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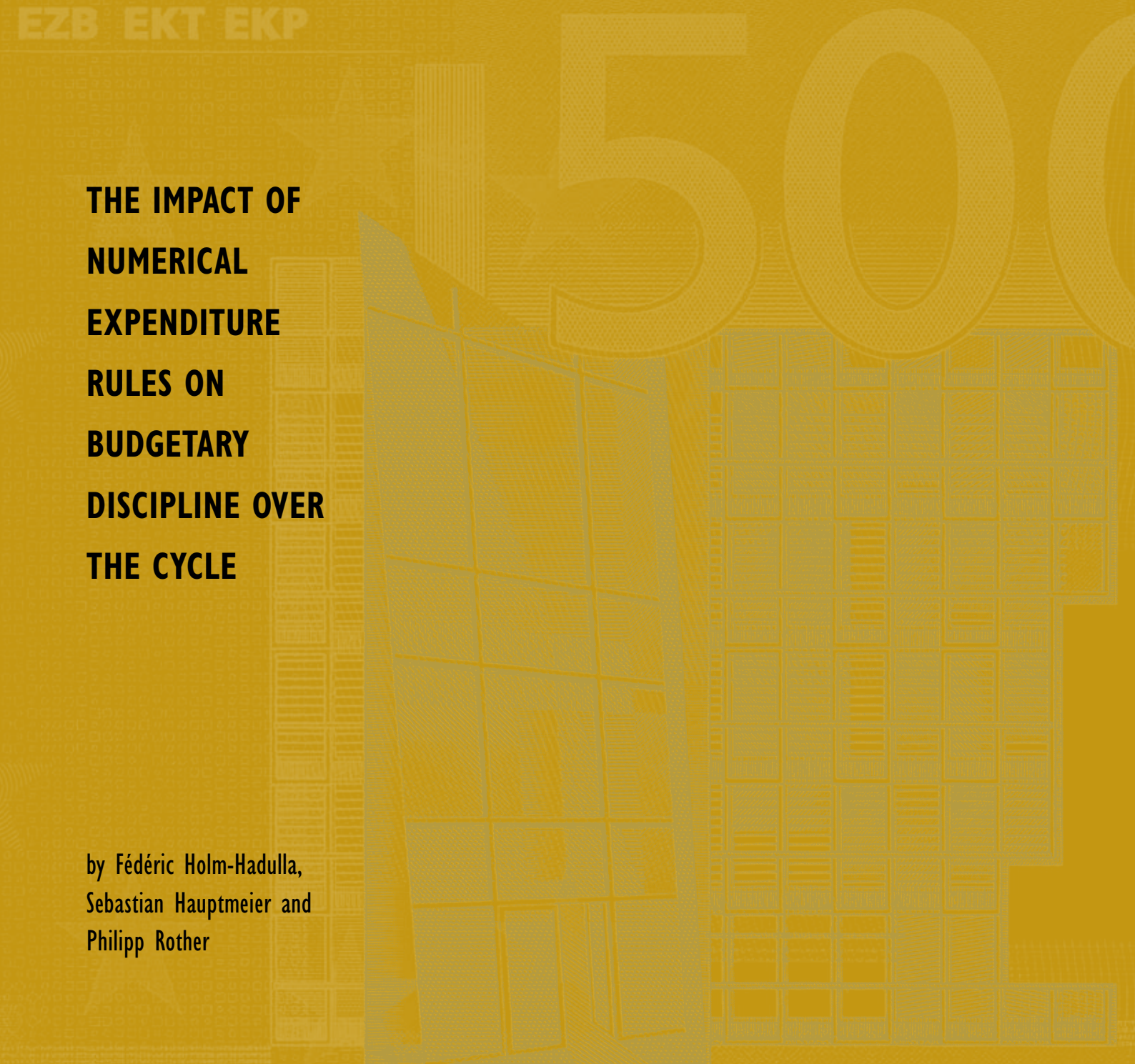

THE IMPACT OF NUMERICAL EXPENDITURE RULES ON BUDGETARY DISCIPLINE OVER THE CYCLE

by Fédéric Holm-Hadulla, Sebastian Hauptmeier and Philipp Rother

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CONTENTS

Abstract

We study the impact of numerical expenditure rules on the propensity of governments to deviate from expenditure targets in response to surprises in cyclical conditions. 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 numerical expenditure rules. These hypotheses are tested against data from a panel of EU Member States. Our key findings are that (i) deviations between actual and planned government expenditure are positively related to unanticipated changes in the output gap, and (ii) numerical expenditure rules reduce this pro-cyclical bias. Moreover, the pro-cyclical spending bias is found to be particularly pronounced for spending items with a high degree of budgetary flexibility.

JEL classification: C23, E62, H50

Keywords: expenditure rules, fiscal discipline, stabilisation, spending bias

Non-Technical Summary

In the last two decades, governments have increasingly adopted numerical fiscal rules which aim to promote fiscal discipline by setting explicit targets or ceilings for key budgetary aggregates. In this context, a broad consensus on the beneficial role of rules to restrict government expenditure has emerged. In particular, many policy observers have argued that they may mitigate pro-cyclical expenditure overruns in upturns and reduce the need to make up for such spending profligacy in ensuing downturns.

However, empirical evidence regarding the impact of expenditure rules on the cyclical stance of government spending has been relatively scarce. Against this background, we conduct an econometric analysis of expenditure policies in EU Member States over the period 2002-2008. More specifically, we study whether the response of government spending to surprising developments in the cyclical position of the economy differs in countries with strong and weak expenditure rules. Our key findings are *(i)* that government spending has been subject to a pro-cyclical bias, defined as the tendency to over-spend (under-spend) when cyclical conditions are unexpectedly favourable (unfavourable), and *(ii)* that numerical expenditure rules reduce this pro-cyclical bias. Thus, from a policy perspective the results confirm both the need for rules-based restrictions to expenditure policy and their effectiveness.

Turning to a disaggregated analysis of government spending, our results point to markedly different patterns across expenditure items: while the pro-cyclical bias is particularly pronounced for spending items with a high degree of budgetary flexibility, no cyclical patterns may be detected for (largely non-discretionary) interest expenditure. For the institutional design of numerical expenditure rules this result implies a trade-off: on the one hand, extending the rules' scope to non-discretionary spending items may be unnecessary and compliance would be more dependent on factors outside the control of policy-makers. On the other hand, transparency is likely to suffer from an exemption of certain aspects of government activity. This in turn would reinforce the policy-makers' information advantage over their electorate and creditors and thus undermine the primary purpose of numerical fiscal rules. Moreover, in the long run essentially all government spending can be influenced by policy-makers. Thus, diverting fiscal accountability away from certain spending items may introduce or reinforce a bias of fiscal policy towards the status quo.

1 Introduction

Self-enforced institutional restrictions to budgetary decision-making are a common feature of fiscal governance in industrialised countries.[1] In particular, in the last two decades, governments have increasingly adopted *numerical fiscal rules* which set explicit ceilings for key budgetary aggregates.[2] 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, thus giving rise to a common pool problem.[3] As a consequence, fiscal policy is biased towards inefficiently high levels of government spending which might be mitigated by restricting governments' discretion through fiscal rules.

In addition to excess spending, previous literature also suggests that these common pool problems may induce a pro-cyclical bias in fiscal policy: for example, Tornell and Lane (1999) develop a dynamic framework in which multiple political groups with diverse preferences compete for a common tax base via the budgetary process. Under favourable macroeconomic circumstances (*i.e.* when the tax base increases) the incentive for each interest group to raise its share of the common pool becomes stronger, whereas in downturns the opposite holds true.[4] Similarly, Talvi and Végh (2005) assume that budgetary surpluses in booms necessary for tax smoothing are costly from a government's perspective as they create political pressure to increase public spending.[5] As a consequence, additional revenue in booms will not fully translate into a larger surplus but will partly result in extra spending relative to the optimal level required by tax smoothing. By contrast, in downturns spending will fall since, due to "excess spending" in booms, the surplus generated in previous periods will not suffice to meet the solvency constraint. These theoretical considerations

[1] For an overview, see Hallerberg et al. (2007) and Debrun et al. (2008).
[2] See European Commission (2006). For a conceptual clarification and definition of numerical fiscal rules see Kopits and Symanski (1998).
[3] For the seminal contributions to this literature see Weingast, Shepsle and Johnsen (1981), von Hagen and Harden (1995) and Alesina and Perotti (1996). For an alternative explanation of pro-cyclical spending policies focussing on the role of borrowing restrictions see *e.g.* Büttner and Wildasin (2009).
[4] This reasoning abstracts from endogenous anti-cyclical expenditure reactions to macroeconomic shocks due to automatic stabilisers.
[5] While the anecdotal evidence in the paper mainly relates to less developed countries, similar tendencies may be observed in European countries. For a discussion of the German case see, *e.g.*, the Annual Report of the German Council of Economic Experts, 2007/2008 p. 12. For the classical argument on tax smoothing see Barro (1979).

provide an explanation for empirical findings suggesting a positive relation between public spending and the cyclical position of the economy.[6]

Accordingly, another rationale for the implementation of numerical fiscal rules is to prevent policymakers from exacerbating macroeconomic volatility through pro-cyclical fiscal policies. In particular, a widespread consensus on the beneficial role of rules to restrict government expenditure has emerged, as summarised 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.*[7] On these grounds, several policy observers have advised governments to strengthen domestic expenditure rules as a means to improve fiscal discipline over the business cycle.[8]

Yet, while the favourable view of domestic expenditure rules has been supported by country experiences,[9] econometric evidence regarding their impact on the cyclical stance of fiscal policy has been relatively scarce. For a panel of fifteen EU countries over the period 1998-2005, Wierts (2008) finds that government spending displayed a less pro-cyclical response to revenue shocks in the presence of strict numerical expenditure rules. Similarly, for a sample of eleven EU countries over the period 1980-2005, Turrini (2008) finds that pro-cyclical expenditure dynamics in good times tend to be less pronounced in countries with strong expenditure rules.

Our contribution to this literature is twofold: first, we take a particular perspective as regards the definition of fiscal cyclicality, in that we do not study expenditure outcomes directly but relative to previous plans. To be specific, we seek to answer the question: *given a certain expenditure target, how do governments adjust their fiscal stance to surprising developments in the cyclical position of the economy?* Accordingly, expenditure overruns (shortfalls) in years of better (worse) than expected cyclical conditions are considered pro-cyclical; counter-cyclical and a-

[6] See Galí and Perotti (2003), Lane (2003), Kaminsky, Reinhart, and Végh (2004), Fatás and Mihov (2003, 2006), Akitoby et al. (2006), Lamo et al. (2007), and Turrini (2008).
[7] European Commission, Directorate General for Economic and Financial Affairs, Quarterly Report on the Euro Area Vol. 3 Nr. 3, 2004, p. 37.
[8] See for example, IMF (2009).
[9] See for example, Ljungman (2008).

cyclical policies are defined analogously.[10] As pointed out by Poterba (1994), this approach allows us to directly identify how government spending adjusts to news on the state of the economy. Moreover, empirical evidence suggests that the adherence to spending plans is particularly relevant for overall budgetary performance in the EU;[11] budgetary lapses, such as breaches of the 3% of GDP reference value for the government deficit established by the Maastricht Treaty and the Stability and Growth Pact, tended to be mainly driven by expenditure overruns.[12]

Second, we separately analyse the incentive effect of numerical expenditure rules with respect to discretionary and non-discretionary items of government expenditure. This distinction seems important since aggregate government expenditure typically includes items (such as interest expenditure or certain legally mandated transfers), that can barely be adjusted by policymakers in the short-run, even if they had an incentive to do so. At the same time, predictions concerning the impact of fiscal rules on fiscal cyclicality presuppose that government spending can react spontaneously to exogenous shocks. Hence, studying overall expenditure may partly conceal policy responses since spending items with low budgetary flexibility hamper the statistical inference of systematic behavioural reactions related to discretionary expenditure.

The paper is organised as follows: the next section describes and discusses the construction of variables and presents the econometric model. Section 3 reports regression results. Section 4 discusses policy implications and concludes.

2 Empirical Strategy

2.1 Measuring deviations between expenditure outcomes and plans

Our aim is to capture the discrepancy between governments' actual expenditure policy for a given period and their previously formulated expenditure plans. We obtain the latter from the EU Member States' Stability and Convergence Programmes which we interpret as reflecting the governments' fiscal policy stance *ex ante*, *i.e.* before

[10] The definition of expenditure overruns and shortfalls is similar to that in Wierts (2008). However, we focus on the policy response to changes in cyclical conditions rather than revenue due to the simultaneity of revenue and expenditure decisions.
[11] See Turrini (2008) and Beetsma et al. (2009).
[12] These findings are based on the analysis of the medium-term budgetary objectives reported in the EU Member States' Stability and Convergence Programmes by Moulin and Wierts (2006). For a more recent study of expenditure overruns in euro area countries see also the European Central Bank 2008.

changes in macroeconomic situations take place. Accordingly, we may write the explanatory variable for deviations in total spending as

$$dev_{i,t}^{total} = g_{i,t}^{total} - \tilde{g}_{i,t}^{total},$$

where $g_{i,t}^{total}$ denotes the actual ratio of total expenditure relative to nominal GDP in country i at time t as reported in the autumn 2008 vintage of the European Commission's Ameco Database;[13] $\tilde{g}_{i,t}^{total}$ denotes the forecast for the expenditure ratio as published in the respective Stability or Convergence Programme from period $t-1$. Since the explanatory variables are expressed in percent of revised nominal GDP (see below), before computing deviations we multiply $\tilde{g}_{i,t}^{total}$ by the European Commission's GDP forecast from the corresponding forecast vintage and divide by revised nominal GDP.[14] Deviations in primary expenditure are defined accordingly.

In light of related literature, the use of Stability and Convergence Programmes as measures of government intentions merits discussion. As pointed out by several commentators, governments 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.[15] Hence, the reported fiscal paths for future periods might deviate from those which governments consider feasible based on internal projections. Yet, these considerations do not affect our analysis in a fundamental way: the projections we use to compute the dependent variables refer to a 1-year horizon; 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. This in turn strongly limits the scope for manipulation of these forecasts, *e.g.* for use in a signalling game with the European authorities.[16]

[13] Hereafter, we will refer to data obtained from this source as "revised" figures.
[14] This procedure leads to a slight inconsistency since the Commission's GDP forecast may deviate from that implied in the expenditure ratio forecast by Member States. However, in several Stability and Convergence Programmes, the latter is not available in levels but only in growth rates. Thus, in the ensuing econometric analysis we control for differences between the Commission's and Member States' growth rate forecasts (see Section 3).
[15] See Strauch et al. (2004), Moulin and Wierts (2006), Stéclebout-Orseau and Hallerberg (2007), von Hagen (2008), and Beetsma et al. (2009).
[16] We are grateful to an anonymous referee for pointing this out to us.

Table 1 displays summary statistics for the variables used in the empirical analysis. While all EU Member States are required to submit Stability or Convergence Programmes on a yearly basis, lack of data availability regarding some explanatory variables reduces the sample to 145 observations over the period 2002-2008 (see section 2.3). As apparent from the first line of table 1, total general government expenditure at the sample average exceeds its planned levels by more than 1% of GDP. However, this figure is subject to substantial heterogeneity, with some deviations between spending outcomes and plans well above 5% of GDP in absolute value. Similar patterns may be observed for primary expenditure.

Table 1: Descriptive Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Dependent variables					
Deviation Total Expenditure	145	1.07	1.75	-7.03	6.39
Deviation Primary Expenditure	145	1.12	1.73	-6.80	6.28
Deviation Discretionary Expenditure	139	0.09	0.68	-2.22	-2.75
Deviation Interest Expenditure	145	-0.54	0.28	-0.69	1.32
Explanatory variables					
Output Gap Surprise	145	0.71	1.25	-2.88	5.43
Expenditure Rules Index	145	0	1	-0.79	2.27
Debt Ratio	145	50.33	26.62	3.49	106.89
Expenditure Ratio	145	45.04	5.90	33.34	56.95
Revenue Ratio	145	43.89	6.29	32.04	57.69
Budget balance ratio	145	-1.14	2.73	-9.32	5.33
GDP deflator	145	3.63	3.28	-0.72	20.30

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.

2.2 Differentiating between discretionary and non-discretionary spending

In a second step, we use disaggregated information on government expenditure to compute deviations between plans and outcomes for discretionary and non-discretionary spending items. For that purpose, we differentiate between expenditure items which are readily manipulated by policy-makers (*i.e.* discretionary) and those which are, in the short-run, exogenous from the government's perspective (*i.e.* non-discretionary). Of course, this differentiation is not straightforward and in most cases requires specific judgement.[17]

[17] Since 2001, EU Member States have been required to provide detailed projections in their Stability and Convergence Programmes for: collective consumption, social transfers in kind, social transfers other than in kind, interest payments, subsidies, gross fixed capital formation, and other expenditure.

To avoid definitional complexities, we focus on those spending items whose categorisation appears fairly unambiguous. In the context of discretionary expenditure, these comprise *spending on subsidies* and *spending on gross fixed capital formation*. Thus, we define the dependent variable for discretionary spending as

$$dev_{i,t}^{disc} = g_{i,t}^{gcap} + g_{i,t}^{subs} - \tilde{g}_{i,t}^{gcap} - \tilde{g}_{i,t}^{subs} \ ,$$

where $g_{i,t}^{subs}$ is the actual ratio of spending on subsidies relative to nominal GDP in country i at time t as reported in the autumn 2008 vintage of the European Commission's Ameco Database; $g_{i,t}^{gcap}$ captures the corresponding values for gross fixed capital formation; $\tilde{g}_{i,t}^{subs}$ and $\tilde{g}_{i,t}^{gcap}$ denote the forecast for the respective expenditure component as published in the Stability or Convergence Programme from period $t-1$.[18]

Of course, these two expenditure items do not comprise all aspects of government spending which should be considered discretionary. However, while it would be desirable to exploit information on *all* available expenditure components, the data structure in the SCP inhibits a more inclusive definition. In particular, the categories *collective consumption* and *other expenditure* lump together both discretionary and non-discretionary spending items which may not be disentangled based on the available information; *social expenditure* (both "in kind" and "other than in kind") displays large degrees of cross-country heterogeneity in terms of the types of government spending implied, so that a classification as either discretionary or non-discretionary would have to rely on arbitrary assumptions. Accordingly, interest expenditure ($g_{i,t}^{\text{int exp}}$) is the only spending item which may be considered as non-discretionary government spending in a straightforward manner. Hence, we define the dependent variable for non-discretionary government spending as

$$dev_{i,t}^{nondisc} = g_{i,t}^{\text{int exp}} - \tilde{g}_{i,t}^{\text{int exp}} \ .$$

[18] Since Spain only reports gross fixed capital formation in their 2001-2005 Stability Programme vintages we only compute the forecast error for gross fixed capital formation in this case to obtain $dev_{i,t}^{disc}$.

Given the above qualifications, the ensuing empirical analysis does not aim to fully *explain* the short-term dynamics of discretionary and non-discretionary government expenditure in the sample. Much rather we use the selected spending items as polar cases to illustrate the structural differences in the reactions of discretionary and non-discretionary spending to the business cycle. As in the case of overall and primary expenditure, both deviations in discretionary and in non-discretionary spending are expressed in percent of revised nominal GDP.

The upper part of table 1 contains summary statistics for the deviations between outcomes and plans in the disaggregated spending variables.[19] While, in line with overall government expenditure, actual discretionary spending on average exceeds planned levels, interest expenditure tends to fall short of plans.

2.3 Measuring output gap surprises

In line with related literature, we use the gap between actual and trend GDP as a measure for the cyclical position of the economy.[20] Since we are interested in "surprising" developments in the cyclical position, also here we include this variable in terms of the deviation between projected and actual levels. To be specific, we seek to capture the discrepancies between the actual cyclical position of the economy in period t and the cyclical position that governments expected for period t at the time when they produced their fiscal forecast, in period $t-1$.

Hence, a potential proxy for the governments' expectations on cyclical developments has to meet two requirements: first, it should be relevant, *i.e.* it should derive from an authoritative 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 SCP should be sufficiently short. Led by these guidelines we choose the output gap projections from the European Commission's autumn forecast as a proxy for the government expectations; given that these forecasts are typically released in the third quarter of the year, they provide a timely measure for the outlook on future economic conditions which prevails at the time when the SCP projections are finalised.

[19] 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 variables by six observations.
[20] See, for example, Balassone and Francese (2004) and Cimadomo (2008).

Accordingly, the explanatory variable for "output gap surprises" (OG_{it}) is defined as the difference between the revised actual output gap in period *t* and the European Commission's output gap forecast (from period *t-1*) for period *t*. To avoid differences between the denominator of the dependent variable and the output gap surprise variable from affecting our estimation results, we make an additional adjustment: the output gap outcome is multiplied with the outcome for trend GDP; output gap forecasts are multiplied with the European Commission's trend GDP forecast from the corresponding forecast vintage; and finally the difference between these two variables is expressed in percent of revised nominal GDP. Output gap projections for new Member States are available from 2005 onwards, and for all other countries from 2002 onwards, thus amounting to 145 observations for the full sample.[21]

2.4 Measuring domestic expenditure rules

To capture the extent to which national expenditure policy faces domestic institutional constraints, we use the expenditure rules index as developed by Debrun et al. (2008).[22] This index is based on a survey conducted by the Working Group on the Quality of Public Finances among practitioners and researchers in the field of fiscal policy. It includes all budgetary provisions which fix numerical targets or ceilings to government expenditure. To attach weights to different institutions, the index takes into account both the share of overall public spending covered by the rule and qualitative features such as the type of enforcement mechanisms and media visibility. As pointed out by Inman (1996), the actual enforcement of rules is particularly important to capture the extent to which expenditure policy is really restricted by the institutional framework. Taken together, this measure bears strong appeal for empirical implementation as it translates a broad set of institutional provisions into a country-specific cardinal ranking.[23] Moreover, the use of this index in related literature facilitates comparability of results across different studies.[24]

[21] Since expenditure plans for Bulgaria and Romania are only available starting in 2007 they are not considered in the below econometric analysis.
[22] For a definition and a detailed description of the computation of this index see European Commission (2006) and Debrun et al. (2008). The index is normalised to have a zero mean and unit variance.
[23] The index also 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.
[24] See *e.g.*, European Commission (2006), Wierts (2008), and Afonso and Hauptmeier (2009).

Theoretical considerations point to two different channels through which expenditure rules might mitigate pro-cyclical spending bias: first, if rules are binding in that both a marginal increase in public spending leads to non-compliance *and* non-compliance is associated with political or legal sanctions, they provide a direct incentive for fiscal discipline. Second, as pointed out by Schuknecht (2004) as well as Morris et al. (2006), numerical fiscal rules may induce budgetary discipline indirectly, in that they serve as benchmarks against which imperfectly informed electorates evaluate governments' fiscal performance.[25] Hence, in the presence of strong numerical rules expenditure policy should be more consistent with budgetary targets and less prone to pro-cyclical reactions even if they do not bind in a strict sense.

The workings of expenditure rules differ with respect to the sign of the underlying shock: in case of positive surprises, expenditure rules *directly* restrain the government's tendency to use additional revenues for budgetary expansion. In the case of negative surprises, the effect is *indirect* in that their favourable impact on budgetary discipline in good times prevents the need for fiscal tightening in bad times.

2.5 Econometric Model

To analyse the impact of expenditure rules on budgetary discipline over the cycle, we estimate the following equation:

$$dev_{i,t}^{k} = c_i + d_t + \alpha OG_{i,t} + \beta(OG_{i,t} \times ER_i) + \gamma X_{i,t} + u_{i,t}^{k}$$

where $dev_{i,t}^{k}$ refers to deviations between actual and planned levels of spending with respect to spending category k (*i.e.* total, primary, discretionary, or interest) for country i in period t; $OG_{i,t}$ is the output gap surprise for country i in period t; ER_i is a country-specific vector which indicates the "strength" of national expenditure rules; $OG_{i,t} \times ER_i$ is an interaction term between output gap surprises and the expenditure rules index. d_t and c_i are full sets of time and country fixed effects, respectively; $X_{i,t}$ is a matrix containing n time and country-specific control variables and $u_{i,t}^{k}$ are random error terms for the respective specification.

[25] See Alesina and Perotti (1996), for a discussion of reasons and means for politicians to reduce transparency on public finances.

Since government expenditure is an important component of aggregate demand simultaneity problems might arise with respect to variables measuring cyclical conditions. To address the resulting identification problem we exploit the "structural" part of output gap surprises for causal inference: forecast errors may arise from unexpected developments in *actual* and/or in *trend* GDP. Since the latter – by definition – is essentially unaffected by short-run fluctuations in the time series for GDP, we also treat it as exogenous to those fluctuations caused by changes in government spending.[26] Thus, we instrument the output gap surprise variable with the forecast error in trend GDP. We extend the instrument set by average output gaps in all foreign sample countries to capture international cyclical developments, not affected by domestic expenditure policy. While the exogeneity assumption for this variable, à priori, appears less compelling than for the forecast error in trend GDP, the number of instruments allows us to test the validity of the instrument set.

Another potential source of endogeneity problems originates from the expenditure rules index. Related literature argues that numerical fiscal rules may not be treated as an exogenous variable since unobservable country-specific preferences might be positively associated with both fiscal accuracy and the propensity to implement these restrictions.[27] Moreover, the self-commitment implied in binding numerical fiscal rules provides an incentive for governments with higher ability or willingness for achieving fiscal targets to implement stricter fiscal rules.[28] However, given that the expenditure rules index displays almost no variation over the sample period, unobservable country-specific preferences for fiscal discipline are captured by the fixed effects. Furthermore, simultaneity bias is unlikely to impair our results due to the short time dimension of our sample: the type of institutional restrictions considered in the expenditure rules index are defined as *permanent constraints on fiscal policy*.[29] In most cases, these constraints are integrated into a multi-annual budgetary framework and/or based on legal, constitutional, or long term political commitments which are not readily adjusted to accommodate current fiscal

[26] The European Commission computes trend GDP based on a Hodrick-Prescott filter; according to this method, trend values 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 European Commission (2008).
[27] See Inman (1996) and Poterba (1996).
[28] See Debrun and Kumar (2007).
[29] See Kopits and Symanski (1998) and Debrun et al. (2008).

developments. As pointed out by Alesina and Perotti (1996, 1999), they may thus be considered exogenous.

The set of control variables includes the lagged stock of government debt and in some specifications the lagged fiscal balance to reflect the possibility that the overall fiscal position may influence the extent to which external fiscal surveillance and the financial markets force governments to comply with their expenditure targets.[30] To allow for systematic differences in budgetary decision-making across countries with large and small public sectors lagged values of the expenditure or revenue ratio are included.[31] In several specifications, we augment the model with a dummy which equals one in years of parliamentary elections and zero otherwise to take into account that upcoming elections may reinforce the incentive to "buy political support" in the short run.[32] Finally, in several specifications we explicitly control for inflation rates as they may affect government expenditure and nominal GDP differently thus giving rise to a "mechanical correlation" between output gap surprises and the denominator of the dependent variables. Descriptive statistics on these control variables are shown in the bottom part of table 1.

3 Results

Table 2 reports baseline regression results. The positive coefficient on the output gap surprise in column 1 points to pro-cyclical slippages in overall expenditure.[33] To be specific, an output gap surprise of one percentage point on average goes along with a deviation between spending outcomes and plans of almost half a percentage point in the same direction. At the same time, the negative coefficient for the interaction term indicates that this pro-cyclical pattern is less pronounced in countries with strong expenditure rules. In particular, an increase in the expenditure index by one standard

[30] For a similar interpretation see Galí and Perotti (2003).
[31] For example, Beetsma et al. (2009) find that countries with higher expenditure ratios tended to adopt more ambitious expenditure plans.
[32] Several empirical studies suggest that the degree of political fragmentation may influence budgetary discipline (see *e.g.* Alesina and Perotti (1999), Kontopoulos and Perotti (2002), and Fabrizio and Mody (2006)). However, none of the common indicators of political fragmentation was statistically significant in our specification.
[33] As regards interpretation, a word of caution is in order: a positive (negative) coefficient for the variable measuring output gap surprises does not necessarily imply a de-stabilising (stabilising) fiscal stance. Much rather, this interpretation only holds if the initial output gap is positive. Starting, by contrast, from a negative output gap a positive coefficient implies that a government contributes more to stabilising the economy. However, based on the definition adopted in this analysis (see section 2) in both cases a positive coefficient is considered to indicate pro-cyclical policy reactions.

deviation almost reduces the pro-cyclical deviation in government expenditure by two thirds.

Qualitatively similar results obtain when analysing primary and discretionary expenditure (see columns 2 and 3). However, the precision of estimates differs notably across specifications. While in the case of total expenditure, coefficients for the output gap surprise and the interaction term are statistically significant at a 10% significance level only, for primary expenditure the null hypotheses is rejected at a 5% level and significance rises further when studying discretionary expenditure. These patterns are in line with the considerations presented in section 2.2: the fewer spending items with a low degree of budgetary flexibility are considered in the dependent variable, the more salient is the pro-cyclical response of government expenditure. A natural robustness check for this hypothesis is to repeat these exercises using non-discretionary spending components, exclusively. As expected, output gap surprises do not exert a significant influence on deviations in interest expenditure from targets (see column 4). These results illustrate the importance to differentiate between expenditure items based on their budgetary flexibility in tests of the spending bias hypothesis.

Table 2: Baseline Regression Results

	(1)	(2)	(3)	(4)
	Deviation Total Expenditure	*Deviation Primary Expenditure*	*Deviation Discretionary Expenditure*	*Deviation Interest Expenditure*
Output Gap Surprise (OGS)	0.44*	0.47**	0.34***	-0.03
	(0.24)	(0.24)	(0.08)	(0.04)
(OGS)(Expenditure Rules Index)*	-0.28*	-0.31**	-0.11**	0.02
	(0.16)	(0.16)	(0.04)	(0.02)
Government Debt (first lag)	0.07**	0.09***	0.02*	-0.01***
	(0.03)	(0.03)	(0.01)	(0.00)
Total Government Spending (first lag)	-0.05	-0.03	0.01	-0.01
	(0.11)	(0.11)	(0.04)	(0.02)
Observations	145	145	139	145
Sargan/Hansen test of overidentifying restrictions (p-value)	0.43	0.69	0.94	0.08
Difference in Sargan/Hansen test for suspect instruments (p-value)	0.29	0.56	0.78	0.03
Difference in Sargan/Hansen test for endogenous regressor (p-value)	0.13	0.10	0.45	0.56
Kleinbergen-Paap rk Wald F-Statistic (Critical value Stock-Yogo weak identification test for 5% maximal IV relative bias: 11.4 and 10% maximal distortion of Wald test: 16.9)	32.93	32.93	34.56	32.93

Note: 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 ountries 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.

Interestingly, the lagged level of debt has a significant positive impact on slippages in total, primary and discretionary spending. An immediate interpretation to this finding is that accumulation of debt and the propensity to miss budgetary targets are driven by common unobservable factors. However, since the identification of causal effects of debt levels on expenditure policy is not at the centre of our attention we do not further investigate this issue.

The lagged expenditure level does not affect the tendency for deviations between outcomes and plans. As robustness checks, we replace this variable with the lagged revenue ratio and the lagged budget balance ratio (see table A1 in the Appendix).[34] Moreover, we include the lagged spending item under consideration (*i.e.* lagged primary and discretionary spending), to allow for the possibility that the ambition of fiscal plans depends on the initial size of the respective budgetary aggregate (see columns one and two of table A2).[35] Finally, we explicitly control for factors giving rise to a "denominator effect" described above (columns three to five of table A2). To this end, we add inflation and the difference between the nominal GDP growth forecast from period *t-1* by the European Commission and the one reported in the Stability and Convergence Programmes as additional regressors.[36] Our main results are essentially unaffected by these variations in the basic model.

Given the non-responsive nature of interest spending, we focus on primary and discretionary spending in the remainder. In the specification shown in columns 1 and 2 of table 3, we augment the basic model by the dummy variable for parliamentary elections. Consistent with related literature,[37] the notion of politically motivated fiscal profligacy finds some support in our analysis: countries on average record significant positive primary expenditure overruns in election years. However, no such effect is detected for discretionary spending deviations.

Throughout this analysis, the relevant specification tests support our identification strategy. Based on the Sargan/Hansen statistic, the instrumental variables pass the

[34] Since deviations in interest expenditure do not respond to output gap surprises they are not reported in the remainder of the analysis.
[35] For example, Beetsma, Giuliodori, and Wierts (2009) find that the plans reported in Stability and Convergence Programmes depend on the starting point of the respected budgetary item.
[36] For the rationale for the inclusion of these variables see the end of the preceding section and footnote 28, respectively.
[37] See *e.g.*, Buti and van den Noord (2004) and Cimadomo (2008).

overidentification test. Also, despite our initial doubts concerning the validity of the average output gap in foreign countries as an instrumental variable, the difference-in-Sargan tests do not reject the null hypothesis of exogeneity. The null hypothesis of weak instruments is clearly rejected. Finally, in many specifications we 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.

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

	(1)	(2)	(3)	(4)
	Deviation Primary Expenditure	*Deviation Discretionary Expenditure*	*Deviation Primary Expenditure*	*Deviation Discretionary Expenditure*
Output Gap Surprise (OGS)	0.46**	0.35***		
	(0.24)	(0.08)		
(OGS)(Expenditure Rules Index)*	-0.28*	-0.10**		
	(0.17)	(0.04)		
Government Debt (first lag)	0.10***	0.02*	0.08***	0.02*
	(0.03)	(0.01)	(0.03)	(0.01)
Primary Government Spending (first lag)	-0.06	0.01	-0.09	0.01
	(0.11)	(0.04)	(0.11)	(0.04)
Parliamentary Election	0.48*	0.07		
	(0.26)	(0.08)		
OGS if Output Gap > 0			0.59**	0.37***
			(0.28)	(0.11)
OGS if Output Gap < 0			0.08	0.17
			(0.70)	(0.24)
(OGS)(Expenditure Rules Index) if Output Gap > 0*			-0.17	-0.14**
			(0.26)	(0.06)
(OGS)(Expenditure Rules Index) if Output Gap < 0*			-0.58	-0.01
			(0.45)	(0.18)
Observations	145	139	145	139
Sargan/Hansen test of overidentifying restrictions (p-value)	0.71	0.97	0.59	0.91
Difference in Sargan/Hansen test for suspect instruments (p-value)	0.73	0.85	0.50	0.77
Difference in Sargan/Hansen test for endogenous regressor (p-value)	0.11	0.43	0.16	0.80
Kleinbergen-Paap rk Wald F-Statistic (Critical value Stock-Yogo weak identification test for 5% maximal IV relative bias: 11.0 and 10% maximal distortion of Wald test: 16.9)	33.8	34.6	n.a.	n.a.

Note: 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 ountries 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.

Economic intuition suggests that spending bias may have asymmetric effects on government expenditure depending on the cyclical position: 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, spending bias may give rise to "cyclical ratcheting" in that pro-cyclical fiscal expansions are not compensated for in downturns.[38] As discussed in section 2.5, a similar asymmetry applies to the impact of expenditure rules due to their direct (indirect) effect on spending policies in upturns (downturns).

To test this intuition, we modify the baseline specification by allowing the coefficients of $OG_{i,t}$ 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).[39] The results support the notion of asymmetric reactions in good and bad times: for both primary and discretionary spending the former coefficient is statistically significant and somewhat higher than in the specifications that do not account for asymmetries. As regards the impact of expenditure rules, the results give a mixed picture. In the case of discretionary spending, the hypothesis that expenditure rules curb the risk of pro-cyclical spending overruns is corroborated. By contrast, no statistically significant effect is found for the corresponding coefficient in the specification for primary spending. However, these results should be interpreted with some caution: the distinction between good and bad times forces us to instrument two additional variables which in turn may aggravate problems of small sample bias.

4 Conclusion

Building on the theory of spending bias, this paper analysed how numerical expenditure rules shape the response of government spending to unexpected changes in macroeconomic conditions. We find that government spending reacts pro-cyclically to surprises in the output gap and that strong domestic expenditure rules serve to mitigate this tendency. Thus, from a policy perspective the results confirm both the need for institutional restrictions to expenditure policy and their effectiveness.

Furthermore, our analysis suggests that the above empirical findings depend on the type of government expenditure considered in the analysis: while the pro-cyclical bias is particularly pronounced for spending items with a high degree of budgetary flexi-

[38] See Jerkewitz and Strawczynski (2004).
[39] An alternative way to conceptualise asymmetries would be to analyse positive and negative output gap surprises, separately. However, results from these regressions proved inconclusive and are hence not reported.

bility, no cyclical patterns may be detected for (largely non-discretionary) interest expenditure. A potential qualification to this conclusion derives from the difficulty to separate spending items based on the degree of budgetary flexibility: our focus on deviations between actual policy and budgetary targets, as formulated in EU Member States' Stability and Convergence Programmes, forced us to isolate only selected spending items which can be assigned to the categories of "discretionary" and "non-discretionary" expenditure in a straightforward manner. A study of different aspects of expenditure policy based on a more comprehensive definition of discretionary and non-discretionary spending would lend further credence to our conclusions. However, the benefit of explaining a larger set of spending items would come at a cost: deviations between outcomes and targets in itself provide an informative measure of fiscal discipline; yet, the above extension would (to the best of our knowledge) only be feasible on the basis of an isolated analysis of budgetary outcomes and not be compatible with a comparison of outcomes and plans.

For the institutional design of numerical expenditure rules the results from the disaggregated analysis of government spending imply a trade-off: on the one hand, extending the scope of the rules to non-discretionary spending items may be unnecessary and compliance would be more dependent on factors outside the control of policy-makers. On the other hand, transparency is likely to suffer from an exemption of certain aspects of government activity. This in turn would reinforce the policy-makers' information advantage over their electorate and creditors and thus undermine the primary purpose of numerical fiscal rules. Moreover, in the long term essentially all government spending can be influenced by policy-makers. Thus, diverting fiscal accountability away from certain spending items may introduce or reinforce a bias of fiscal policy towards the status quo. Vice versa, tying current governments' political track record to their success in achieving lasting fiscal adjustment (*e.g.* by lowering debt today and thus reducing future interest spending) may actually mitigate inter-temporal co-ordination failures in fiscal policy: governments will have a stronger incentive to implement reforms which yield benefits in periods beyond the current politicians' time horizon.

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Appendix

Table A 1: Alternative Measures for Public Sector Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Deviation Total Expenditure	*Deviation Primary Expenditure*	*Deviation Discretionary Expenditure*	*Deviation Total Expenditure*	*Deviation Primary Expenditure*	*Deviation Discretionary Expenditure*
Output Gap Surprise (OGS)	0.49**	0.51**	0.34***	0.46*	0.48**	0.34***
	(0.23)	(0.24)	(0.07)	(0.24)	(0.25)	(0.08)
(OGS)(Expenditure Rules Index)*	-0.25	-0.30*	-0.11***	-0.28*	-0.32*	-0.11**
	(0.16)	(0.16)	(0.04)	(0.16)	(0.17)	(0.04)
Government Debt (first lag)	0.07**	0.08***	0.02*	0.08**	0.09***	0.02*
	(0.03)	(0.03)	(0.01)	(0.03)	(0.03)	(0.01)
Total Government Revenue (first lag)	0.05	0.03	-0.01			
	(0.10)	(0.10)	(0.04)			
General Government budget balance (first lag)				0.08	0.06	-0.01
				(0.11)	(0.10)	(0.04)
Observations	145	145	139	145	145	139
Sargan/Hansen test of overidentifying restrictions (p-value)	0.36	0.62	0.93	0.38	0.64	0.94
Difference in Sargan/Hansen test for suspect instruments (p-value)	0.36	0.61	0.76	0.30	0.55	0.78
Difference in Sargan/Hansen test for endogenous regressor (p-value)	0.07	0.06	0.54	0.07	0.06	0.47
Kleinbergen-Paap rk Wald F-Statistic (Critical value Stock-Yogo weak identification test for 5% maximal IV relative bias: 11.4 and 10% maximal distortion of Wald test: 16.9)	29.6	29.6	29.7	32.5	32.5	33.7

Note: 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 ountries 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.

Table A 2: Controlling for initial size of LHS variable and denominator effect

	(1)	(2)	(3)	(4)	(5)
	Deviation Primary Expenditure	*Deviation Discretionary Expenditure*	*Deviation Total Expenditure*	*Deviation Primary Expenditure*	*Deviation Discretionary Expenditure*
Output Gap Surprise (OGS)	0.46*	0.34***	0.43*	0.46*	0.35***
	(0.25)	(0.08)	(0.24)	(0.24)	(0.07)
(OGS)(Expenditure Rules Index)*	-0.33**	-0.11***	-0.28*	-0.31*	-0.11***
	(0.16)	(0.04)	(0.17)	(0.17)	(0.04)
Government Debt (first lag)	0.09***	0.02*	0.07**	0.08***	0.02*
	(0.03)	(0.01)	(0.03)	(0.03)	(0.01)
Primary Government Spending (first lag)	-0.07				
	(0.11)				
Discretionary Government Spending (first lag)		-0.07			
		(0.13)			
Total Government Spending (first lag)			-0.04	-0.03	0.04
			(0.11)	(0.11)	(0.04)
GDP deflator			-0.01	-0.01	-0.06*
			(0.08)	(0.09)	(0.03)
Forecast Error in nominal GDP Growth			0.07	0.07	0.14*
			(0.16)	(0.17)	(0.08)
Observations	145	139	145	145	139
Sargan/Hansen test of overidentifying restrictions (p-value)	0.72	0.79	0.49	0.74	0.54
Difference in Sargan/Hansen test for suspect instruments (p-value)	0.54	0.68	0.31	0.57	0.65
Difference in Sargan/Hansen test for endogenous regressor (p-value)	0.10	0.32	0.09	0.07	0.14
Kleinbergen-Paap rk Wald F-Statistic (Critical value Stock-Yogo weak identification test for 5% maximal IV relative bias: 11.4 and 10% maximal distortion of Wald test: 16.9)	34.7	30.9	31.3	31.3	31.8

Note: 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 ountries 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.