Numerical Expenditure Rules: Design and Effects

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Abstract

This paper analyzes national numerical expenditure rules and how policy maker react to (non-)compliance with them. Based on the exact legal wording of the expenditure rules in national legislation the variable constrained and the numerical limit imposed by the rule are calculated. This enables a joint analysis of the eight expenditure rules which are or were in force in the EU28 from 2000-2014 covering the central or general government. Statistics show that countries only comply with their expenditure rules in around 60% of the years and forecasts. Nevertheless, econometric exercises indicate that the reduction of expenditures is twice as strong with an expenditure rule in force than without, if the country does not comply with the rule in the previous year or previous forecast. The estimations also show that policy makers increase the constrained variables in case of compliance with the rules (especially in the forecasts).

JEL-Classification: H60, H68, E02, E62
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1 Introduction

In the last decades governments, especially in the EU, more and more relied on statutory expenditure rules to control government spending and consolidate public budgets. Compared to other types of fiscal rules, expenditure rules are especially often used to constrain public expenditures of the general or central government, as opposed to e.g. balanced budget rules which are used more often on the regional or local government level. In the aftermath of the sovereign

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debt crisis, supranational expenditure rules also play an important role in the strengthened fiscal governance framework of the EU.

While policy makers are introducing expenditure rules, there is mixed evidence in the academic literature about their effectiveness and implications. On the one hand, empirical studies, like Debrun et al. (2008) or Nerlich & Reuter (2013), find no significant effect of expenditure rules on public finances, as opposed to balanced budget or debt rules. On the other hand, one key advantage of expenditure rules pointed out by the theoretical literature (e.g. Wierts 2008, Holm-Hadulla et al. 2010, Ayuso i Casals 2012) is that they are more targeted, better suited to tackle the deficit bias and not as pro-cyclical as other fiscal rules.

The various expenditure rules introduced in a wide range of countries differ in many aspects, a.o. with regards to the variables chosen to be constrained and even if some are constraining the same variables, they are setting different numerical limits. Additionally the full legal articles usually also include several exceptions and cumbersome instructions on how to calculate the constrained variables. Some countries have rules which are very strict and others have rules which are very loose such that they are always complied with. Some rules account for the current economic situation in the design of the numerical constraint, others do not. Previous studies were not able to take this into account and classified the various expenditure rules according to important characteristics using dummy variables or composite indices.

This paper makes use of a new dataset and analyses the performance of the various expenditure rules as well as the policy reaction to (non-)compliance. This data allows a joint analysis with different types and different implementations of expenditure rules. Furthermore, it reduces the problems associated with the so far used composite indices, which are largely time invariant, do not consider the actual numerical targets of the various rules and ignore the fiscal situation of a country with respect to this limit.

The paper is organized as follows: Section 2 introduces the data on expenditure rules and several definitions Section 3 presents statistical observations regarding the design of expenditure rules and the (non-)compliance of countries. Section 4 specifies the econometric exercises performed in this paper and Section 5 presents the results of these exercises. Finally, Section 6 concludes.

2 Data

There are two major data sets, published by the European Commission (2012) and the IMF (2013), describing national numerical fiscal rules. The data sets include balanced budget, debt, expenditure and revenue rules covering different levels of government for the EU28 (European Commission 2012) and 81 countries worldwide (IMF 2013) respectively. In total the two data sets present 169 fiscal rules for the EU28 countries from 1985-2014, of which 102 are covering the general or central government and of which 123 are enshrined in law or constitution. Of those 169 rules there are 76 balanced budget, 39 debt, 44

expenditure and 10 revenue rules. This paper focuses on the 18 expenditure rules, mentioned in these data sets, covering the general or central government and enshrined in statutory law (none of those rules is enshrined in the constitution of the countries). This choice is motivated for theoretical reasons and data availability: i) fiscal rules enshrined in statutory law cannot easily be changed every year and are said to be more credible than mere political commitments or coalitional agreements, ii) statutory rules are set out in legal documents which are publicly available, iii) economic data on the general and central government are more reliable and more significant for the consolidation of public finances than those for the regional or local governments, and iv) the compliance of local or regional governments with their expenditure rules would not be possible to determine on an aggregate level.

The analysis of this paper is based on the dataset, presented in Reuter (2014), of the exact text passages from constitutional and statutory documents of the EU countries that set out the expenditure rules mentioned above. With the help of native speakers, translators and lawyers the respective legal document and law paragraphs (plus related paragraphs) defining each of these fiscal rules were collected. Based on this information the actual and forecast values of the numerical limit ($\mathcal{F}^{\mathcal{R}}$) set by the expenditure rules, as well as the constrained variable ($\mathcal{F}$) on which the rule is imposed on, are calculated. Data for the actual and forecast values are taken from various vintages of the AMECO database of the European Comission. As an robustness check the actual values were also calculated based on the Government Finance Statistics database of the IMF. To be able to compare the behavior of governments in times before and after an expenditure rule is introduced in legislation, the constrained variables and numerical limits were also calculated for the years in which the rules were not in force yet or anymore (i.e. assuming the respective expenditure rule would have been effective over the full sample period).

For the empirical analysis of this paper only eight out of the 14 countries having one of the expenditure rules mentioned above can be used, as i) three rules (AT, CZ and SE) are in fact medium term budgetary (expenditures) frameworks, changed quite regularly and constraining only single years, ii) two rules (IE and IT) only cover very small fractions of the government (expenditures for pharmaceutical products and contributions to the pension reserve fund, respectively) for which data are not available, and iii) one rule (SK) cannot be calculated using international databases (as the rule entails the difference between planned and actual expenditures). The resulting eight expenditure rules used in this paper, together with simplified versions of the respective rules as set out in the legal documents, are shown in Table 1.

Table 1: National numerical expenditure rules included in this paper

Cty[1]	Time	EC[2]	IMF[3]	Simplified Rule
BG	12-	x	x	$E_t^Y(GG) <= 40\%$
ES	11-	x	x	$\delta(PE_t(CG) - UnempB_t(CG)) \leq \varnothing_9 \delta Y_t$
FR	11-	x	x	$Max(\delta RE_t(CG), \delta PE_t(CG)) <= 0$
HR	12-	x	x	$\Delta E_t^Y(GG) <= -1\%$
HU	09	-	-	$PE_t <= PE_{t-1}$
HU	10-11	-[4]	x	$\delta RPE_t(GG) < 0.5\delta RY_t$
LT	08-	x	x	if $\varnothing_5 BB_t(GG) < 0 : \delta E_t(GG) <= 0.5\varnothing_5 \delta R_t(GG)$
PL	11-	x	x	$\delta RPE_t(CG) <= 1\%$
RO	10-	-	x	if $BB_t(GG) < 0$: $\delta E_t(GG) < \delta Y_t$

Notes: [1] Country name; [2] "x" if rule is included in European Commission (2012), deviations from European Commission (2012) in notes; [3] "x" if rule is included in IMF (2013), deviations from IMF (2013) in notes; [4] in European Commission (2012) included as Debt Rule; δ growth rate from $t-1$ to t, $\varnothing_\theta$ θ-year average, with ^{Y} always ratio of GDP, E total expenditures, PE Primary expenditures, RE real expenditures, RPE real primary expenditures, $UnempB$ expenditures for unemployment benefits, Y gross domestic product, RY Real gross domestic product; CG central government, GG general government.

As can be seen the various rules differ in various respects. Different definitions of variables are chosen to be constrained and even if rules use the same definition, they are setting different numerical limits. Table 1 only presents the main rules, but often there are various exceptions and escape clauses stated in the legal documents. For the empirical exercises of this paper, those exemptions are also taken into account either by calculating the variables reduced by the exemptions or by omitting the observation where no quantification of the exemption is given in the legal text. Nevertheless, some vagueness remains, as parts of some rules can be read in an ambiguous way (maybe to leave some room for interpretation for policy makers) and for specific parts of some rules data were not available for all exceptions. But both problems usually affect both the constrained variable and the numercial limit in the same way and the missing data makes up only very small fractions of the total variables, such that it should not be a problem in the empirical exercises.

The calculation of the numerical limit and the constrained variable is based on data from the AMECO database of the European Commission. For the actual values (2000-2014) the autumn 2014 vintage of the database is used (as a robustness check the actual values are also taken from the IMF Government Finance Statistics database) and the forecasts are taken from the semi-annual vintages between spring 1998 and autumn 2014. Using data from the European Commission instead of national data has two opposing implications: i) Countries might still (not) comply with their expenditure rule in national data, but (do) not in the EU data, which would result in biased estimates of the reaction of governments to (non-) compliance. But if one assumes that national and EU data are fairly close and governments are not able to exactly steer the economic variables towards (non-) compliance with their rules, then this should only be a minor concern. ii) The forecasts of the European Commission (opposed to the own forecasts of the governments, as e.g. used in Frankel & Schreger 2013) might be more resilient to the political influence of governments and national interest

groups. The sources of all variables used in this paper are given in Appendix A and Appendix C presents graphical illustrations of all the constrained variables and numerical limits used in this paper.

All constrained variables and numerical limits are transformed into percentage of GDP figures, to enable a joint analysis accross countries. Furthermore, some variables are inverted (multiplied by -1) such that a homogenous meaning in respect of the compliance with expenditure rules is given, i.e. if the constrained variable is larger than the numerical limit, the country does not comply with the rule, otherwise it does.

The variable which is constrained by the expenditure rule (e.g. level of general government expenditures to GDP, growth rate of central government expenditures, etc.) is denoted as $\mathcal{F}_{i,t,\tau}$, i.e. the constrained variable for year t of the numerical expenditure rule of country i. Parts of this paper also look at the forecast values and thus variables are available for each year t at six different points in time: the actual value (taken from the autumn 2014 vintage of the AMECO database; represented by $\tau = 0$), the autumn forecast in the same year t ($\tau = -1$), the spring forecast in the same year t ($\tau = -2$), the autumn forecast of the previous year $t-1$ ($\tau = -3$), the spring forecast of the previous year $t-1$ ($\tau = -4$) and the autumn forecast of two years before $t-2$ ($\tau = -5$). The numerical limit set by the expenditure rule is denoted as $\mathcal{F}^{\mathcal{R}}_{i,t,\tau}$ and represents the constraint set by the expenditure rule of country i forecast in period τ (or the actual value if $\tau = 0$) for the year t.

3 Compliance Statistics

In the last one and a half decades countries all over the world introduced more and more numerical fiscal rules (see e.g. Schaechter et al. (2012) for an overview). They are used to constrain e.g. the budget balance or debt level of different levels of government, but also public expenditures and revenues. During this period (especially from 2009 to 2012) also numerical expenditure rules have become popular, especially those covering the central or general government.

Figure 1 shows the number of countries of the EU28 which have or had an expenditure rule covering the general or central government enshrined in its national legislation. While in 1999 no country of the EU28 had such a rule in place, almost half of the countries had one in 2012. Also the coverage of the expenditure rules increased to five countries having rules that cover the finances of the general government in 2012.

By calculating the constrained variable and the numerical limit the annual (or forecast) compliance with the expenditure rules can be observed. The dummy variable $\mathcal{N}_{i,t,\tau}$ defined in Equation 1 is one, if country i is not complying with its expenditure rule in forecast τ of year i, i.e. the constrained variable is larger than the constraint imposed by the fiscal rule.

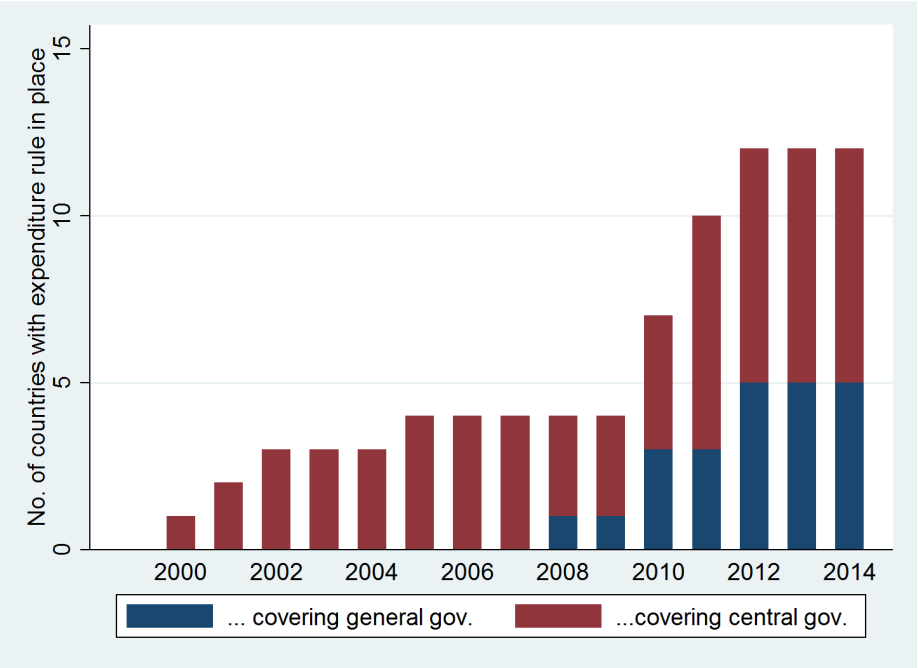

Figure 1: EU28 countries with expenditure rule

$$\mathcal{N}_{i,t,\tau} := \begin{cases} 1 & \text{if } \mathcal{F}^{\mathcal{R}}_{i,t,\tau} < \mathcal{F}_{i,t,\tau} \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

The respective percentage of years in which the countries did comply with their expenditure rules while they were in force, is presented in Table 2. In general the countries complied with their expenditure rules in 61% of the years and also in around 62% of the forecasts.

When looking at how compliance changed over time it can be noted that in a third of the years a country changed to compliance with the rule in year t, when it did not comply with it three years ahead or in the forecasts two years ahead. The closer to the actual values the years or forecasts get, the less did the governments change from non-compliance to compliance. This is a first indication that policy makers do want to change from non-compliance (in previous years or in early forecasts) to compliance with their expenditure rules, but they need time for this change to materialize. A change from compliance in the previous years to non-compliance can be observed more often the closer one gets to the actual year. This might indicate that non-compliance of countries with their expenditure rules happens because of unexpected shocks which cannot be corrected fast enough, rather than long planned expenditure increases.

Table 2: Compliance with the numerical expenditure rules in force

overall compliance in actual values ($\mathcal{N}_{i,t,0} = 0$):		61%			
		$t-1$	$t-2$	$t-3$	
compl. in t, changed from non-compl. in...		19%	21%	32%	
non-compl. in t, changed from compl. in...		31%	33%	18%	
overall compliance in forecasts ($\mathcal{N}_{i,t,\tau} = 0$):		62%			
$\tau =$	-1	-2	-3	-4	-5
compl. in $\tau = 0$, changed from non-compl. in...	18%	10%	29%	33%	33%
non-compl. in $\tau = 0$, changed from compl. in...	18%	19%	14%	25%	21%

Notes: Percentage of years (upper panel) or forecasts (lower panel) in which countries complied (or did not comply) with their expenditure rules while they were in force between 2000-2014.

As can already be seen in Table 1, the various expenditure rules differ strongly with regards to how they constrain the public expenditures. Table 3 presents the same compliance statistics as Table 2 before, but for subsamples of the countries according to some broad classification. About half of the expenditure rules used in this paper target variables of the general government and the other half of the central government. The compliance with the rules is slightly higher with the expenditure rules targeting only the central government (67% vs. 58% in the actual values and 50% vs. 46% in the forecasts). Furthermore, half of the countries cover more than 50% of their general government finances by the expenditure rules, and half cover less (sometimes only very small fractions). Compliance is higher with the rule covering smaller fractions of the general government expenditures, especially so in the forecasts. Both observations indicate that it is easier for governments to comply with (especially in the forecasts) expenditure rules that are targeting only the central government and smaller fractions of the general government expenditures. This might be a result of not always easy or successful negotiation processes with lower levels of government, as general government expenditures also include the budgets of those.

Four countries in the sample use automatic corrections mechanisms or sanctions to enforce their expenditure rules. Those are almost always complied with in the forecasts, but only slightly more complied with in the actual values. This could indicate that governments try to always comply with their expenditure rules if they are enforced by sanctions or correction mechanisms, but unexpected shocks reduce the actual compliance. Furthermore, one-third of the countries have definitions of the constrained variables using the level of expenditures, and two-thirds various forms of the growth rate. There is no difference in the compliance with those rules.

Table 3: Compliance and characteristics of the numerical expenditure rules included in this paper

Compliance in...	Actual ($\tau = 0$)	Forecast $t-2$ ($\tau = -5$)	Countries
General	61%	48%	
General Gov.	58%	46%	BG, HR, HU, LT, RO
Central Gov.	67%	50%	ES, PL, FR, (IE, IT, SK)
Coverage of GG: $< 50\%$	63%	80%	FR, LT, PL, (IE, IT, SK)
Coverage of GG: $> 50\%$	58%	18%	BG, HR, HU, RO, ES
Sanctions or automatic corr. mechanisms.	67%	94%	HR, ES, PL, (SK)
None	58%	35%	FR, LT, BG, HU, RO, (IE, IT)
Level	61%	48%	BG, (IE, IT, SK)
Growth rate	60%	39%	HR, FR, HU, LT, PL, RO, ES
Combination with other fiscal rules covering general or central government			
any	60%	50%	BG, HU, HR, LT, PL, ES, (SK)
BBR	63%	71%	BG, HU, ES
DR	59%	42%	BG, HU, HR, LT, PL, (SK)
none	57%	25%	RO, FR, LT, (IE, IT)

Notes: Percentage of years (column 2) or forecasts (column 3) in which countries complied with their expenditure rules while they were in force between 2000-2014, split by characteristics shown in column 1. GG= General government expenditures, BBR = Balanced Budget Rules, DR = Debt Rules.

Some policy makers and authors in the literature (e.g. Guichard et al. 2007) advocate the use of combinations of fiscal rules. The bottom panel of Table 3 shows the compliance statistics for countries which combine expenditure rules with other types of rules. Especially in combination with balanced budget rules (which three of the countries in the sample have) and in forcasts the compliance is higher.

The difference between the constrained variable and the numerical constraint for the same time period and the same forecast shows how far away the fiscal variables are from the limit set by the expenditure rule (Equation 2). As all variables have been transformed to have a homogenous meaning with respect to the expenditure rule, this difference $\Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau}$ is negative if the country complies with the rule, i.e. the constrained variable is below the limit set by the fiscal rule, and positive otherwise.

$$\Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau} := \mathcal{F}_{i,t,\tau} - \mathcal{F}^{\mathcal{R}}_{i,t,\tau} \tag{2}$$

Figure 2 shows the average of this variable $\Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau}$ for the different forecast

periods split by the years when the expenditure rule was in force and the years when it was not. The average distance is above the numerical limit for the forecasts one and two years ahead, while it is below the limit in the forecasts of the actual year. Generally the average distance in years with fiscal rules in force is lower than in years without a fiscal rule. Furthermore the compliance statistics of Table 2 are confirmed as the average distance is negative for the years with expenditure rules and slightly positive for the years without.

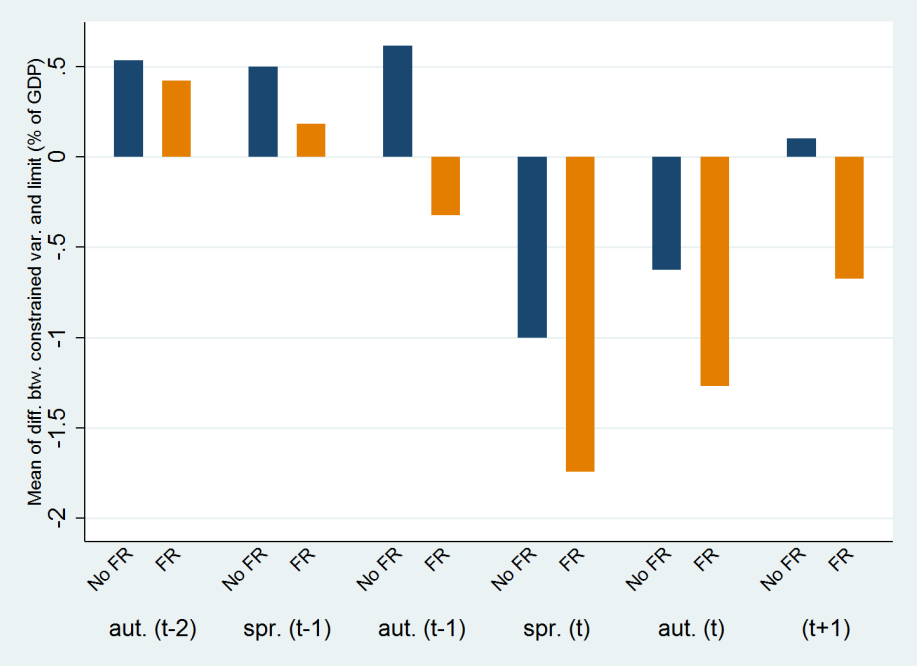

Figure 2: Difference between constrained variable and numerical limit per forecast period (in % of GDP) split by years when expenditure rule was in force (FR) and when it was not (No FR)

4 Empirical Framework

Section 3 already presented some assumptions about the reaction of policy makers to (non-)compliance with their expenditure rules. The empirical analysis investigates this behaviour in more detail and analyzes the determinants of the change of the difference between the constrained variable and the numerical limit.

First, the effect of the dummy variable indicating if the expenditure rule was not complied with ($\mathcal{N}_{i,t-1}$) in the previous year, on the change of the difference

between the constrained variable and numerical limit ($\Delta^t(\Delta^R\mathcal{F}_{i,t,0})$) is analyzed. As the constrained variable and the numerical limit are calculated for the full sample period (2000-2014, i.e. not only the years the expenditure rule was acutally in force in), it is important to distinguish between years in which the expenditure rule was actually in force in and enshrined in statutory law. The dummy variable $\mathcal{R}_{i,t}$ is one if this is the case for country i in year t, and zero otherwise. This enables a distinction between a general behaviour of fiscal policy and the actual effect of introducing a fiscal rule in national legislation. The basic setting is presented in Equation 3:

$$\Delta^t(\Delta^R\mathcal{F}_{i,t,0}) = \beta_0 + \beta_1\mathcal{R} \times \mathcal{N}_{i,t-1} + \beta_2\mathcal{R}_{i,t} + \beta_3\mathcal{N}_{i,t-1} + \mu_i + \nu_t + \epsilon_{i,t,0} \quad (3)$$

Rule/ country fixed effects (μ_i) and time fixed effects (ν_t) are included, and $\epsilon_{i,t,0}$ represents the idiosyncratic error term. Hausman tests on omitting the rule or time fixed effects were all rejected and robustness checks of leaving out the rule or time fixed effects, which are quantitatively and qualitatively very similar, are shown in Table 6 in Appendix B.1.

$$\Delta^t(\Delta^R\mathcal{F}_{i,t,0}) = \beta_0 + \beta_1\mathcal{R}_{i,t} \times \Delta^R\mathcal{F}_{i,t-1,0} + \beta_2\mathcal{R}_{i,t} + \beta_3\Delta^R\mathcal{F}_{i,t-1,0} + \mu_i + \nu_t + \epsilon_{i,t,0} \quad (4)$$

Second, the policy reaction might be different depending on how far away the constrained variable is from the limit set by the expenditure rule. Thus, Equation 4 investigates the effect of the difference between the constrained variable and numerical limit ($\Delta^{\mathcal{R}}\mathcal{F}_{i,t-1,0}$) on the change of this variable to the next period ($\Delta^t(\Delta^R\mathcal{F}_{i,t,0})$), depending on the fact that the fiscal rule is in force or not ($\mathcal{R}_{i,t}$). Two different forms of this change/ differences are defined to distinguish between i) the difference of the constrained variable from one forecast to the next (half a year later) for the same year t, and ii) the annual difference between the actual values ($\tau = 0$) betwenn two consecutive years. Equation 5 represents the difference in forecasts and Equation 6 the difference in actual values.

$$\Delta^\tau\mathcal{F}_{i,t,\tau} := \mathcal{F}_{i,t,\tau} - \mathcal{F}_{i,t,\tau-1} \quad (5)$$

$$\Delta^t\mathcal{F}_{i,t,0} := \mathcal{F}_{i,t,0} - \mathcal{F}_{i,t-1,0} \quad (6)$$

The reaction of policy makers might also be different depending on which side of the numerical constraint the variables are. Thus, the difference between constrained variable and numerical limit ($\Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau}$) can also be split into a positive (when the country does not comply with its rule, Equation 7) and a negative part (when the country complies with the rule, Equation 8).

$$\Delta^{\mathcal{R}+}\mathcal{F}_{i,t,\tau} := \begin{cases} \Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau} & \text{if } \mathcal{F}^{\mathcal{R}}_{i,t,\tau} < \mathcal{F}_{i,t,\tau} \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

$$\Delta^{\mathcal{R}-}\mathcal{F}_{i,t,\tau} := \begin{cases} \Delta^{\mathcal{R}}\mathcal{F}_{i,t,\tau} & \text{if } \mathcal{F}^{\mathcal{R}}_{i,t,\tau} > \mathcal{F}_{i,t,\tau} \\ 0 & \text{otherwise} \end{cases} \tag{8}$$

Equation 4 is then also estimated using those split values instead of $\Delta^{R}\mathcal{F}_{i,t-1,0}$.

As a robustness check all equations are also estimated including a wide range of control variables which are standard in the literature as determinants of fiscal policy variables. For a detailed description of the variables and the reasons for including them see e.g. Nerlich & Reuter (2013) and Appendix A. The controls can be grouped into three categories: i) economic variables (lagged debt levels, lagged output gap, dependency ratio, population and openness), ii) political variables (ideology of government, ideological distance of parties in government, fragmentation of parliament and district magnitude), and iii) institutional variables (delegation or contract approach to governance, and stability and growth pact). The results stay qualitatively the same with or without control variables included.

After analyzing the reaction to annual compliance also the change in the distance between constrained variable and numerical limit from forecast to forecast is analyzed. Basically all above mentioned Equations 3 and 4 are also estimated using (t, τ) and $(t, \tau - 1)$ instead of $(t, 0)$ and $(t - 1, 0)$. The full Equation 4 using the explanatory variable split into positive and negative values and including the control variables for the difference between forecasts is presented in Equation 9.

$$\begin{aligned} \Delta^{\tau}(\Delta^{R}\mathcal{F}_{i,t,\tau}) = \beta_0 + \beta_1\mathcal{R}_{i,t} \times \Delta^{\mathcal{R}+}\mathcal{F}_{i,t,\tau-1} + \beta_2\mathcal{R}_{i,t} \times \Delta^{\mathcal{R}-}\mathcal{F}_{i,t,\tau-1} + \beta_3\mathcal{R}_{i,t} \\ + \beta_4\Delta^{\mathcal{R}+}\mathcal{F}_{i,t,\tau-1} + \beta_5\Delta^{\mathcal{R}-}\mathcal{F}_{i,t,\tau-1} + x'_{i,t} + \mu_i + \nu_t + \epsilon_{i,t,\tau} \end{aligned} \tag{9}$$

5 Results

The main purpose of introducing expenditure rules is to get policy makers to restrict their spending and force them to comply with the rules set out in the legal documents. As seen in Section 3 this is only the case in approximately 61% of the years. A secondary goal of introducing expenditure rules would be to at least steer the policy variables towards the numerical limit in case of non-compliance. I.e. if e.g. an unexpected shock leads to an increase in expenditures which breaks the constraint set by the rule, then policy makers should at least move the variable in the right direction and towards compliance in the following periods. This Section tests if this behavior can be observed in the data.

5.1 Reaction to annual (non-)compliance with expenditure rules

Table 4 presents the estimation results for the annual change in the difference between constrained variable and the numerical limit ($\Delta^{t}(\Delta^{R}\mathcal{F}_{i,t,0})$). Column

(1) shows the results for Equation 3. As already seen in previous studies, we cannot observe a direct effect of having a fiscal rule in force or not ($\mathcal{R}_t$) on the constrained variable. This indicates that there is no general level effect on the constrained variable of introducing an expenditure rule, but only an effect on the reaction of fiscal policy to (non-)compliance. This will remain valid throughout the estimations of annual differences. When looking at a fictional rule over the full sample period ($\mathcal{N}_{t-1}$), we do see a strong effect towards the numerical limit, if the rule was not complied with in the previous period. This effect is much stronger when an expenditure rule is actually enforced in national legislation ($\mathcal{R} \times \mathcal{N}_{t-1}$). So while also without an expenditure rule governments reduce their constrained variables in times when they would not comply with a fictional rule, the effect is much stronger (approximately three times the size) when the expenditure rule is actually in force. Nevertheless, the results so far also show a significant increase of the constrained variables towards the numerical limit from below, i.e. if the (fictional) expenditure rules are complied with.

Table 4: Regression results: Annual change of difference between constrained variable and numerical limit (Dep. Var: $\Delta^t(\Delta^R \mathcal{F}_{i,t,0})$)

	(1)	(2)	(3)	(4)
$\mathcal{R}_t$	0.631	−0.142	0.541	1.030
	(0.987)	(0.548)	(1.113)	(1.460)
$\mathcal{N}_{t-1}$	−2.636***			
	(0.813)			
$\mathcal{R} \times \mathcal{N}_{t-1}$	−5.369***			
	(1.650)			
$\Delta^R \mathcal{F}_{t-1,0}$		−0.826***		
		(0.130)		
$\mathcal{R}_t \times \Delta^R \mathcal{F}_{t-1,0}$		−0.495***		
		(0.177)		
$\Delta^{R+} \mathcal{F}_{t-1,0}$			−1.079***	−1.198***
			(0.070)	(0.244)
$\Delta^{R-} \mathcal{F}_{t-1,0}$			−0.360*	−0.609**
			(0.206)	(0.256)
$\mathcal{R}_t \times \Delta^{R+} \mathcal{F}_{t-1,0}$			−1.085**	−1.034**
			(0.512)	(0.520)
$\mathcal{R}_t \times \Delta^{R-} \mathcal{F}_{t-1,0}$			−0.298	−0.155
			(0.369)	(0.340)
Debt (-1)				−0.047
				(0.050)
Output Gap (-1)				0.029
				(0.134)
Openness				−4.106
				(6.366)
Dependency Ratio				−4.890
				(10.207)
Population				0.001***
				(0.000)
Ideology				0.571***
				(0.183)
Idological Range				0.131
				(0.326)
Parl. Fragmentation				−2.789*
				(1.448)
Delegation				2.088**
				(1.002)
Contract				−1.287
				(4.760)
District Magnt.				0.137
				(0.188)
SGP				2.083**
				(1.010)
N	105	91	91	85
R^2 (within)	0.396	0.656	0.699	0.791

Notes: Estimation results for Equations 3 to 4; time and country fixed effects are included in all regressions but not reported; dependent variable is the change of the difference of the constrained variable to its numerical constraint from year to year $\Delta^t(\Delta^R \mathcal{F}_{i,t,0})$, explanatory variables are the difference between constrained variable and numerical limit ($\Delta^R \mathcal{F}_{t-1,0}$) for the previous year, also split into positive ($\Delta^{R+} \mathcal{F}_{t-1,0}$) and negative ($\Delta^{R+} \mathcal{F}_{t-1,0}$) values, a dummy variable being one if this difference is positive ($\mathcal{N}_{t-1}$), i.e. the rule is not complied with, and a dummy variable being one if the fiscal rule is in force in the respective years $\mathcal{R}_t$. Heteroscedasticity robust standard errors are in parentheses. * indicate significance at 10% level, ** at 5% level and *** at 1% level.

To investigate if the distance between the constrained variable and the numerical limit matters, Column (2) estimates Equation 4. The results confirm the findings for Column (1), i.e. if countries do not comply with their expenditure rules then policy makers lower the constrained variable in the next period and this effect is stronger if the rule is actually in force. The only shortcoming of this finding is that this estimation did not differentiate between times when the rule is complied with or not. This is why the actual effect might be larger than what is seen in Column (2). Furthermore, again this also means that policy makers use their "space" by increasing the constrained variable if they comply with the rule.

To address this issues, Column (3) splits the distance between constrained variable and numerical constraint into positive ($\Delta^{R+}\mathcal{F}_{t-1,0}$), i.e. the distance in times of non-compliance), and negative ($\Delta^{R+}\mathcal{F}_{t-1,0}$), i.e. the distance in times of compliance), values. A more detailed picture emerges: First, the adjustment towards the numerical constraint is much stronger (and more significant) in times when the (fictional) rule is not complied with, i.e. the tendency towards the numercial limit is much stronger from above than from below. Second, the expenditure rule actually being in force doubles the adjustment in times of non-compliance, but is not significant for times of compliance. The results suggest that introducing expenditure rules does not have a significant effect in times of compliance with them. Countries still slightly increase their constrained variables towards the numerical limit. But when fiscal variables are above (do not comply with the) numerical constraints, the adjustment is twice as strong with expenditure rules being in force. As an robustness check Column (4) also includes a wide range of control variables, but the results stay qualitatively and quantitatively the same.

5.2 Reaction to forecast (non-)compliance with expenditure rules

Section 5.1 showed the reaction of fiscal policy variables to (non-)compliance with their expenditure rules in previous years. Expenditure rules might also have a strong effect in the reaction of policy makers to forecasts of fiscal variables and especially to forecast (non-)compliance. Columns (1) to (4) of Table 5 show the same estimations as Table 4, but instead of looking at the change from year to year the change from one forecast to the next is used.

Overall the main results are confirmed. When expenditure rules are actually introduced in national legislation and the country did not comply with the rule in the previous forecast, then the constrained variable is decreased twice as fast as without such a rule in force. Nevertheless, two main differences emerge when comparing the results to the annual differences: First, the dummy variable of having an expenditure rule in force in national legislation or not ($\mathcal{R}_t$) becomes significant. Usually countries also strengthen their other fiscal institutions for forecasting, monitoring and auditing when introducing fiscal rules. These changes have effects on the fiscal variables which are independently of the current stance of fiscal policy or the compliance or non-compliance of the policy

makers with the expenditure rule. Thus, the significant level effect in the regressions of Table 5 could be an indication that those strengthened institutions do in fact have an effect, but only on the forecast (non-)compliance with expenditure rules e.g. through improved forecasts. Table B.2 in Appendix B.2 shows robustness checks regarding the time period used for the estimations. Overall the results remain qualitatively the same. But smaller differences regarding the size of the fixed level effect can be observed. After the financial crisis the level effect is still highly significant but much smaller than before. This would correspond to the effect being driven by an improvement of the quality of the forecasts.

Second, the increase of the constrained variables in times of compliance with the expenditure rule is much stronger than for the annual differences. In fact, the effect is even stronger than the decrease of the variable in times of non-compliance. This is independent of the fiscal rule being actually in force or not. I.e. governments strongly use the "space" towards the numerical limit and increase the constrained variable, if they see compliance with the rules in the forecasts.

Table 5: Regression results: Forecast change of difference between constrained variable and numerical limit (Dep. Var: $\Delta^{\tau}(\Delta^{R}\mathcal{F}_{i,t,\tau})$)

	(1)	(2)	(3)	(4)
$\mathcal{R}_t$	-1.042^{*}	-1.697^{***}	-2.201^{***}	-1.723^{**}
	(0.625)	(0.738)	(0.763)	(0.723)
$\mathcal{N}_{t,\tau-1}$	-2.935^{***}			
	(1.109)			
$\mathcal{R} \times \mathcal{N}_{t,\tau-1}$	-2.815^{***}			
	(1.002)			
$\Delta^{R}\mathcal{F}_{t,\tau-1}$		-0.936^{***}		
		(0.108)		
$\mathcal{R}_t \times \Delta^{R}\mathcal{F}_{t,\tau-1}$		-0.160^{*}		
		(0.103)		
$\Delta^{R+}\mathcal{F}_{t,\tau-1}$			-0.664^{**}	-0.912^{***}
			(0.278)	(0.336)
$\Delta^{R-}\mathcal{F}_{t,\tau-1}$			-0.939^{***}	-1.030^{***}
			(0.091)	(0.106)
$\mathcal{R}_t \times \Delta^{R+}\mathcal{F}_{t,\tau-1}$			-0.585^{***}	-0.617^{**}
			(0.219)	(0.270)
$\mathcal{R}_t \times \Delta^{R-}\mathcal{F}_{t,\tau-1}$			-0.030	0.067
			(0.094)	(0.119)
Debt (-1)				-0.058^{**}
				(0.029)
Output Gap (-1)				0.243^{***}
				(0.094)
Openness				3.594
				(3.408)
Dependency Ratio				54.900
				(67.710)
Population				0.001^{*}
				(0.001)
Ideology				0.274^{**}
				(0.138)
Ideological Range				-4.463^{*}
				(2.338)
Parl. Fragmentation				1.363
				(2.391)
Delegation				-0.790
				(0.869)
Contract				-0.351
				(2.847)
District Magnt.				0.017
				(0.036)
SGP				-0.438
				(1.449)
N	333	333	333	317
R^2 (within)	0.076	0.542	0.540	0.552

Notes: Estimation results for Estimation results for Equations 3 to 4 with forecast differences instead of annual differences; time and country fixed effects are included in all regressions but not reported; dependent variable is the change of the difference of the constrained variable to its numerical constraint from forecast to forecast $\Delta^{t}(\Delta^{R}\mathcal{F}_{i,t,\tau})$, explanatory variables are the difference between constrained variable and numerical limit $(\Delta^{R}\mathcal{F}_{t,\tau-1})$ for the previous forecast, also split into positive $(\Delta^{R+}\mathcal{F}_{t,\tau-1})$ and negative $(\Delta^{R+}\mathcal{F}_{t,\tau-1})$ values, a dummy variable being one if this difference is positive $(\mathcal{N}_{t,\tau-1})$, i.e. the rule is not complied with, and a dummy variable being one if the fiscal rule is in force in the respective years $\mathcal{R}_t$. Heteroscedasticity robust standard errors are in parentheses. * indicate significance at 10% level, ** at 5% level and *** at 1% level.

6 Conclusions

This paper analyses the reaction of policy makers to (non-)compliance with statutory expenditures rules in the EU28. For this purpose it calculates the exact variables and numerical limits as set out in the legal documents for the actual values and forecasts from 2000-2014.

Descriptive statistics show that countries only comply with their expenditure rules in around 60% of the years. But the data already show a tendency of policy makers to change non-compliance with their rules into compliance over the medium-term. On the other hand non-compliance after years of compliance emerges only in the short-term. Furthermore, countries seem to comply with their expenditure rules more often if they constrain the central government, only smaller fractions of the general government finances, and are enforced with sanctions or automatic correction mechanisms.

Three main result stands out in the empirical exercises of this paper: First, there is a general tendency of the constrained variables towards the numerical limit from above (in times of non-compliance) and from below (in times of compliance). With actual values the change from above is stronger and with forecasts from below. Second, this general tendency is independent of actually introducing the expenditure rules in national legislation. But after doing so the adjustment in years of non-compliance is twice as strong as without. Third, only in the forecasts also a level effect of improved fiscal institutions can be observed.

While this paper presents a first look on the reaction of policy makers on (non-)compliance with expenditure rules, more research is needed to understand the mechanisms at work. First of all more observations would increase the statistical significance and allow more experiments with sub-samples of the expenditure rules to analyze the effects of their various characteristics. Furthermore, the combination of various fiscal rules and the interplay with medium term expenditure (budgetary) frameworks would be interesting research topics.

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A Data & Control Variables

Variable	Source
Economic variables	
(lagged) Debt level	AMECO, European Commission
(lagged) Output gap	AMECO, European Commission
Dependency ratio	Population structure and ageing, EC
Population	Population structure and ageing, EC
Openness	(Imports + Exports) / GDP, AMECO, European Commission
Political variables	
Ideology of government	World Bank Political Database
Ideol. dist. of parties in government	World Bank Political Database
Fragmentation of parliament	World Bank Political Database
District magnitude	World Bank Political Database
Institutional variables	
Contract or delegation approach	Hallerberg et al. (2009), Ylaoutlinen (2004)
Stability and growth pact	authors input

B Robustness Checks

B.1 Robustness Fixed Effects

Table 6: Robustness regarding the use of fixed effects

	(1)	(2)	(3)	(4)
$\mathcal{R}_t$	0.541	0.098	0.537	0.239
	(1.113)	(0.863)	(1.346)	(1.012)
$\Delta^{R+}\mathcal{F}_{t-1,0}$	-1.079^{***}	-1.199^{***}	-0.983^{***}	-1.096^{***}
	(0.070)	(0.133)	(0.114)	(0.137)
$\Delta^{R-}\mathcal{F}_{t-1,0}$	-0.360^{*}	-0.407^{***}	-0.019	-0.083
	(0.206)	(0.121)	(0.106)	(0.088)
$\mathcal{R}_t \times \Delta^{R+}\mathcal{F}_{t-1,0}$	-1.085^{**}	-1.017^{***}	-1.092^{**}	-1.043^{***}
	(0.512)	(0.344)	(0.502)	(0.355)
$\mathcal{R}_t \times \Delta^{R-}\mathcal{F}_{t-1,0}$	-0.298	-0.232	-0.480	-0.389
	(0.369)	(0.302)	(0.374)	(0.333)
Country fixed effects	Yes	Yes	No	No
Time fixed effects	Yes	No	Yes	No
N	91	91	91	91
R^2 (within)	0.699	0.631	0.688	0.622

Notes: Estimation results for Equation 4; fixed effects are included in according to middle panel; dependent variable is the change of the difference of the constrained variable to its numerical constraint from year to year $\Delta^t(\Delta^R\mathcal{F}_{i,t,0})$, explanatory variables are the difference between constrained variable and numerical limit $(\Delta^R\mathcal{F}_{t-1,0})$ for the previous year, also split into positive $(\Delta^{R+}\mathcal{F}_{t-1,0})$ and negative $(\Delta^{R+}\mathcal{F}_{t-1,0})$ values, and a dummy variable being one if the fiscal rule is in force in the respective years $\mathcal{R}_t$. Heteroscedasticity robust standard errors are in parentheses. * indicate significance at 10% level, ** at 5% level and *** at 1% level.

B.2 Robustness Time Period

Table 7: Robustness regarding the time period

	(1) 2000-2014	(2) 2000-2009	(3) 2008-2014	(4) 2005-2011
$\mathcal{R}_t$	-2.201^{***}	-4.175^{***}	-0.954^{**}	-1.950^{***}
	(0.763)	(1.544)	(0.417)	(0.761)
$\Delta^{R+}\mathcal{F}_{t,\tau-1}$	-0.664^{**}	-1.078^{***}	-0.286^{***}	-0.716^{**}
	(0.278)	(0.397)	(0.077)	(0.297)
$\Delta^{R-}\mathcal{F}_{t,\tau-1}$	-0.939^{***}	-0.988^{***}	-0.724^{***}	-0.867^{***}
	(0.091)	(0.086)	(0.123)	(0.143)
$\mathcal{R}_t \times \Delta^{R+}\mathcal{F}_{t,\tau-1}$	-0.585^{***}	-1.489^{***}	-0.420^{**}	-0.571^{**}
	(0.219)	(0.519)	(0.193)	(0.286)
$\mathcal{R}_t \times \Delta^{R-}\mathcal{F}_{t,\tau-1}$	-0.030	0.500	-0.044	-0.013
	(0.094)	(0.307)	(0.126)	(0.123)
N	333	221	179	217
R^2 (within)	0.540	0.583	0.365	0.515

Notes: Estimation results for Equations 4; Sample period used for calculations incdicated in header; time and country fixed effects are included in all regressions but not reported; dependent variable is the change of the difference of the constrained variable to its numerical constraint from forecast to forecast $\Delta^t(\Delta^R\mathcal{F}_{i,t,\tau})$, explanatory variables are the difference between constrained variable and numerical limit ($\Delta^R\mathcal{F}_{t,\tau-1}$) for the previous forecast, also split into positive ($\Delta^{R+}\mathcal{F}_{t,\tau-1}$) and negative ($\Delta^{R+}\mathcal{F}_{t,\tau-1}$) values, a dummy variable being one if the fiscal rule is in force in the respective years $\mathcal{R}_t$. Heteroscedasticity robust standard errors are in parentheses. * indicate significance at 10% level, ** at 5% level and *** at 1% level.

C Constrained variables and numerical limits

C.1 Bulgaria - General Government, Since 2012

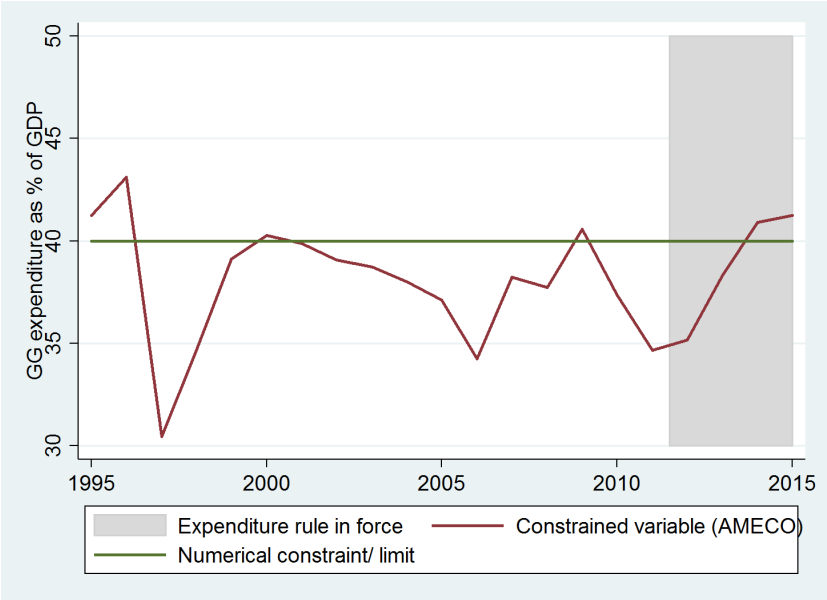

Figure 3: Variables of Expenditure Rule, Bulgaria, AMECO

C.2 Croatia - General Government, Since 2012

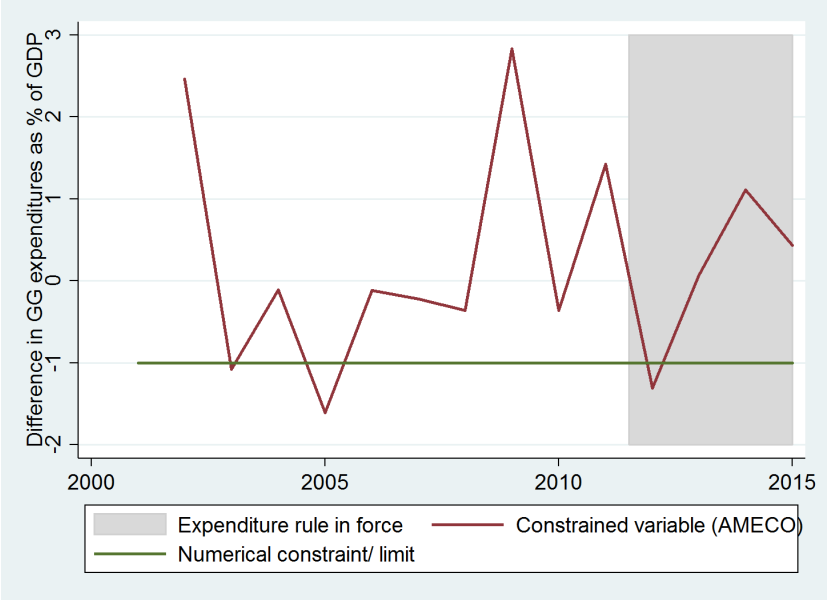

Figure 4: Variables of Expenditure Rule, Croatia, AMECO

C.3 France - Central Government, Since 2011

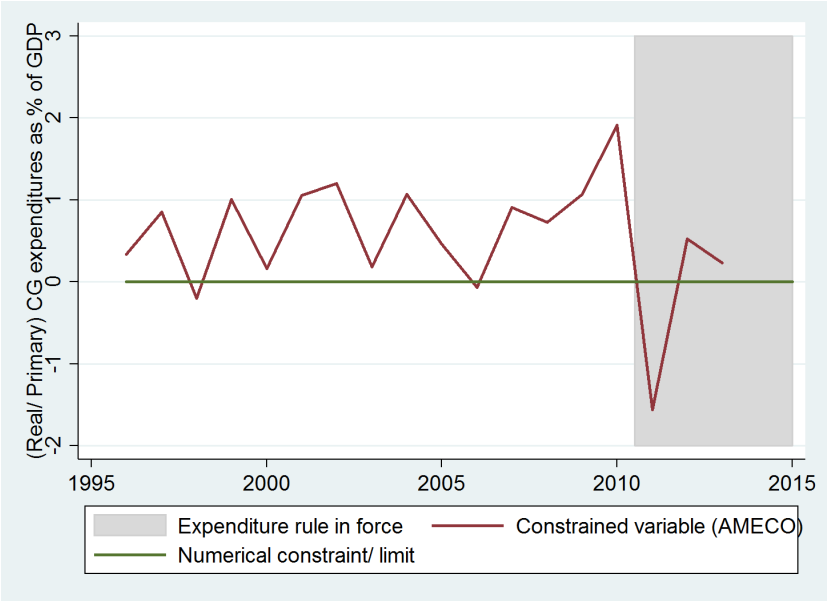

Figure 5: Variables of Expenditure Rule, France, AMECO

C.4 Hungary - General Government, 2010 - 2011

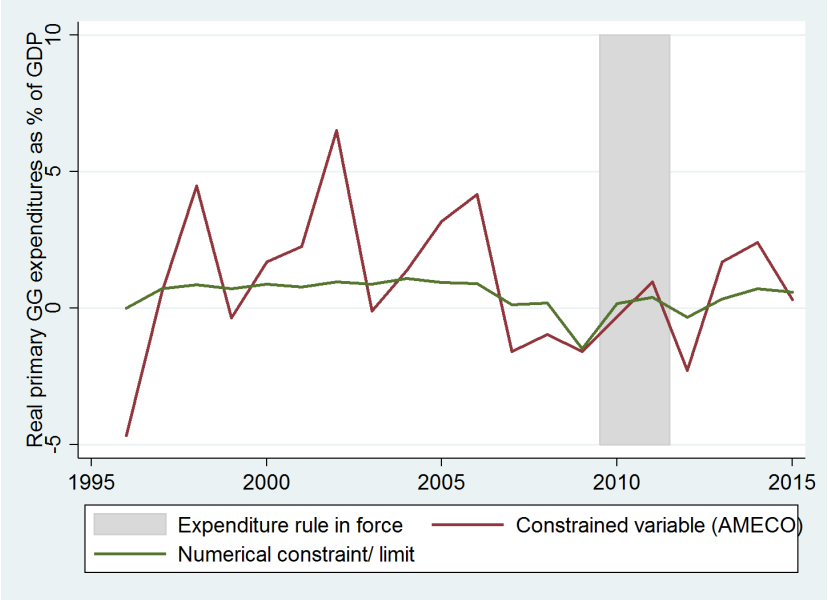

Figure 6: Variables of Expenditure Rule, Hungary, AMECO

C.5 Lithuania - General Government, Since 2008

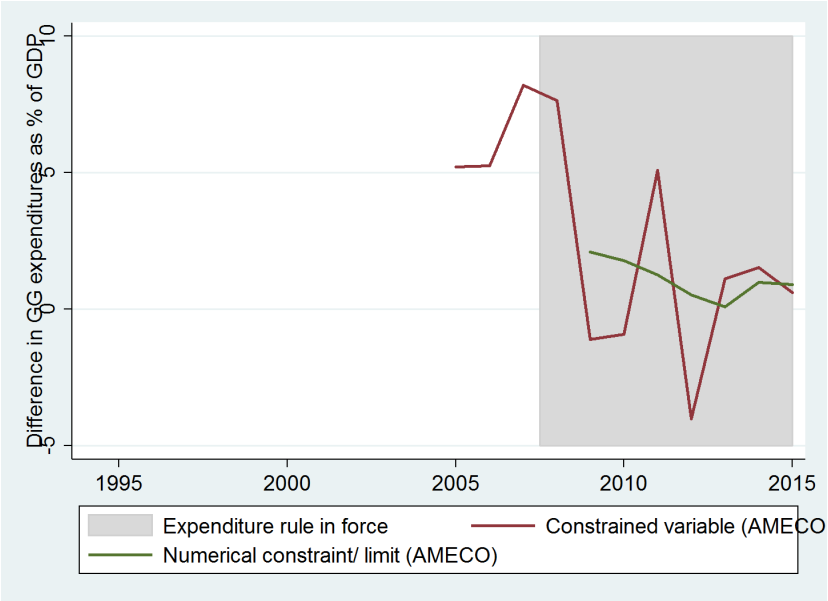

Figure 7: Variables of Expenditure Rule, Lithuania, AMECO

C.6 Poland - Central Government, Since 2011

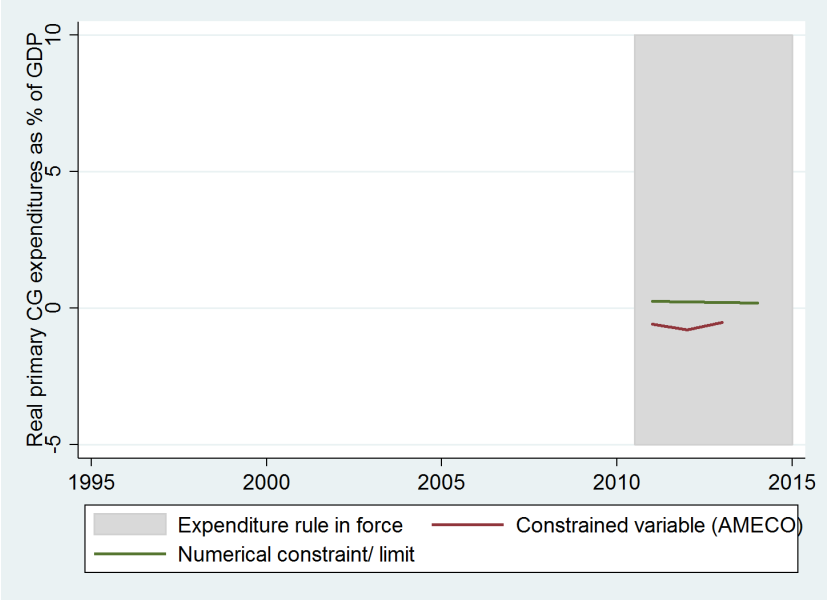

Figure 8: Variables of Expenditure Rule, Poland, AMECO

C.7 Romania - General Government, Since 2010

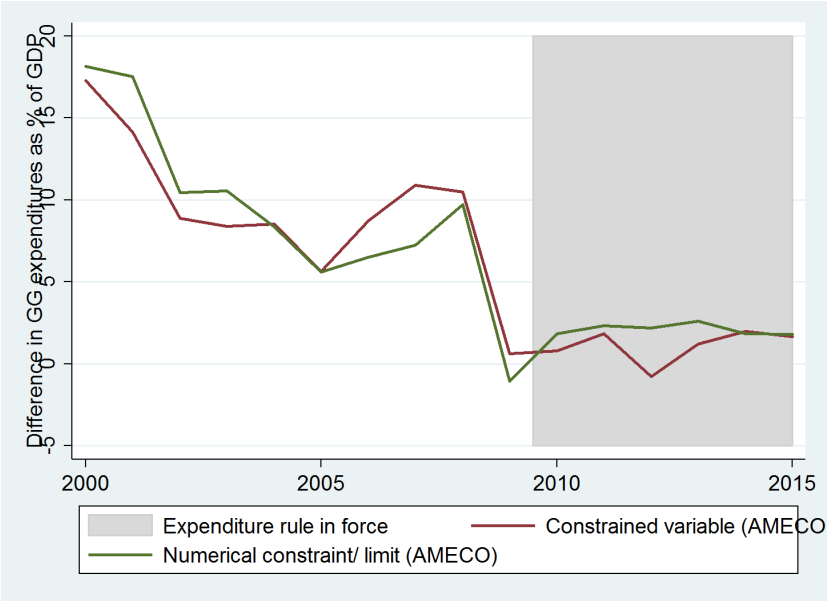

Figure 9: Variables of Expenditure Rule, Romania, AMECO

C.8 Spain - Central Government, Since 2011

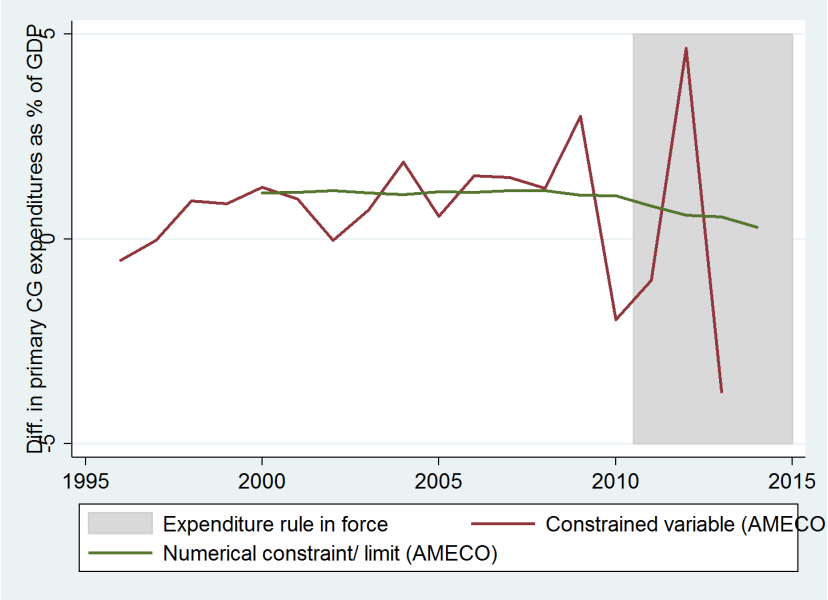

Figure 10: Variables of Expenditure Rule, Spain, AMECO