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The impact of expenditure rules on budgetary discipline over the cycle*

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Abstract

We study the impact of expenditure rules on the propensity for governments to deviate from their expenditure plans in response to surprising cyclical developments. Theoretical considerations suggest that due to political fragmentation in the budgetary process expenditure policy might be prone to a pro-cyclical bias. However, this tendency may be mitigated by strictly enforced expenditure rules. These hypotheses are tested against data from a panel of European Union (EU) Member States. Our key findings are that (i) deviations between actual and planned government expenditure tend to be positively related to output gap surprises, and (ii) expenditure rules reduce this pro-cyclical bias. These results are particularly pronounced when the analysis is confined to spending items with a high degree of budgetary flexibility.

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* The views expressed in this article are those of the authors and do not necessarily reflect those of the European Central Bank.

I. Introduction

Institutional restrictions to budgetary decision-making are a common feature of fiscal governance in the EU Member States. In particular, in the last two decades, many governments have adopted numerical fiscal rules which set explicit ceilings for key budgetary aggregates (for an overview see Debrun *et al.*, 2008). These rules are mainly motivated as a device to correct coordination failures inherent in the budgetary process: governments typically consist of multiple decision-makers which cater to diverse constituencies and compete for overall fiscal resources available to society. As pointed out by von Hagen and Harden (1995), this arrangement gives rise to a common pool problem leading to inefficiently high levels of government expenditure. Moreover, it may induce a pro-cyclical spending bias since pressures for budgetary expansion tend to intensify in upturns whereas in downturns governments may be forced to make up for past fiscal profligacy.¹ This provides a possible explanation for the positive relation between public spending and the cyclical position of the economy found in several empirical studies (for evidence on OECD countries see Lane, 2003; on developing countries see Kaminsky *et al.*, 2004; on EU countries see Turrini, 2008).

Against this background, a widespread consensus on the beneficial role of rules to restrict government expenditure has emerged, which is summarized by the European Commission's assessment that: '*Enforced national expenditure rules (...) help to counteract forces leading to pro-cyclical fiscal policy in good times and thus prevent the need to retrench in bad times*' (European Commission,

¹ For models establishing a formal link between the common pool problem in budgetary processes and fiscal pro-cyclicality see Tornell and Lane (1999) and Talvi and Végh (2005).

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3 2004). Yet, while several recent studies examine the link between fiscal rules and
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expenditure policies in a broader context, empirical evidence for their impact on
the cyclical stability of government spending is scant.² One of the few analyses
addressing this issue directly is provided by Turrini (2008) who finds that the
pro-cyclical spending bias was less pronounced in those EU countries with
strong expenditure rules.

The aim of the current article is to further explore the effect of expenditure rules
on the cyclical stance of government expenditure in the EU Member States. In
particular, we test whether governments tend to deviate from previously
formulated expenditure targets in response to surprising cyclical developments
and whether this reaction differs in countries with weak and strong expenditure
rules. The specific focus on deviations between actual and planned government
expenditure is motivated by two stylized facts (see Beetsma *et al.*, 2009). First,
fiscal performance in the European Union has primarily suffered from a failure to
implement budgetary plans rather than a lack of ambition in formulating them:
while Member States typically set out targets in their stability and convergence
programmes that would lead to an improvement in budget balances, these
adjustment plans tend to be overcompensated by implementation failures thus
resulting in a deterioration in fiscal positions. Second, budgetary slippages
mainly originate from the spending side with governments systematically

² Focussing on the overall size of public spending, Debrun *et al.* (2008) find that those EU
countries with strong expenditure rules tend to have slightly lower primary expenditure-to-GDP
ratios. Badinger (2009) finds that after the introduction of fiscal rules in several OECD countries
since the 1990s, the volatility of government spending has fallen significantly in these countries.
For a sample of 15 EU countries Wierts (2008) finds that government spending tends to be less
responsive to revenue windfalls or shortfalls in countries with stringent expenditure rules. By
contrast, Büttner and Wildasin (2009), find that the presence of formal borrowing restrictions for
US municipalities intensifies fluctuations in investment spending in response to revenue shocks.

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3 exceeding the planned expenditure paths set out in their respective programmes.³
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6 Against this background, analyses of deviations between actual and planned
7
8 government spending yield important insight into the determinants of fiscal
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10 performance in the European Union.
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13 Besides studying broad aggregates of government spending, the analysis also
14
15 distinguishes between discretionary and nondiscretionary items of government
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17 expenditure. This distinction seems important since aggregate government
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19 expenditure typically includes items (such as interest expenditure or certain
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21 legally mandated transfers), that can barely be adjusted by policymakers in the
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23 short-run, even if they had an incentive to do so. At the same time, theoretical
24
25 predictions concerning the impact of fiscal rules on fiscal cyclicity presuppose
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27 that government spending can react spontaneously to exogenous shocks. Hence,
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29 studying overall expenditure may partly conceal policy responses in
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31 discretionary spending since expenditure items with low budgetary flexibility
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33 hamper statistical inference.
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41 The article is organized as follows. Section II describes the construction of
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43 variables and presents the econometric model. Section III reports regression
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45 results. Section IV discusses policy implications and concludes.
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49 **II. Empirical Strategy**

50 *Dependent Variables*

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52 Our aim is to capture the discrepancy between governments' actual expenditure
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54 policy for a given period and their previously formulated expenditure plans. We
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³ Actual revenues tend to be slightly above the levels targeted in the programmes thus exerting a positive impact on budget balances.

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3 obtain the latter from the EU Member States' stability and convergence
4 programmes which we interpret as the governments' fiscal stance *ex ante*, i.e.
5 before surprises in macroeconomic conditions take place. Accordingly, we define
6 the dependent variable as
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$$12 \quad dev_{i,t}^k = g_{i,t}^k - \tilde{g}_{i,t}^k,$$

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14 where $g_{i,t}^k$ measures the actual outcome for general government expenditure as a
15 ratio of nominal Gross Domestic Product (GDP) in country i and year t as
16 reported in the European Commission's Ameco Database. $\tilde{g}_{i,t}^k$ is the
17 corresponding target for the expenditure ratio for year t as formulated in the
18 country's stability or convergence programme published in year $t-1$. To focus
19 on those deviations between $g_{i,t}^k$ and $\tilde{g}_{i,t}^k$ that derive from changes in expenditure
20 policy rather than differences in denominators we express both variables as a
21 percentage of actual nominal GDP.⁴
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39 In a second step, we use disaggregated information on government expenditure
40 to distinguish between expenditure items which are readily manipulated by
41 policy-makers (i.e. discretionary) and those which are, in the short-run,
42 exogenous from the government's perspective (i.e. nondiscretionary). While
43 already conceptually this differentiation is not clear-cut, it is further inhibited by
44 the aggregation level and reporting conventions in the stability and convergence
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58 ⁴ While stability and convergence programmes contain growth rate forecasts, they do not always
59 provide the information needed to derive the GDP forecast in levels. Hence, we use the respective
60 Commission forecast to adjust denominators and control for differences between stability and
convergence programme and Commission growth rate forecasts in the empirical analysis (see
Section III).

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3 programmes.⁵ In particular, the categories collective consumption and other
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6 expenditure reported in the programmes lump together various spending items
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8 which may not be disentangled based on the available information.⁶ As regards
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10 social transfers, reporting practices differ substantially across countries and time
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12 thus impeding interpretability of this variable.⁷ These qualifications prevent an
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15 exhaustive classification of government spending items as either discretionary or
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18 nondiscretionary. Instead, the analysis focuses on the remaining expenditure
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20 items treating them as polar cases with respect to their budgetary flexibility. In
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22 line with related literature, interest expenditure is classified as nondiscretionary
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24 since the outstanding amount of government debt mostly results from past rather
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26 than current policy choices and interest rates are determined on capital markets
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28 rather than being a choice variable of governments (see, e.g. Blanchard, 1990;
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30 Larch and Salto, 2005). Discretionary spending is defined as the sum of subsidies
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32 and gross fixed capital formation both of which are more easily adjusted in the
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34 short run (e.g. via changes in the implementation schedules of existing spending
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36 programmes). Deviations in discretionary and in nondiscretionary spending are
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39 also expressed in percent of actual nominal GDP.⁸
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49 ⁵ Since 2001, EU Member States have been required to provide detailed projections in their
50 stability and convergence programmes for collective consumption, social transfers in kind, social
51 transfers other than in kind, interest payments, subsidies, gross fixed capital formation, and other
52 expenditure.

53 ⁶ Most notably, the variable collective consumption typically includes compensation of
54 employees and intermediate consumption. Given the transaction cost associated with changes in
55 the public workforce and the elaborate negotiation processes surrounding public sector wage
56 setting, the flexibility for compensation of employees to respond to surprises in cyclical
57 conditions appears limited. By contrast, intermediate consumption which includes a broad range
58 of operating expenses leaves significantly more scope for adjustments at the margin.

59 ⁷ For example, Germany only reports social transfers other than in kind as a separate variable
60 whereas social transfers in kind is generally reported along with collective consumption. By
contrast, in some years the French stability programmes only report total social transfers.

⁸ For an alternative approach to isolating the discretionary aspect of fiscal policy based on
statistical properties of time-series see Badinger (2009) and Afonso et al. (2010).

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In light of the related literature, the interpretation of stability and convergence programmes as a government's fiscal plans merits discussion. As pointed out by several commentators, Member States might use these programmes as a strategic device, e.g. to signal to the European authorities that they intend to meet their obligations under the Stability and Growth Pact (Strauch *et al.*, 2004; von Hagen, 2010). Hence, the reported fiscal paths for future periods might deviate from those which governments consider feasible based on internal projections. However, while this concern applies to the medium-term projections in the programmes (usually covering a time horizon of up to three years) we only use the projections referring to the next year; these figures are in most cases equivalent to the budgets approved by national parliaments. Thus, in contrast to projections over a longer time horizon, they embed a direct political commitment and may thus be interpreted as the government's planned fiscal stance.

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Table 1 displays summary statistics for the variables used in the empirical analysis. While all EU Member States have been required to report detailed spending plans in their stability or convergence programmes since 2001, some deficiencies in reporting practices and lack of data availability regarding some explanatory variables reduces the sample to 145 observations over the period 2002 to 2008 (see below).⁹ While all expenditure variables except for interest spending tend to exceed their planned levels, the figures are subject to large variation so that no clear patterns can be inferred.

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⁹ Belgium, Malta, and France do not report sufficiently disaggregated spending plans in the 2001 vintage, the 2005 vintage, and 2001-2004 programme vintages, respectively, to compute discretionary spending deviations thus reducing the sample size for this variable by six observations. Since Spain only reports gross fixed capital formation in the 2001-2005 stability programme vintages we use this variable exclusively to compute the discretionary spending deviations. Since expenditure plans for Bulgaria and Romania are only available starting in 2007 they are not considered in the analysis.

[TABLE 1]

Main Explanatory Variables

In line with related literature, we use the gap between actual and trend GDP as a measure for the cyclical position of the economy. Since we are interested in *surprising* developments in the cyclical position, again, we include this variable in terms of deviations between projected and actual levels. To be specific, we seek to capture the discrepancies between the actual cyclical position of the economy in year t and the cyclical position that governments expected for year t at the time when they produced their fiscal forecast in year $t-1$. Hence, a potential proxy for the governments' expectations on cyclical developments has to meet two requirements: first, it should derive from an official source which governments are likely to perceive as a benchmark for their own projections. Second, it should be up-to-date, i.e. the time span between the release of the output gap forecast and the preparation of the stability and convergence programmes should be sufficiently short. Both conditions are likely to be met by the European Commission's autumn forecast; given that it is typically released in the third quarter of the year and provides a timely measure for the outlook on future economic conditions which prevails at the time when the stability and convergence programme projections are finalized. Accordingly, the explanatory variable for output gap surprises $OG_{i,t}$ is defined as the difference between the actual output gap in period t and the European Commission's output gap forecast from period $t-1$ for period t . To align the denominator with that of the

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3 dependent variable, this difference is also expressed as a percentage of actual
4 nominal GDP.
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9 To capture the extent to which national expenditure policy faces domestic
10 institutional constraints, we use the expenditure rules index as developed by
11 Debrun *et al.* (2008). This index is based on a survey conducted by the Working
12 Group on the Quality of Public Finances among practitioners and researchers in
13 the field of fiscal policy. It includes all budgetary provisions which fix numerical
14 targets or ceilings for government expenditure. To attach weights to different
15 institutions, the index takes into account both the share of overall public
16 spending covered by the rule and qualitative features such as the type of
17 enforcement mechanisms and media visibility. As pointed out by Inman (1998),
18 the actual enforcement of rules is particularly important to capture the extent to
19 which fiscal policy is really restricted by the institutional framework. Taken
20 together, this measure bears strong appeal for empirical implementation as it
21 translates a broad set of institutional provisions into a country-specific cardinal
22 ranking.¹⁰
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43 Theoretical considerations point to two different channels through which
44 expenditure rules might mitigate pro-cyclical spending bias: first, if rules are
45 binding in that both a marginal increase in public spending leads to non-
46 compliance and non-compliance is associated with political or legal sanctions,
47 they provide a direct incentive for fiscal discipline. This favourable impact on
48 budgetary discipline in turn should be expected to prevent the need for fiscal
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58 ¹⁰ For a detailed description of the computation of this index see European Commission (2006)
59 and Debrun *et al.* (2008). The index is normalized to have a zero mean and unit variance. It also
60 displays some time-variability, especially in the 1990's. However, for the time-period considered
in this study the index only varies across countries but not across time, except for a single
increase in the expenditure rule index in Italy in 2004 and in France in 2005.

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3 tightening in response to unfavourable economic developments. Second, as
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5 pointed out by Schuknecht (2004), numerical fiscal rules may induce budgetary
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7 discipline indirectly, in that they serve as benchmarks against which imperfectly
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9 informed electorates evaluate governments' fiscal performance. Hence, in the
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11 presence of strong numerical rules expenditure policy should be more consistent
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13 with budgetary targets and less prone to pro-cyclical reactions even if they do not
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15 bind in a strict sense.
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19 20 21 *Econometric Model*

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24 To analyze the impact of expenditure rules on budgetary discipline over the
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26 cycle, we estimate the following equation:
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$$29 \quad dev_{i,t}^k = c_i + d_t + \alpha OG_{i,t} + \beta(OG_{i,t} \times ER_i) + \gamma X_{i,t} + u_{i,t}^k$$

30
31 where $dev_{i,t}^k$ refers to deviations between actual and planned levels of spending
32
33 with respect to spending category k (i.e. total, primary, discretionary, or interest)
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35 for country i in period t ; $OG_{i,t}$ is the output gap surprise; ER_i is a country-
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37 specific vector which indicates the strength of national expenditure rules;
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39 $OG_{i,t} \times ER_i$ is an interaction term between output gap surprises and the
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41 expenditure rules index. d_t and c_i are full sets of time and country fixed effects,
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43 respectively; $X_{i,t}$ is a matrix containing time and country-specific control
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45 variables and $u_{i,t}^k$ is a random error term.¹¹
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¹¹ Note that since the expenditure rules index is almost perfectly collinear with the fixed effects (see footnote 9), it is not included in the regression equation.

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3 Since government expenditure is an important component of aggregate demand
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5 simultaneity problems might arise with respect to variables measuring cyclical
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7 conditions. To address the resulting identification problem we exploit the
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9 'structural' part of the output gap surprises for causal inference: forecast errors
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11 may arise from unexpected developments in actual and/or in trend GDP. Since
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13 the latter is essentially unaffected by short-run fluctuations in the time series for
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15 GDP, it may also be treated as exogenous to those fluctuations caused by
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17 changes in government spending.¹² Thus, we instrument the output gap surprise
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19 variable with the forecast error in trend GDP. We extend the instrument set by
20
21 the GDP-weighted average of output gaps in all foreign sample countries to
22
23 capture international cyclical developments, not directly affected by domestic
24
25 expenditure policy (Galí and Perotti, 2003). While the exogeneity assumption for
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27 this variable, a priori, appears less compelling than for the forecast error in trend
28
29 GDP, the number of instruments allows us to test the validity of the instrument
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31 set using over-identifying restrictions.
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40 Another potential source of endogeneity originates from the expenditure rules
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42 index. Fiscal institutions can not generally be regarded as exogenous since both
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44 the propensity to implement certain restrictions and overall fiscal performance
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46 may be correlated with unobservable country-specific preferences (for a
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48 discussion see Poterba, 1996 and Inman, 1998). Moreover, the self-commitment
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50 implied in effective numerical fiscal rules provides an incentive for governments
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52 with higher ability or willingness for achieving fiscal targets to implement
53
54 stricter fiscal rules (see Debrun and Kumar, 2007). However, since the
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59 ¹² The European Commission computes trend GDP based on a Hodrick-Prescott filter; in general,
60 trend values derived by this method tend to be strongly influenced by actual values at the end of
the sample. However, the Commission's methodology corrects for the end point bias, thus
supporting our identification strategy; see Röger and Ongena (1999).

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3 expenditure rules index displays almost no variation over the time dimension of
4
5 the sample and the regression includes fixed effects, the bias from potential
6
7 correlation with latent country-specific preferences is mitigated. Furthermore,
8
9 simultaneity bias is unlikely to impair our results due to the short time dimension
10
11 of our panel: the type of institutional restrictions considered in the expenditure
12
13 rules index are, by definition, permanent constraints on fiscal policy. In most
14
15 cases, these constraints are integrated into a multi-annual budgetary framework
16
17 and/or based on legal, constitutional, or long term political commitments which
18
19 are not readily adjusted to accommodate current fiscal developments. As pointed
20
21 out by Alesina and Perotti (1996), they may thus be considered exogenous in the
22
23 short- and medium-term.
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30 The set of control variables includes the lagged stock of government debt and in
31
32 some specifications the lagged fiscal balance to reflect the possibility that the
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34 overall fiscal position may influence the extent to which external fiscal
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36 surveillance and the financial markets force governments to comply with their
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38 expenditure targets. To allow for systematic differences in budgetary decision-
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40 making across countries with large and small public sectors lagged values of the
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42 expenditure or revenue ratio are included. In several specifications, we augment
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44 the model with a dummy which equals one in years of parliamentary elections
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46 and zero otherwise to take into account that upcoming elections may reinforce
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48 the incentive to ‘buy political support’. Finally, in several specifications we
49
50 explicitly control for inflation rates as they may affect government expenditure
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52 and nominal GDP differently thus giving rise to a ‘mechanical correlation’
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54 between output gap surprises and the denominator of the dependent variables.
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3 Descriptive statistics on these control variables are shown in the bottom part of
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6 Table 1.
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10 **III. Results**

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14 Table 2 reports baseline regression results. The positive coefficient on the output
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16 gap surprise in column 1 points to pro-cyclical slippages in total government
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18 expenditure. To be specific, an output gap surprise of one percentage point goes
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20 along with a deviation between spending outcomes and plans of close to half a
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22 percentage point in the same direction when the expenditure rules index is at its
23
24 sample mean. At the same time, the negative coefficient for the interaction term
25
26 indicates that this pro-cyclical pattern is less pronounced in countries with strong
27
28 expenditure rules. In particular, an increase in the expenditure rules index by one
29
30 standard deviation reduces the pro-cyclical deviation in government expenditure
31
32 by almost two thirds. Qualitatively similar results are obtained when analyzing
33
34 primary and discretionary expenditure (see columns 2 and 3). However, the
35
36 precision of estimates differs notably across specifications. While in the case of
37
38 total expenditure, coefficients for the output gap surprise and the interaction term
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40 are statistically significant at a 10% significance level only, for primary
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42 expenditure the null hypotheses is rejected at a 5% level and significance rises
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44 further when studying discretionary expenditure.¹³
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57 ¹³ Throughout the analysis, the relevant specification tests support our identification strategy.
58 Based on the Sargan/Hansen statistic, the instrumental variables pass the overidentification test.
59 The null hypothesis of weak instruments is clearly rejected. Finally, in many specifications we
60 can not reject the null hypothesis that output gap surprises are endogenous or the p-values of the
corresponding test statistic are only slightly above 10% thus suggesting the use of instrumental
variable estimation.

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3 These patterns are in line with the considerations presented in Section II: the
4 fewer spending items with a low degree of budgetary flexibility are considered in
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6 the dependent variable, the more salient is the pro-cyclical response of
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8 government expenditure. A natural robustness check for this hypothesis is to
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10 repeat these exercises using nondiscretionary spending components, exclusively.
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12 As expected, output gap surprises do not exert a significant influence on
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14 deviations in interest expenditure from targets (see column 4). These results
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16 illustrate the importance to differentiate between expenditure items based on
17
18 their budgetary flexibility when testing the spending bias hypothesis.
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26 Interestingly, the lagged level of debt has a significant positive impact on
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28 slippages in total, primary and discretionary spending. An immediate
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30 interpretation to this finding is that accumulation of debt and the propensity to
31
32 miss budgetary targets are driven by common unobservable factors. However,
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34 since the identification of causal effects of debt levels on expenditure policy is
35
36 not at the centre of our attention we do not further investigate this issue. The
37
38 lagged expenditure level does not affect the tendency for deviations between
39
40 outcomes and plans.¹⁴
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45 [TABLE 2]
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48 Given the nonresponsive nature of interest spending, we focus on primary and
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50 discretionary spending in the remainder. In the specification shown in columns 1
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54 ¹⁴ Several robustness checks of the baseline specification were conducted. For example, we
55 included the lagged spending item under consideration (i.e. lagged primary, discretionary or
56 interest spending) to allow for the possibility that the ambition of fiscal plans depends on the
57 initial size of the respective budgetary aggregate. Moreover, we explicitly controlled for factors
58 giving rise to a “denominator effect” as described in Section II. To this end, we added inflation
59 and the difference between the nominal GDP growth forecast from period t-1 by the European
60 Commission and the one reported in the stability and convergence programmes as additional
regressors. Our main results are unaffected by these variations in the basic model. Results for the
robustness checks are available upon request.

and 2 of Table 3, we augment the basic model by a dummy variable for parliamentary elections. Consistent with related literature, the notion of politically motivated fiscal profligacy finds some support in our analysis:¹⁵ countries on average record significant positive primary expenditure overruns in election years. However, no such effect is detected for discretionary spending deviations.

[TABLE 3]

Economic intuition suggests that the spending bias may occur asymmetrically over the cycle: while pressures for extra spending in good times directly derive from the political economy of the budget process, pro-cyclical tightening in bad times results from the need to make up for this spending profligacy and to ensure fiscal sustainability. However, given that none of the countries studied here faced acute sustainability concerns over the sample period, this secondary effect might be limited. Much rather, the spending bias may give rise to pro-cyclical fiscal expansions which are then not compensated for in downturns (for a discussion see Kolluri and Wahab, 2007). To test this intuition, we modify the baseline specification by allowing the coefficients on $OG_{i,t}$ and $OG_{i,t} \times ER_i$ to differ depending on whether output gap surprises take place at positive or negative values of the output gap (see columns 3 and 4 in Table 3). The results support the notion of asymmetric reactions in good and bad times: for both primary and

¹⁵ For example, Buti and van den Noord (2004), Cimadomo (2008) and Afonso and Hauptmeier (2009) find for EMU and OECD countries, respectively, that governments tend to adopt a looser fiscal stance in election years. Focussing on tax policy, Andrikopolous *et al.* (2006) do not find evidence for an electoral cycle which is consistent with the commonly held perception that political pressures for budgetary expansion are mainly focussed on the expenditure rather than the revenue side. Interestingly, for the case of the German regional governments (*Länder*) Jochimsen and Nuscheler (2010) find the opposite pattern with the increase in debt being lower in pre-election years. The authors interpret this finding as reflecting German voters' preferences for fiscal prudence.

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3 discretionary spending the coefficient on the output gap surprise shows the
4 expected sign and is statistically significant in case of a positive output gap. At
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6 the same time, the size of the effect is somewhat stronger than in the
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8 specifications that do not account for asymmetries. However, we do not observe
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10 a statistically significant effect of surprises in the cyclical position if the output
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12 gap takes negative values. As regards the impact of expenditure rules, the results
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14 give a mixed picture. In the case of discretionary spending, the hypothesis that
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16 expenditure rules curb the risk of pro-cyclical spending overruns is confirmed.
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18 By contrast, no statistically significant effect is found for the corresponding
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20 coefficient in the specification for primary spending. However, these results
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22 should be interpreted with caution in view of potential weak identification
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24 problems resulting from the fact that in this specification, four (rather than two)
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26 endogenous variables had to be instrumented.
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35 As a final exercise, we return to the baseline specification and study how the
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37 overall cyclical response of spending varies over the range of the expenditure
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39 rules index. Since the coefficients on the output gap surprise variable and the
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41 interaction term have opposite signs, the pro-cyclical spending bias found at the
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43 sample mean of the expenditure rules index may in fact disappear when it takes
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45 on higher values.¹⁶ The solid lines in Fig. 1 show how the spending response to
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47 output gap surprises changes with the expenditure rules index, controlling for all
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49 other variables included in the baseline specification (see Table 2); the dashed
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51 lines show the 95% confidence interval around the estimates. As illustrated by
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53 the upper panel, a pro-cyclical bias in primary government spending can be
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¹⁶ Recall that the overall effect of a marginal change in the output gap surprise is
 $\partial dev / \partial OG = \alpha + \beta ER$ and thus depends on the coefficient on the interaction term and the
value of the expenditure rules index.

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3 observed for a wide range of values for the expenditure rules index.¹⁷ However,
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5 from a value of around 1.05 upwards, the effect ceases to be statistically different
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7 from zero (as indicated by the intersection of the lower bound of the 95%
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9 confidence interval and the x-axis). More intuitively, the estimates suggest that
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11 countries imitating the expenditure rules that are in place in the Czech Republic,
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13 Luxembourg, the Netherlands or Sweden (all of which score above 1.05 on the
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15 expenditure rules index) would overcome the tendency for pro-cyclical spending
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17 slippages. By contrast, for discretionary expenditure a statistically significant
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19 (albeit small) pro-cyclical bias would be expected even in the Netherlands where
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21 the expenditure rules index takes the maximum value of 2.27 (see Fig. 1, lower
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23 panel).
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30 **[Figure 1]**
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34 **IV. Conclusion**

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37 This paper analyzes how numerical expenditure rules shape the response of
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39 government spending to unexpected changes in macroeconomic conditions. We
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41 find that government spending reacts pro-cyclically to surprises in the output gap
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43 and that strong domestic expenditure rules serve to mitigate this tendency.
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45 Furthermore, the analysis suggests that these findings depend on the type of
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47 government expenditure considered in the analysis: while the pro-cyclical bias is
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49 particularly pronounced for spending items with a high degree of budgetary
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51 flexibility, no cyclical patterns are detected for (largely nondiscretionary) interest
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53 expenditure.
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¹⁷ The charts are constructed according to the methodology suggested by Brambor *et al.* (2006).

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3 The conclusion that institutional restrictions to government expenditure may
4 improve spending discipline has relevant implications for the ongoing debate on
5 options to strengthen fiscal surveillance in EMU. For example, the European
6 Commission's proposal to strengthen the Stability and Growth Pact foresees that
7 government expenditure developments be '*consistent with prudent fiscal policy*
8 *making*' and linked to a '*prudent medium term rate of growth of GDP*'
9 (European Commission, 2010). This paper suggests that governments could
10 enhance compliance with such requirements at the European level by enforcing
11 the corresponding expenditure path through effective national expenditure rules.
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Table 1: Descriptive Statistics

	N	Mean	SD	Min.	Max.
Dependent variables					
<i>Deviation Total Expenditure</i>	145	1.07	1.75	-7.03	6.39
<i>Deviation Primary Expenditure</i>	145	1.12	1.73	-6.80	6.28
<i>Deviation Discretionary Expenditure</i>	139	0.09	0.68	-2.22	2.75
<i>Deviation Interest Expenditure</i>	145	-0.54	0.28	-0.69	1.32
Explanatory variables					
<i>Output Gap Surprise</i>	145	0.71	1.25	-2.88	5.43
<i>Expenditure Rules Index</i>	145	0	1	-0.79	2.27
<i>Debt Ratio</i>	145	50.33	26.62	3.49	106.89
<i>Expenditure Ratio</i>	145	45.04	5.90	33.34	56.95
<i>Revenue Ratio</i>	145	43.89	6.29	32.04	57.69
<i>Budget balance ratio</i>	145	-1.14	2.73	-9.32	5.33
<i>GDP deflator</i>	145	3.63	3.28	-0.72	23.81

Sources: European Commission Ameco Database and stability and convergence programmes for fiscal variables; Debrun *et al.* (2008) for expenditure rules index.

Note: all variables except for GDP deflator and expenditure rules index are expressed in % of GDP. GDP deflator is measured in terms of percentage change on preceding year.

Table 2: Baseline regression results

	(1)	(2)	(3)	(4)
	<i>Deviation Total Expenditure</i>	<i>Deviation Primary Expenditure</i>	<i>Deviation Discretionary Expenditure</i>	<i>Deviation Interest Expenditure</i>
<i>Output Gap Surprise (OGS)</i>	0.441*	0.472**	0.343***	-0.029
	(0.241)	(0.240)	(0.078)	(0.034)
<i>(OGS)*(Expenditure Rules Index)</i>	-0.279*	-0.313**	-0.107**	0.024
	(0.165)	(0.160)	(0.042)	(0.016)
<i>Government Debt (first lag)</i>	0.071**	0.086***	0.022*	-0.015***
	(0.030)	(0.029)	(0.012)	(0.005)
<i>Total Government Spending (first lag)</i>	-0.047	-0.035	0.008	-0.014
	(0.109)	(0.107)	(0.043)	(0.020)
<i>Observations</i>	145	145	139	145
<i>Sargan/Hansen test of overidentifying restrictions (p-value)</i>	0.43	0.69	0.94	0.05
<i>Difference in Sargan/Hansen test for endogenous regressor (p-value)</i>	0.13	0.10	0.45	0.56
<i>Kleinbergen-Paap rk Wald F-Statistic</i>	32.93	32.93	34.56	32.93

Notes: All estimates are obtained from two-stage least squares estimation including country- and time-fixed effects. Excluded instruments for the output gap surprise and its interaction with the expenditure rules index are the forecast error in trend GDP, the average output gap in all other countries in the sample and the corresponding interaction terms. Robust standard errors in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Critical value of Stock-Yogo weak identification test for 5% maximal IV relative bias: 11.04 and 10% maximal distortion of Wald test: 16.87.

Table 3: Impact of parliamentary elections and asymmetries in good and bad times

	(1)	(2)	(3)	(4)
	<i>Deviation Primary Expenditure</i>	<i>Deviation Discretionary Expenditure</i>	<i>Deviation Primary Expenditure</i>	<i>Deviation Discretionary Expenditure</i>
<i>Output Gap Surprise (OGS)</i>	0.459** (0.239)	0.345*** (0.077)		
<i>(OGS)*(Expenditure Rules Index)</i>	-0.285* (0.170)	-0.098** (0.041)		
<i>Government Debt (first lag)</i>	0.095*** (0.030)	0.023* (0.012)	0.082*** (0.030)	0.022* (0.012)
<i>Primary Government Spending (first lag)</i>	-0.061 (0.108)	0.015 (0.041)	-0.090 (0.110)	0.008 (0.041)
<i>Parliamentary Election</i>	0.477* (0.257)	0.07 (0.089)		
<i>OGS if Output Gap > 0</i>			0.587** (0.283)	0.373*** (0.108)
<i>OGS if Output Gap < 0</i>			0.079 (0.699)	0.171 (0.244)
<i>(OGS)*(Expenditure Rules Index) if Output Gap > 0</i>			-0.175 (0.257)	-0.138** (0.062)
<i>(OGS)*(Expenditure Rules Index) if Output Gap < 0</i>			-0.576 (0.447)	-0.014 (0.175)
<i>Observations</i>	145	139	145	139
<i>Sargan/Hansen test of overidentifying restrictions (p-value)</i>	0.71	0.97	0.59	0.91
<i>Difference in Sargan/Hansen test for endogenous regressor (p-value)</i>	0.11	0.43	0.16	0.80
<i>Kleinbergen-Paap rk Wald F-Statistic</i>	33.84	34.64	1.38	1.28

Notes: All estimates are obtained from two-stage least squares estimation including country- and time-fixed effects. Excluded instruments for the output gap surprise and its interaction with the expenditure rules index are the forecast error in trend GDP, the average output gap in all other countries in the sample and the corresponding interaction terms. Robust standard errors in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Critical value Stock-Yogo weak identification test for 5% maximal IV relative bias for specifications in columns (1) and (2): 11.0 and 10% maximal distortion of Wald test: 16.9. For specifications in columns (3) and (4) no critical values are computed due to the weakness of the instruments (see text).

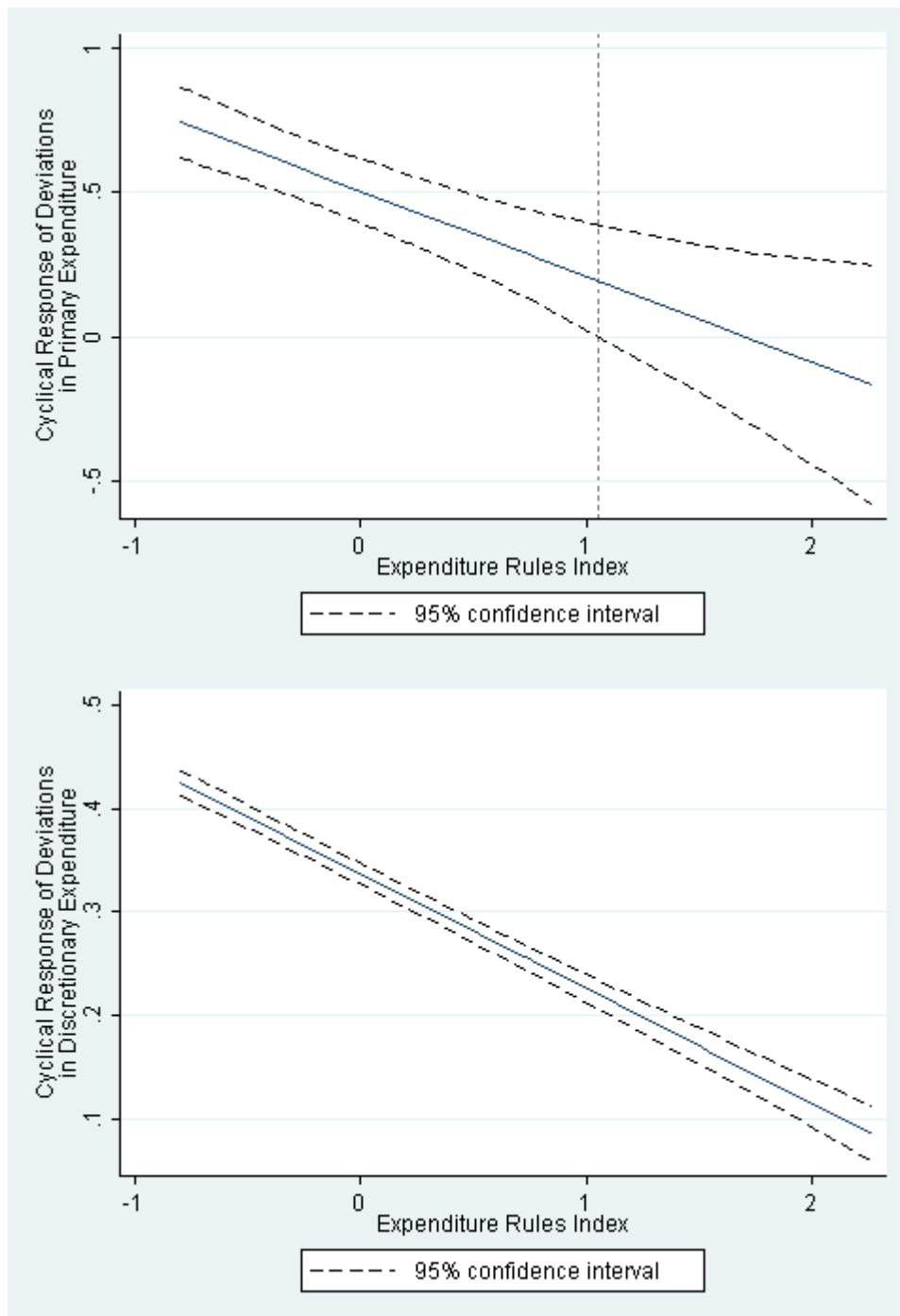


Figure 1: Overall cyclical response of spending deviations conditional on expenditure rules index

Note: Solid lines plot the overall response of expenditure deviations to output gap surprises ($\partial dev / \partial OG = \alpha + \beta ER$) against the expenditure rules index. The overall effect is significant at a 5% level if both boundaries of the 95% confidence interval are above or below the x-axis.