030*** (0.003)	-0.041*** (0.003)
<i>Information asymmetry</i>			
Checks and Balances	-0.447*** (0.116)	-0.037*** (0.005)	-0.017** (0.008)
<i>Impatience and short-sightedness of governments and political competition</i>			
Political Regime	1.047*** (0.239)	0.076*** (0.014)	0.048*** (0.015)
Government Stability	0.205*** (0.052)	0.016*** (0.003)	0.015*** (0.004)
<i>Spillovers and outside pressures</i>			
Inflation Targeting	2.936*** (0.514)	0.183*** (0.017)	0.261*** (0.029)
Monetary Union	2.414*** (0.271)	0.051*** (0.014)	0.115*** (0.020)
<i>Economic and fiscal conditions</i>			
Inflation	-0.303*** (0.103)	-0.012*** (0.005)	-0.022*** (0.006)
GDP Growth	-1.550*** (0.223)	-0.012* (0.006)	-0.129*** (0.023)
Pseudo R <sup>2</sup>	0.722	0.817	0.638
Observations	1,443	1,443	1,443

*Notes:* Fractional logit estimates using the approach by Papke and Wooldridge (1996). Pseudo R<sup>2</sup> is squared correlation between predicted and observed values. Country-fixed effects are included in all models. Average marginal effects reported with standard errors in parentheses. \*, \*\*, \*\*\* indicate significance at 10%, 5%, 1%.