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FISCAL RULES IN GOOD TIMES AND BAD

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ABSTRACT

I estimate fiscal reaction functions to analyze the cyclical behavior of discretionary measures in the euro area and the potential impact of changes in the fiscal framework. The core is to analyze whether fiscal rules have an asymmetric impact on discretionary measures over the cycle. First, results confirm the general perception that overall discretionary fiscal policy in the EMU is marginally procyclical. Procyclicality is, however, characterized by strong fiscal tightening in contractions while reactions in upturns are neutral. Second, fiscal rules marginally increase countercyclical policy responses in upturns, but strongly reinforce destabilizing procyclical polices in downturns. Interestingly, expenditure rules perform comparably better with regard to the stabilization objective than budget or debt rules.

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Fiscal Rules in Good Times and Bad

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Keywords. Fiscal rules, fiscal reaction function, fiscal cyclicality, debt sustainability, EMU

JEL classification. E6, H11, H6

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1 Introduction

Starting in the early 1990s, there has been a notable trend towards rules-based fiscal policy. According to the IMF Fiscal Rules Dataset (Schaechter et al. 2012; International Monetary Fund 2016), in 1990, only seven countries worldwide had fiscal rules implemented. By 2015, this number had increased to 92. The primary wave of implementations had already started before the financial crisis. Although the trend did not kick-start nor accelerate after the crisis, it has not come to a halt either. A similar picture emerges for Europe, where rules-based frameworks are a central part of fiscal policy nowadays. In line with the start of the trend in the 1990s, ideas of fiscal constraints found their way into the debate on the macroeconomic architecture of the European Monetary Union (EMU), resulting in the supranational rules agreed upon in the Maastricht Treaty (MT) and operationalized in the Stability and Growth Pact (SGP).

In the present paper, I estimate fiscal reaction functions for a panel of EMU member countries between 1985 to 2015 to analyze the behavior of fiscal policy over the business cycle in the euro area and the potential impact of changes in the respective budgetary framework. The central contribution is to analyze whether fiscal rules have an asymmetric impact on discretionary measures over the cycle. I do so by linking the novel IMF Fiscal Rules dataset (International Monetary Fund 2016; Schaechter et al. 2012) to a reaction function approach ala Galí and Perotti (2003), Candelon et al. (2009), and Huart (2012).

One important intention of fiscal rules is to restrict governments which, for various politico-economic reasons, could otherwise implement inadequate fiscal policies with negative effects on general welfare. The second objective is to allow and support short-term macroeconomic stabilization (Anderson and Minarik 2006). Findings in the empirical literature on the effects of fiscal policy on output show that short-run multipliers have been significantly underestimated in the past (Blanchard and Leigh 2013). The seminal work by Perotti (1999) emphasizes the importance to differentiate fiscal policy's effects between good and bad times as well as between measures on both side of the budget. Recent estimates show that multipliers are exceptionally high in recessions (Auerbach and Gorodnichenko 2012; Batini et al. 2012; Baum et al. 2012) and for shocks to public expenditures (Gechert 2015). These findings suggest that discretionary fiscal policy should play a more active role in counterbalancing business cycle fluctuations and accommodate monetary policy particularly when interest rates are at the effective lower bound. Accordingly, austerity reduces growth in the short-run and may increase public debt-to-GDP ratios in the medium- to long-run (Cottarelli and Jaramillo 2012; Furman 2016), because consolidation in recessions leads to output losses that may become persistent by lowering long-term potential output (Fatás and Summers 2018; Gechert et al. 2019). Countercyclical policy may thus turn out to be favorable to debt sustainability. The traditional trade-off between fiscal discipline and macroeconomic stabilization needs to be rethought. Against this background, the cyclical performance of budgetary rules is highly relevant for policymaking.

This paper asks, how discretionary fiscal policy behaves with regard to the output cycle in the euro area, and whether this relationship has been affected by the imple-

mentation and augmentation of fiscal rules. Fiscal policy is particularly important for EMU member countries because of the loss of other macroeconomic instruments for stabilization, namely national monetary policies and exchange rate adjustments. Therefore, cyclical behavior is central to the stability of the EMU as a whole. Furthermore, rules play a significant part in the fiscal framework within this group of countries.

Overall, discretionary fiscal policy in the EMU-11 over the sample period is marginally procyclical. However, the average policy is characterized by fiscal contractions in the downturn, while the reaction is neutral in the upturn. Further disaggregation shows that procyclicality is mainly determined by the discretionary reaction of public expenditures, not revenues. The effect of fiscal rules on cyclical behavior is rather limited. Fiscal rules somewhat increase countercyclical policy responses in the upturn, but at the cost of more destabilizing policies in the downturn. Interestingly, expenditure rules perform better concerning the stabilization objective compared to budget or debt rules.

The remainder of the paper is structured as follows. Section 2 takes a look at the related empirical literature on fiscal reaction functions. In section 3, I elaborate on the model and data before presenting baseline results for the cyclical behavior of fiscal policy in section 4. For robustness, in section 5 I discuss potential outliers driving the results. Section 6 integrates fiscal rules into the framework and section 7 evaluates their effect on the cyclical behavior of discretionary fiscal policy. Finally, section 8 draws some conclusions and discusses policy implications.

2 Related literature

Perotti and Gavin (1997) estimate fiscal reaction functions for Latin American countries. They find a procyclical bias for the overall budgetary balance in these countries, mainly driven by expansionary measures in good economic times and by changes to public expenditures. Talvi and Végh (2000) and Lane (2003) confirm the procyclical bias for a broader sample of developing countries and provide evidence that advanced countries tend to be more acyclical. In a similar vein, Kaminsky et al. (2004) find government spending in developing and "middle-high" income countries to be procyclical, while most OECD countries yield more acyclical or countercyclical results. More recently, Frankel et al. (2013) show, however, that around a third of developing countries graduated from procyclical fiscal policy over the past decade. Their results are driven by better institutional quality and show that stronger institutions have contributed to less procyclical bias. Fatás and Mihov (2006) are among the first to connect the empirical discussion directly to a broader set of fiscal rules. According to them, the presence of budgetary constraints in US states leads to more procyclical policy. Since Schaechter et al. (2012) have developed the IMF Fiscal Rules Dataset, more researchers have turned towards analyzing the effects of fiscal rules on cyclical properties between budgetary variables and economic activity.

Extending the analysis of Frankel et al. (2013), Bova et al. (2014) examine the link between fiscal rules and the cyclicality of public spending for the developing world. Contrary to Frankel et al. (2013), they find no graduation from procyclical policy in emerging and developing economies. Moreover, implementing fiscal rules did not eliminate the sys-

tematic procyclical bias of public spending in developing countries. However, they do find evidence for better performance of "second-generation fiscal rules" (Schaechter et al. 2012), characterized, for instance, by cyclically-adjusted targets or escape clauses. Consequently, fiscal rules should be accompanied by the implementation of more flexibility into the rules-based framework. Combes et al. (2017), on the contrary, confirm the finding that developing countries graduated from procyclicality, albeit the respective coefficient is much lower in size compared to advanced countries. For rules, Combes et al. (2017) find them to be rather effective and able to turn fiscal policy more countercyclical.

For Europe, the discussion mainly focused on the impact of the MT and the SGP on cyclicality. In their seminal contribution, Galí and Perotti (2003) analyze discretionary fiscal policy in the EMU and show that it was mildly procyclical before implementing the MT but has become more countercyclical since then. Their evidence is in stark contrast to fears by critics of the European fiscal framework at the time that the implemented constraints would reduce member states' ability to conduct effective stabilization policy. With a few years of additional data points, Dullien and Schwarzer (2009) confirm that the EMU as a whole moved from somewhat procyclical behavior before the SGP to an overall acyclical reaction in the period after. However, they make an individual country distinction and find that the cases under an European Commission excessive deficit procedure at the time, Germany and Portugal, became more procyclical. Therefore, they conclude that the SGP hinders countries to let their automatic stabilizers fully work. Furthermore, the authors conclude that the cyclical orientation of EMU countries shows the smallest stabilization motive compared to the United States and Japan.

Fatas and Mihov (2009) find discretionary fiscal policy somewhat procyclical in the euro area over a prolonged sample period (1970-2007). They conclude that the implementation of the SGP had no relevant impact on the cyclical reaction of fiscal policy. In an update of Galí and Perotti (2003) and in contrast to their results, Candelon et al. (2009) find that discretionary fiscal policy remained procyclical after the introduction of the MT and ratification of the SGP using revised data and an extended time dimension. Bénétrix and Lane (2013) evaluate cyclical patterns of fiscal policy regarding the subperiods pre-MT, post-MT until the launch of the Euro, and post-Euro launch up to the financial crisis, separately. In line with preceding evidence, they find a procyclical bias for the pre-MT period. Post-MT, fiscal authorities behaved more countercyclical during the transition to the agreed-upon targets. However, according to Bénétrix and Lane (2013) improved countercylicality remained temporary and has become more procyclical again since 1999. Huart (2012) analyzes the cyclical orientation of the fiscal stance for 18 OECD countries, concentrating on European countries over the period 1970 to 2007 and different sub-periods. She finds a countercyclical fiscal stance in bad economic times for countries of the euro area after 1999. In this study, there is no significant case for procyclicality after 1999, neither in bad nor in good times.

In sum, there is no clear-cut consensus among researchers about the cyclical orientation of fiscal policy in EMU countries since 1992 or the effects of supranational rules on governments' behavior. Empirical results differ according to their definition of economic conditions, the methodology employed, and the data vintage and samples used (Golinelli and Momigliano 2008).

3 Fiscal reaction function and data

Following Galí and Perotti (2003) (henceforth GP), I use a fixed-effects panel data analysis to investigate the behavior of discretionary fiscal policy concerning economic conditions in a systematic way empirically. The reason is essentially threefold. (i) Data for (cyclically-adjusted) fiscal variables is rather limited and leads to a low number of observations for the individual country analysis. This problem is reinforced due to the application of the IMF Fiscal Rules Dataset in section 6, which further constrains the available data to the period 1985 to 2015. (ii) Higher frequency data is rather problematic when analyzing fiscal policy reactions. Annual data has the advantage that it captures budgetary years more effectively (Checherita-Westphal and Žd'árek 2017). (iii) Concerning the euro area's political economy and stability, I am interested in the overall average reaction of fiscal policy.

In the most simple form, the model of our fiscal reaction function (FRF) reads

$$FP_{it} = \alpha_i + \beta Cycle_{it} + \epsilon_{it}, \tag{1}$$

where FP is an indicator for the fiscal stance and $Cycle$ a measure of the business cycle, subscripts $i = 1, ..., N$ denote the country- and $t = 1, ..., T$ the time-dimension of the observation. The coefficient α is a country-fixed effect and β a slope coefficient for the business cycle and thus captures the responsiveness of fiscal policy to cyclical conditions, finally ϵ represents an error term.

The simple model is extended to include fiscal sustainability concerns and policy dynamics. First, the lag of public debt D_{it-1} is added as a regressor to take a debt stabilization motive into account when the government sets up the budget (Bohn 1998). Second, to control for policy inertia, the lagged dependent variable FP_{it-1} is included (see GP). As a result, the augmented reaction function is of the form:

$$FP_{it} = \alpha_i + \beta Cycle_{it} + \gamma D_{it-1} + \delta FP_{it-1} + \epsilon_{it}. \tag{2}$$

In this paper, I am interested in the *discretionary* policy reaction of fiscal authorities. Therefore, one cannot use the headline budget balance for our measure of FP because changes include automatic fluctuations of budgetary components outside policymakers' direct control. When analyzing discretionary fiscal policy, identifying fiscal shocks that can be deemed truly exogenous is crucial since the actual budget is sensitive to cyclical conditions and, therefore, prone to endogeneity bias. I consider the change of the cyclically-adjusted primary balance (CAPB) or components thereof as our measure for the fiscal stance FP to deal with this issue. The CAPB is a top-down identified measure calculated by subtracting a cyclical component based on assumptions regarding budget elasticities and the output gap from headline budgetary figures.

An important caveat when estimating equation 2 is the endogeneity between the fiscal impulse and the cycle, as has been pointed out by GP or Jaimovich and Panizza (2007) among others. Therefore, the FRFs are estimated following an instrumental variable (IV)

approach.[1] The output gap is taken as proxy for $Cycle$. In line with GP, I instrument the output gap by each country's own lagged output gap and the lag of the US output gap. Note, the analysis focuses on ex-post fiscal policy outcomes and not real-time ex-ante budgetary plans. The latter's related question is whether policymakers intend to be countercyclical but lack full information of current cyclical conditions leading to procyclical policy. However, this paper is concerned with what has been the actual outcome of government policy and whether discretionary policy on average has been pro- or countercyclical. Most studies looking at ex-ante data find policy design to be rather countercyclical (see overview in Cimadomo 2016).

Regarding the interpretation of β in equation 2, if $\beta > 0$ the outcome displays countercyclical and if $\beta < 0$ procyclical discretionary fiscal policy. Assuming the government follows a long-term debt-stabilization target, the coefficient γ for the lag of the debt ratio is expected to be positive. One also expects some autocorrelation of budgetary decisions and, therefore, the coefficient δ of the lagged dependent variable to be positive.

A potential extension is to check for the asymmetry of fiscal reactions over the business cycle (Balassone et al. 2010; Agnello and Cimadomo 2009; Huart 2012). Thus, equation 2 is modified such that the cycle coefficient is allowed to vary for periods of economic contraction and expansion,

$$FP_{it} = \alpha_i + \beta^P Cycle_{it} * P_{it} + \beta^N Cycle_{it} * N_{it} + \gamma D_{it-1} + \delta FP_{it-1} + \epsilon_{it}, \tag{3}$$

where P represents positive (upturn) and N negative variations of the output gap (downturn). Thus, good economic times (P) are defined as $\Delta OG > 0$ and bad times (N) as $\Delta OG < 0$, where Δ indicates the change of the output gap in the given as compared to the previous year.

Furthermore, two additional controls are added to some specifications following Candelon et al. (2009) and Checherita-Westphal and Žd'árek (2017). First, I include an election dummy as a proxy for the political cycle turning to 1 in a federal election year.[2] The political economy rationale is to control for the possibility that governments overspend in election years to attract voters. Second, a crisis dummy, which is 1 from 2009 on for the effects of the financial crisis on fiscal policy, is added. As expected, throughout most of our econometric specifications, the latter is strong in magnitude, negative, and highly statistically significant.

Data for fiscal variables and the output gap are taken from the OECD Economic

[1] Considering the dynamic nature of our specification, the lag of the dependent variable as regressor will most likely be correlated with the error term, causing a bias. Nickell (1981) shows that the estimator's consistency depends upon the properties of the panel, arguing that with large T, the bias becomes less of an issue. Arellano and Bover (1995) proposed a GMM framework to increase the performance of dynamic panels as compared to using the simple within estimator. However, Harris and Matyas (2004) argue that the large instrument matrices of GMM can cause biased results if the sample size is finite (see also in Candelon et al. (2009)). Given the properties of our sample (small N, large T) and the ongoing debate in the econometric literature, I follow most of the recent studies on fiscal reaction functions and decide for the fixed effects IV estimator.

[2] In line with Checherita-Westphal and Žd'árek (2017), I use electionresources.org as our main source for the election year dummy and correct for missing and erroneous data.

Outlook (June 2017, No. 101) and are in percent of potential output.[3] That leaves me with an unbalanced panel for the EMU-11[4] countries from 1985 to 2015. In some rare cases, debt-to-GDP data is the shortest time series; therefore, I augment the OECD data on debt by the Historical Public Debt (HPDD) database of the IMF. The fact that the panel remains unbalanced comes from missing data on output gaps or cyclically-adjusted fiscal variables.

4 Baseline Results

Table 1 reports results of equation 2 and 3 for estimations of the full sample. The cyclically-adjusted primary balance reacts procyclically to the output gap, yet with rather low statistical significance (column (1)). The output gap coefficient does not change when the election year dummy is included; see column (2). However, the dynamics become much clearer when the effect of the business cycle is allowed to vary between good and bad economic conditions. While the discretionary reaction of fiscal policy is on average acyclical in good times for our EMU-11 panel, it is significantly procyclical in bad times (columns (3) and (4)). The remaining coefficients mainly yield expected results. The lagged dependent variable's effect is found to be positive and highly significant throughout the specifications, showing strong persistence in fiscal policy.

Regarding the response of fiscal policy to the lag of the debt ratio, our results show a small but significant debt-stabilization motive, coefficient of around 0.03, very much in line with recent results in the respective FRF literature concentrating on this relationship (see overview in Checherita-Westphal and Žd'árek 2017: 23-25). The election dummy is found to be negative, as expected, but not statistically different from zero. Therefore, its inclusion has only a minimal effect on the remaining coefficients. Here in the form of the crisis dummy, the financial crisis had a statistically significant negative effect on the cyclically-adjusted budget balance, which is also high in magnitude.

Next, I disaggregate the CAPB into cyclically-adjusted primary expenditures (CAPEXP) and cyclically-adjusted revenues (CAREV), for which there is both data available by the OECD[5], and use them as a proxy for FP in the FRFs respectively. Results for this exercise are presented in Table 2. Importantly, the sign interpretation of the reaction coefficient for the cyclical behavior β and the debt-stabilization motive γ changes in the case of CAPEXP, simply because of $CAPB = CAPREV - CAPEXP$. If $\beta > 0$, discretionary expenditures behave procyclically, otherwise countercyclically. Column (1) shows that CAPEXP reacts systematically procyclical to the business cycle. Splitting

[3] I check for stationarity of our data by panel unit root tests. The null of a unit root for the CAPB and output gap is rejected using the LLC (Levin et al. 2002) and IPS (Im et al. 2003) tests. For the debt ratio, the LLC and IPS show ambiguous results. However, Bohn (1998) argues that unit root tests for the debt ratio fail to detect its mean revision because of its high persistence and the fact that the public balance reacts positively to increasing debt (also shown by our results in section 4) satisfies the intertemporal budget constraint (see also Favero and Marcellino (2005)). Moreover, Checherita-Westphal and Žd'árek (2017) point out that the problem of non-stationarity is less critical in panel data settings.

[4] Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain.

[5] See Girouard and André (2005) for methodological background on the calculation of this data.

Table 1: FRFs – The cyclical reaction of discretionary fiscal policy in the EMU

	Dependent Variable: CAPB			
	(1)	(2)	(3)	(4)
OG	-0.157^{*}	-0.158^{*}		
	(0.083)	(0.083)		
$OG * bad$			-0.330^{***}	-0.332^{***}
			(0.094)	(0.093)
$OG * good$			-0.103	-0.104
			(0.120)	(0.121)
D_{t-1}	0.032^{***}	0.032^{***}	0.033^{***}	0.033^{***}
	(0.010)	(0.010)	(0.010)	(0.010)
FP_{t-1}	0.620^{***}	0.620^{***}	0.622^{***}	0.621^{***}
	(0.031)	(0.032)	(0.033)	(0.033)
$Election$		-0.303		-0.304
		(0.230)		(0.230)
$Crisis\ Dummy$	-1.506^{***}	-1.511^{***}	-1.804^{***}	-1.810^{***}
	(0.436)	(0.437)	(0.557)	(0.559)
Observations	315	315	315	315
Adjusted R^2	0.534	0.535	0.534	0.535

Notes: Fixed effects IV panel estimates of equations 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$ shows coefficient is statistically significant at 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxy for FP is the cyclically-adjusted primary balance $CAPB$, OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add a crisis dummy and in (2) and (4) Election is a dummy variable which signals 1 *in an election year.*

the business cycle's reaction up into positive and negative variations of the output gap, columns (3) and (4) yield results economically similar to our CAPB estimates above. The procyclical reaction is mainly driven by fiscal tightening in recessionary periods. This implies additional destabilization from fiscal policy during downturns. Behavior in the upturn is also slightly procyclical, but the reaction coefficient has rather low statistical significance. Again, I find a positive debt-stabilization motive, however, on a somewhat lower level than the estimations with CAPB. The effect of the lagged dependent variable is higher, indicating strong policy inertia in case of primary expenditures. Results remain robust when the dummy for an election year is included in the specification. However, compared to our CAPB estimates, an election year has a significant influence on expenditures (see column (2) and (4)).

Regarding the revenue side of the budget, the response of CAREV is acyclical (column (5) and (6)). Nonetheless, conditioning on contractionary economic phases also shows procyclicality for discretionary changes to revenues, similar to the expenditure side. Thus, the overall effect is slightly neutralized by the asymmetric reaction of revenues, column (7), and (8). There is no relationship between the lag of public debt and contemporaneous changes in cyclically-adjusted revenues.

In sum, the marginally systematic procyclical reaction of discretionary fiscal policy

is mainly determined by budgetary tightening in the business cycle's downturn and, to a more considerable extent, by changes in public expenditures. However, these relationships stretch over the whole time dimension of the sample. There might be severe heterogeneities between different countries and sub-periods, which, as has been described above, include substantial underlying changes to fiscal frameworks and implementation of various rules-based constraints, on national and supranational levels, throughout the euro area.

Table 2: FRF: Disaggregating the CAPB in CAPEXP and CAREV

	Dependent variable:							
	CAPEXP				CAREV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OG	0.112***	0.113***			−0.007	−0.008		
	(0.025)	(0.025)			(0.030)	(0.030)		
OG ∗ *bad*			0.166***	0.168***			−0.115***	−0.116***
			(0.026)	(0.025)			(0.044)	(0.045)
OG ∗ *good*			0.063*	0.064*			0.029	0.028
			(0.034)	(0.034)			(0.026)	(0.026)
D_{t-1}	−0.013**	−0.013**	−0.015**	−0.015**	−0.0004	−0.001	0.001	0.0004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
FP_{t-1}	0.946***	0.944***	0.952***	0.950***	0.876***	0.878***	0.868***	0.869***
	(0.029)	(0.029)	(0.029)	(0.029)	(0.025)	(0.025)	(0.025)	(0.025)
Election		0.273***		0.271***		−0.201**		−0.200**
		(0.054)		(0.056)		(0.082)		(0.084)
Crisis Dummy	0.640***	0.646***	0.700***	0.707***	0.279*	0.278*	0.088	0.086
	(0.175)	(0.175)	(0.188)	(0.187)	(0.143)	(0.143)	(0.182)	(0.183)
Observations	315	315	315	315	315	315	315	315
Adjusted R^2	0.900	0.901	0.900	0.902	0.795	0.796	0.802	0.803

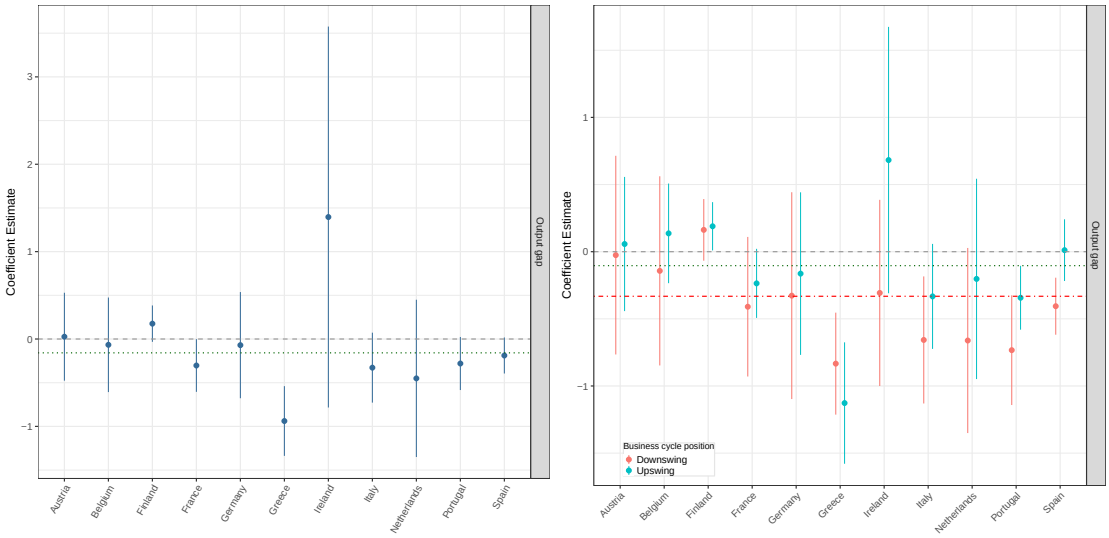
*Notes: Fixed effects IV panel estimates of equations 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. *p<0.1; **p<0.05; ***p<0.01 shows coefficient is statistically significant at 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxies for FP are cyclically-adjusted primary expenditures CAPEXP (1)-(4) and cyclically-adjusted revenues CAREV (5)-(8), OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add a crisis dummy and in (2) and (4) Election is a dummy variable which is* 1 *in an election year.*

5 Heterogeneity

Next, potential heterogeneities of the country-dimension with CAPB as the dependent variable are discussed along two paths, (i) individual country estimations and (ii) potential outlier countries driving the overall panel results. For brevity, the analysis will concentrate on the output gap coefficients.

(i) Figure 1 shows individual country estimations of the baseline and asymmetric FRF. Note that I choose the panel approach due to data availability problems – with a maximum of 30 observations per country and seven or eight parameters to estimate the results for individual states should be treated carefully. Consequently, for some countries, I find

Figure 1: Individual country analysis – Output gap coefficient



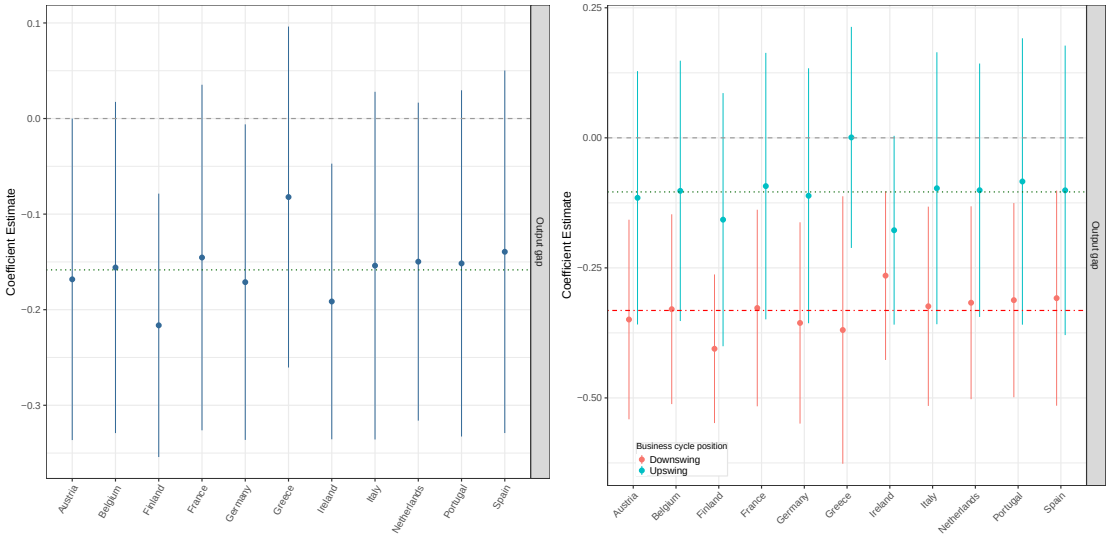
(a) Baseline (b) Asymmetry

Notes: 1a shows output gap coefficients for estimations of $FP_t = \alpha + \beta Cycle_t + \gamma D_{t-1} + \delta FP_{t-1} + \epsilon_t$ *and 1b for* $FP_t = \alpha + \beta^P Cycle_t * P_t + \beta^N Cycle_t * N_t + \gamma D_{t-1} + \delta FP_{t-1} + \epsilon_t$*, estimating each country individually. The dependent variable is CAPB. The election and crisis dummy are included. Dots indicate the point estimate of the respective country estimation and vertical whiskers around represent 95% confidence intervals. For comparison, in 1a the dotted green line marks the baseline panel point estimate of* β *and in 1b it shows* β^P*. Consequently, the dotted-dashed red line represents* β^N *of the baseline panel estimates.*

rather large confidence intervals. However, even though there is a fair amount of heterogeneity observable, only Finland and Greece yield estimates statistically significantly different from the baseline (Figure 1a). Finland – often referred to as a poster child of public policy – is the only country which shows robustly countercyclical policy. On the contrary, Greece is more strongly procyclical compared to other countries in the sample. The divergence from baseline for Greece is especially pronounced in expansionary phases of the cycle (Figure 1b) but not constrained to them. Also, in economic contractions, Greece implements, on average, strongly procyclical discretionary policies. Italy, the Netherlands, and Portugal are also candidates with noticeably lower point estimates, but mainly for Greece, these are statistically significantly different from baseline. Portugal, in the upswing, shows borderline significantly different results towards higher procyclicality as well.

(ii) As a mirror image, one can analyze whether these outliers significantly drive our baseline panel results. Accordingly, Figure 2 compares results for output gap coefficients of the basic and asymmetric model wherein each case one country is *dropped* from the full sample. 2a shows that the omission of Finland, Ireland, and Greece changes the results most distinctively. Nonetheless, in none of the specifications, the output gap coefficient is statistically significantly different from baseline, indicating robust results against potential outliers. While Greece seems to drive the baseline results more towards

Figure 2: Outlier analysis – Output gap coefficient



(a) Baseline

(b) Asymmetry

Notes: Figures 2a and 2b show dot-whisker plots for output gap coefficient estimates of different fixed-effect panel estimations of equations 2 and 3, respectively, where each dot-whisker denotes a panel model with the respective country being dropped (!) from the sample. The dependent variable is CAPB. The election and crisis dummy are included. Dots indicate the point estimate of the respective panel model and vertical whiskers around represent 95% confidence intervals. For comparison, in 2a the dotted green line marks the baseline panel point estimate of β and in 2b it shows β^P. Consequently, the dotted-dashed red line represents β^N of the baseline estimates.

procyclicality, Finland and Ireland perform comparatively better in cyclical behavior. 2b presents how the omission of countries change our panel results for the output gap reaction when it is allowed to vary between contractionary and expansionary phases of the cycle. Again, for both cases, there is no specification with significantly different results. There is evidence of Finland making results in the downturn generally more countercyclical, whereas Greece pulls the OG coefficient in the upturn towards more procyclicality.

6 Extended model and fiscal rules

In this section, I extend the model from section 3 to analyze the effects of changes to fiscal frameworks within our sample of countries. Therefore, the intercept and covariates' slope coefficients are allowed to vary between periods with and without different fiscal rules and are then estimated simultaneously.

Following the approach by GP, I specify

$$\begin{aligned} FP_{it} = \alpha_i^{BR} + \alpha_i^{AR} \\ + \beta^{BR} Cycle_{it} + \beta^{AR} Cycle_{it} \\ + \gamma^{BR} D_{it-1} + \gamma^{AR} D_{it-1} \\ + \delta^{BR} FP_{it-1} + \delta^{AR} FP_{it-1} + \epsilon_{it}, \end{aligned} \tag{4}$$

where BR signals the period without and AR with the respective fiscal rule in force. Thus, the β coefficients capture the discretionary fiscal policy's reaction to the cycle for different sub-periods. Similarly, the remaining coefficients for the lag of public debt, the lag of the dependent variable, and the election dummy are allowed to vary. Additionally, the model allows for shifts of the fixed-effects, represented by the α coefficients. In line with Candelon et al. (2009), I perform simple F-tests on the hypothesis that the respective coefficient has not changed between BR and AR (e.g., $\beta^{BR} = \beta^{AR}$). Even though the election year had a limited role in our baseline results, it remains in our estimations below as a proxy for political risk given that fiscal rules aim to automatize budgetary decisions and thereby reduce procyclicality especially in the upturn[6].

An important caveat of the analysis is that one only controls for a rule's existence, not for its compliance. Also, the included breakpoints are motivated exogenously by the fact that a fiscal rule comes into place.The potential breakpoints are not determined endogenously by the data. The reason is that I am interested as to whether a fiscal rule affected how policy behaved over the cycle ex-post.

Regarding information on different fiscal rules in the sample, the analysis relies entirely on the IMF Fiscal Rules Dataset (International Monetary Fund 2016). I use the information as to whether a specific design type of a fiscal rule is in force or not. The dataset includes dummy variables with 1, indicating that a particular rule is implemented. Generally, there are four design types – balanced budget, debt, expenditure and revenue rules, each named after the budgetary aggregate they target[7]. Accordingly, results for FRFs with a structural break if the country has implemented a budget balance rule (BBR), a debt rule (DR) or an expenditure rule (ER) are presented (Table 3). The EMU-11 sample has very little observations for revenue rules, which are therefore omitted from the analysis. Note that the correlation coefficient between budget and

[6]Given the limited space, I do not show results for estimations excluding the election dummy. However, results for other covariates are very robust to the exclusion of the election and crisis dummy. Results can be obtained upon request.

[7]A summarised description on what is included in the database is given by Bova et al. (2014: 5): "The database includes all rules with specific numerical targets fixed in legislation and arrangements for which the targets can be revised but are binding for a minimum of three years. [..] The database only includes de jure arrangements and does not consider the de facto compliance with the rule. According to the aggregate targeted, rules classify as debt rules, budget balance rules, expenditure rules, or revenue rules. Debt rules set an explicit limit or target for public debt in percent of GDP. Budget balance rules set a limit on the overall balance (including or net of capital expenditures), the structural or cyclically-adjusted balance, or the balance "over the cycle". Expenditure rules set limits on total, primary, or current spending, while revenue rules set ceilings on revenues and specify how unanticipated revenues should be allocated."

debt rules in the sample is very high ($\rho = 0.94$), signaling that these two design types are mostly introduced simultaneously.

Moreover, the European supranational rules set in the MT and SGP are essentially budget and debt rules, which is for most countries in the IMF database the years 1992 or 1995 and therefore drive results for these design types (Table 3). Only a small number of additional national budget and debt rules cause differences in results. Table 6 presents estimates for the supranational framework.

7 Effects of rules-based constraints on cyclical behavior

Table 3 shows estimates for equation 4 and variations of it in line with the asymmetric model in section 3. I find the discretionary fiscal policy to be disconnected from the business cycle before the implementation of all rule types. In contrast, the output gap's coefficient becomes marginally statistically significant when budget and debt rules are implemented, signaling slightly more procyclical policies. However, the estimates for the output gap coefficient before and after implementation of both design types are not statistically different. Given the high correlation between implementing budget and debt rules in our sample, the results are very similar. In the specification allowing an asymmetric reaction of the output gap (column (2) and (4)), fiscal policy has, on average, a stabilizing influence on the cycle in contractions without budget and debt rules in place; this effect is only weakly statistically significant and somewhat higher for budget than for debt rules. However, in the period after implementation of these two rule types, fiscal policy is found to be significantly procyclical and thus systematically exacerbating the downturn. With 0.4, the point estimate is also comparatively high in magnitude and statistically different from the period's coefficient without a budget and debt rule implemented.

In contrast, in the business cycle upturn, discretionary fiscal policy is found to be somewhat expansionary, thus procyclical. The coefficient is statistically significant without budget and debt rules but becomes effectively disconnected from economic fluctuations afterward. However, the estimates are very similar – -0.14^{**} before versus -0.13 afterward for *BBR*, and -0.15^{***} before versus -0.12 afterward for *DR*(Table 3). Therefore, concerning the effects of budget and debt rules on discretionary fiscal policy's cyclical behavior, there seems to be a trade-off according to our results. While it may be argued that the deficit bias in the economic expansion can be marginally attenuated with these rules, it comes at the cost of strongly more procyclical fiscal tightening in economic contractions.

Interestingly, the results differ for expenditure rules. The response of discretionary fiscal policy to the output gap shows no significant effect before and after implementing expenditure rules (column (5)). But, the picture changes when asymmetry regarding the cyclical position is included in the specification. The response is procyclical without expenditure rules, but the estimate becomes substantially more countercyclical after their implementation – turning to be effectively acyclical. Besides, while policy becomes more countercyclical in the downturn with expenditure rules, the estimate for the coefficient of lagged debt remains positive and even increases in magnitude.

Table 3: FRF: CAPB – Different fiscal rule types

	Dependent Variable: CAPB											
	BBR				DR				ER			
	(1)	BR=AR p-value	(2)	BR=AR p-value	(3)	BR=AR p-value	(4)	BR=AR p-value	(5)	BR=AR p-value	(6)	BR=AR p-value
OG^{BR}	−0.063				−0.081				−0.132			
	(0.067)				(0.061)				(0.121)			
OG^{AR}	−0.196*	0.228			−0.191*	0.338			−0.103	0.815		
	(0.101)				(0.106)				(0.102)			
$OG^{BR} * bad$			0.111**				0.089*				−0.408**	
			(0.053)				(0.051)				(0.163)	
$OG^{AR} * bad$			−0.395***	0.000			−0.392***	0.000			−0.130	0.051
			(0.059)				(0.060)				(0.112)	
$OG^{BR} * good$			−0.136**				−0.154***				−0.015	
			(0.059)				(0.054)				(0.141)	
$OG^{AR} * good$			−0.127	0.957			−0.118	0.831			−0.149	0.460
			(0.157)				(0.164)				(0.138)	
D^{BR}_{t-1}	−0.005		−0.012		−0.003		−0.009		0.033**		0.033**	
	(0.016)		(0.013)		(0.016)		(0.013)		(0.016)		(0.014)	
D^{AR}_{t-1}	0.035***	0.047	0.036***	0.011	0.036***	0.060	0.036***	0.014	0.042***	0.500	0.041**	0.556
	(0.012)		(0.011)		(0.013)		(0.012)		(0.012)		(0.016)	
FP^{BR}_{t-1}	0.691***		0.587***		0.759***		0.660***		0.674***		0.676***	
	(0.149)		(0.112)		(0.142)		(0.121)		(0.068)		(0.062)	
FP^{AR}_{t-1}	0.566***	0.382	0.567***	0.849	0.566***	0.154	0.567***	0.420	0.286***	0.000	0.274***	0.000
	(0.021)		(0.028)		(0.021)		(0.027)		(0.061)		(0.067)	
$Election^{BR}$	−1.017**		−0.982***		−1.077***		−1.021***		−0.218		−0.221	
	(0.394)		(0.349)		(0.357)		(0.317)		(0.369)		(0.350)	
$Election^{AR}$	−0.184	0.112	−0.193	0.095	−0.163	0.065	−0.167	0.056	−0.165	0.883	−0.163	0.869
	(0.270)		(0.267)		(0.277)		(0.276)		(0.159)		(0.160)	
Crisis Dummy	−1.927***		−2.275***		−1.915***		−2.264***		−2.121***		−2.276***	
	(0.377)		(0.481)		(0.382)		(0.485)		(0.702)		(0.773)	
Observations	315		315		315		315		315		315	
Adjusted R^2	0.536		0.541		0.534		0.540		0.554		0.548	

*Notes: Fixed effects IV panel estimates of fiscal reaction functions 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. *p<0.1; **p<0.05; ***p<0.01 shows coefficient is statistically significant at the 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxy for FP is the cyclically-adjusted primary balance CAPB, OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add an crisis dummy and in (2) and (4) Election is a dummy variable which signals 1 in an election year. BR restricts the effect to periods without and AR with the respective fiscal rule in force. We analyze balanced-budget rules (BBR), debt rules (DR) and expenditure rules (ER).*

In contrast, the implementation of budget and debt rules effectively increases the debt stabilization motive of discretionary fiscal policy, but, as pointed out above, simultaneously increases the destabilizing character of fiscal policy with regard to the output cycle in recessionary times. Note that our estimates for the lag of public debt regarding the AR cases are in line with recent findings by Checherita-Westphal and Žd'árek (2017). When it comes to the influence of an election year on fiscal policy, I find that election years have a statistically significant adverse effect on the budget balance without budget and debt rules. After the use of fiscal rules, however, this statistical significance vanishes.

Now I turn again to cyclically-adjusted primary expenditures and revenues to investigate the potential effects of different fiscal rule types on fiscal policy's budgetary components. First, Table 4 presents results for CAPEXP. Column (1) shows that the implementation of budget rules comes with no change in the reaction to the business cycle (coefficients OG^{BR} and OG^{AR}), which, however, is markedly statistically significant and economically procyclical. Allowing the reaction to vary across cycle regimes shows that procyclicality is determined by fiscal tightening in the downturn (column(2)), again with no substantial changes between the with- and without-rule period. The estimate's magnitude slightly decreases from 0.26 to 0.15 but is not statistically significantly different from each other. The coefficient for the upturn yields acyclical results throughout the whole sample with no effect of fiscal rules on the cyclical behavior of discretionary changes to expenditures. As discussed above, given the parallel nature of implementing budget and debt rules in our sample, the results of columns (3) and (4) are very similar to columns (1) and (2). However, examining expenditure rules shows different results again; see columns (5) and (6) of Table 4. In countries and periods without an expenditure rule in place, fiscal policy is found to be systematically procyclical, but the estimate switches sign when an ER is implemented. Even though the coefficient remains statistically insignificant and should therefore be interpreted as an acyclical reaction to the business cycle in this model framework, an expenditure rule in force makes discretionary changes of public expenditures effectively more countercyclical than in the period without it. Looking at column (6) shows that the output gap's effect is procyclical in the up- and downturn without expenditure rule in place. With an ER, discretionary policy turns neutral in the downturn, as found for the general reaction. Importantly, in the upturn, the coefficient also changes its sign and even becomes marginally statistically significant. Accordingly, expenditure rules seem to be most efficient in containing governments in the boom phase of the cycle while being less restrictive in the downturn than other design types.

What about the reaction of cyclically-adjusted revenues? The response of CAREV to the output gap is countercyclical and highly significant without a budget or debt rule implemented and only becomes marginally procyclical in countries and periods with these rules constraining fiscal policy, see Table 5 columns (1) and (3). The result is mainly determined by the reaction in bad economic times, as columns (2) and (4) show. In times of no budget rule in force, the coefficient is 0.29 and statistically significant. With it, the reaction coefficient becomes -0.19, again strongly statistically significant and different from the BR-case. A similar picture is found in the case of debt rules.

Contrary to the results for overall CAPB and CAPEXP, discretionary revenue-side

Table 4: FRFs – CAPEXP: Different fiscal rule types

	Dependent Variable: CAPEXP											
	BBR				DR				ER			
	(1)	BR=AR p-value	(2)	BR=AR p-value	(3)	BR=AR p-value	(4)	BR=AR p-value	(5)	BR=AR p-value	(6)	BR=AR p-value
OG^{BR}	0.108***				0.109***				0.134***			
	(0.037)				(0.034)				(0.025)			
OG^{AR}	0.106***	0.972			0.106**	0.948			−0.109	0.003		
	(0.040)				(0.041)				(0.089)			
$OG^{BR} * bad$			0.260***				0.264***				0.171***	
			(0.050)				(0.048)				(0.021)	
$OG^{AR} * bad$			0.154***	0.114			0.154***	0.098			−0.036	0.024
			(0.042)				(0.043)				(0.086)	
$OG^{BR} * good$			0.031				0.038				0.097***	
			(0.062)				(0.061)				(0.036)	
$OG^{AR} * good$			0.059	0.714			0.055	0.828			−0.177*	0.004
			(0.048)				(0.049)				(0.106)	
D^{BR}_{t-1}	−0.032		−0.045		−0.032		−0.044		−0.018**		−0.019**	
	(0.024)		(0.042)		(0.024)		(0.041)		(0.007)		(0.008)	
D^{AR}_{t-1}	−0.014*	0.450	−0.016**	0.469	−0.014*	0.436	−0.016**	0.468	−0.010	0.409	−0.017***	0.825
	(0.008)		(0.007)		(0.008)		(0.007)		(0.008)		(0.006)	
FP^{BR}_{t-1}	1.040***		1.124***		1.041***		1.126***		0.981***		0.981***	
	(0.127)		(0.157)		(0.124)		(0.160)		(0.034)		(0.034)	
FP^{AR}_{t-1}	0.924***	0.385	0.930***	0.232	0.925***	0.375	0.931***	0.238	0.776***	0.000	0.789***	0.000
	(0.036)		(0.036)		(0.036)		(0.036)		(0.041)		(0.043)	
$Election^{BR}$	0.461		0.459*		0.509*		0.532**		0.233**		0.234***	
	(0.286)		(0.267)		(0.261)		(0.259)		(0.090)		(0.088)	
$Election^{AR}$	0.250***	0.529	0.251***	0.504	0.233***	0.370	0.232***	0.313	0.187**	0.772	0.185**	0.737
	(0.074)		(0.072)		(0.071)		(0.067)		(0.094)		(0.078)	
Crisis Dummy	0.746***		0.795***		0.741***		0.789***		0.743***		0.781***	
	(0.232)		(0.249)		(0.232)		(0.250)		(0.216)		(0.205)	
Observations	315		315		315		315		315		315	
Adjusted R^2	0.905		0.905		0.904		0.904		0.914		0.915	

Note: *p<0.1; **p<0.05; ***p<0.01

*Notes: Fixed effects IV panel estimates of fiscal reaction functions 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. *p<0.1; **p<0.05; ***p<0.01 shows coefficient is statistically significant at the 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxy for FP is the cyclically-adjusted primary balance CAPEXP, OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add an crisis dummy and in (2) and (4) Election is a dummy variable which signals 1 in an election year. BR restricts the effect to periods without and AR with the respective fiscal rule in force. We analyze balanced-budget rules (BBR), debt rules (DR) and expenditure rules (ER).*

Table 5: FRFs – CAREV: Different fiscal rule types

	Dependent Variable: CAREV											
	BBR				DR				ER			
	(1)	BR=AR p-value	(2)	BR=AR p-value	(3)	BR=AR p-value	(4)	BR=AR p-value	(5)	BR=AR p-value	(6)	BR=AR p-value
OG^{BR}	0.093***				0.089***				0.030			
	(0.026)				(0.025)				(0.029)			
OG^{AR}	−0.060*	0.001			−0.064**	0.001			−0.168*	0.027		
	(0.031)				(0.031)				(0.089)			
$OG^{BR} * bad$			0.286***				0.274***				−0.050	
			(0.041)				(0.030)				(0.064)	
$OG^{AR} * bad$			−0.188***	0.000			−0.192***	0.000			−0.247***	0.008
			(0.054)				(0.056)				(0.088)	
$OG^{BR} * good$			0.020				0.024				0.061*	
			(0.026)				(0.023)				(0.034)	
$OG^{AR} * good$			−0.008	0.270			−0.012	0.151			−0.155	0.090
			(0.027)				(0.028)				(0.105)	
D^{BR}_{t-1}	0.006		0.002		0.007		0.004		0.005		0.006	
	(0.005)		(0.013)		(0.005)		(0.012)		(0.010)		(0.009)	
D^{AR}_{t-1}	−0.001	0.394	0.0001	0.892	−0.002	0.338	−0.001	0.751	−0.003	0.345	0.0004	0.546
	(0.007)		(0.008)		(0.007)		(0.008)		(0.007)		(0.009)	
FP^{BR}_{t-1}	0.823***		0.914***		0.809***		0.893***		0.812***		0.803***	
	(0.112)		(0.131)		(0.112)		(0.135)		(0.034)		(0.037)	
FP^{AR}_{t-1}	0.812***	0.931	0.809***	0.480	0.813***	0.970	0.811***	0.590	0.620***	0.003	0.626***	0.006
	(0.044)		(0.040)		(0.043)		(0.038)		(0.061)		(0.069)	
$Election^{BR}$	−0.404		−0.439		−0.454		−0.469		−0.202		−0.202	
	(0.326)		(0.343)		(0.291)		(0.301)		(0.131)		(0.126)	
$Election^{AR}$	−0.126	0.436	−0.132	0.394	−0.106	0.285	−0.108	0.262	−0.177**	0.883	−0.180*	0.893
	(0.089)		(0.090)		(0.093)		(0.092)		(0.087)		(0.094)	
Crisis Dummy	0.165		−0.055		0.155		−0.065		0.152		0.045	
	(0.159)		(0.196)		(0.161)		(0.199)		(0.218)		(0.237)	
Observations	315		315		315		315		315		315	
Adjusted R^2	0.802		0.807		0.802		0.807		0.815		0.815	

*Notes: Fixed effects IV panel estimates of fiscal reaction functions 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. *p<0.1; **p<0.05; ***p<0.01 shows coefficient is statistically significant at the 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxy for FP is the cyclically-adjusted primary balance CAREV, OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add an crisis dummy and in (2) and (4) Election is a dummy variable which signals 1 in an election year. BR restricts the effect to periods without and AR with the respective fiscal rule in force. We analyze balanced-budget rules (BBR), debt rules (DR) and expenditure rules (ER).*

measures behave more procyclical with expenditure rules in action. Mainly because *ERs* do not protect from tax increases in the downturn. Discretionary revenues react comparatively more procyclical in the upturn as well. However, the coefficient remains statistically insignificant, with policy being effectively acyclical in the expenditure rule case.

Finally, I look at the EU supranational rules separately, Table 6 shows results for fiscal reaction functions when allowing the effects to vary between before and after the introduction of the MT and operationalization of the SGP again with CAPB as the dependent variable. These specifications allow us to compare our estimations to similar studies such as Galí and Perotti (2003), Candelon et al. (2009) or Bénétrix and Lane (2013). I have a prolonged dataset and revised data on cyclical conditions. Columns (1) and (2) present estimations where the structural break is motivated by the MT[8]. In line with the previous literature, I find the discretionary fiscal intervention to be procyclical before 1992. The estimate of the output gap turns statistically insignificant for the post-MT period. Thus policy becomes slightly more countercyclical, being effectively neutral to the cycle, the same result GP find. Contrary to Bénétrix and Lane (2013), the increase in countercyclicality after 1992 is not found to be statistically significant for our sample. While the discretionary policy does become more stabilizing post-MT, the sign of the coefficient does not change, in contrast to GP but in line with Candelon et al. (2009), who also investigate a prolonged post-MT sample compared to GP. Nonetheless, our cyclicality coefficient does not remain significantly different from zero compared to Candelon et al. (2009). In the specification controlling for the state of the cycle (column (2)), fiscal policy intervenes systematically procyclical in the up- and downturn pre-MT, however, only marginally statistically significant in recessionary periods. About the post-MT period, the expansionary policy in the upturn disappears, pointing to a potentially stricter constraint for governments to overspend or reduce taxes under favorable economic conditions due to the fiscal framework. In contrast, the output gap coefficient remains statistically significantly procyclical in bad economic times with an effect size slightly higher in magnitude (-0.316) than pre-MT (-0.275). Very much in line with Candelon et al. (2009), the election year has a substantial and significant effect on discretionary fiscal policy pre-MT but not post-MT, and the coefficient for lagged debt halves from around 0.08 pre-MT to 0.04 post-MT. The F-tests show that debt stabilization was significantly less pronounced after MT, and the proxy for political risk signals an increased automatization of fiscal policy.

In columns (3) and (4), the pre-SGP and post-SGP periods are investigated similarly. The output gap coefficients yield estimates insignificantly different from zero and, therefore, acyclical over the whole time horizon. Compared to the MT specification, I find some evidence for the argument that the time between the signing of MT and the start of the SGP in 1999 is marked by countries' consolidation of public finances towards reaching the agreed-upon targets. This transition period was accompanied by a gen-

[8]Even though the Maastricht Treaty became effective in 1993, I follow the related literature and determine 1992 as the starting year for the MT dummy, considering the negotiations were already finished in 1991.

Table 6: FRF: CAPB – Supranational fiscal rules

	Dependent Variable: CAPB							
	MT				SGP			
	(1)	BR=AR p-value	(2)	BR=AR p-value	(3)	BR=AR p-value	(4)	BR=AR p-value
OG^{BR}	-0.221^{***}				-0.036			
	(0.038)				(0.085)			
OG^{AR}	-0.146	0.544			-0.141	0.530		
	(0.113)				(0.152)			
$OG^{BR} * bad$			-0.275^{*}				-0.007	
			(0.150)				(0.099)	
$OG^{AR} * bad$			-0.316^{***}	0.854			-0.337^{***}	0.000
			(0.092)				(0.059)	
$OG^{BR} * good$			-0.197^{***}				-0.071	
			(0.046)				(0.095)	
$OG^{AR} * good$			-0.078	0.459			-0.052	0.935
			(0.162)				(0.229)	
D_{t-1}^{BR}	0.077^{***}		0.076^{***}		0.045^{***}		0.043^{***}	
	(0.023)		(0.019)		(0.010)		(0.011)	
D_{t-1}^{AR}	0.038^{***}	0.119	0.040^{***}	0.085	0.048^{***}	0.892	0.052^{***}	0.663
	(0.013)		(0.013)		(0.015)		(0.015)	
FP_{t-1}^{BR}	0.468^{***}		0.487^{***}		0.610^{***}		0.612^{***}	
	(0.133)		(0.138)		(0.120)		(0.122)	
FP_{t-1}^{AR}	0.583^{***}	0.395	0.588^{***}	0.456	0.549^{***}	0.617	0.552^{***}	0.641
	(0.030)		(0.029)		(0.024)		(0.038)	
$Election^{BR}$	-1.103^{***}		-1.119^{**}		-0.506^{**}		-0.513^{**}	
	(0.414)		(0.455)		(0.196)		(0.202)	
$Election^{AR}$	-0.130	0.071	-0.124	0.084	-0.151	0.376	-0.144	
	(0.263)		(0.266)		(0.322)		(0.326)	0.349
Crisis Dummy	-1.713^{***}		-1.991^{***}		-1.985^{***}		-2.363^{***}	
	(0.432)		(0.531)		(0.529)		(0.589)	
Observations	315		315		315		315	
Adjusted R^2	0.529		0.530		0.536		0.546	

Notes: Fixed effects IV panel estimates of fiscal reaction functions 2 and 3 for EMU-11 from 1985-2015. Robust standard errors are reported in parenthesis. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$ shows coefficient is statistically significant at the 10%, 5% and 1%, respectively. The coefficients for fixed effects are not reported. The proxy for FP is the cyclically-adjusted primary balance $CAPB$, OG is the output gap in year t instrumented by each countries own lag of OG plus the lag of the US OG and D is the debt-to-GDP ratio. Bad constraints the effect to negative and good to positive variations of the output gap. We add an crisis dummy and in (2) and (4) Election is a dummy variable which signals 1 *in an election year. BR restricts the effect to periods without and AR with the respective fiscal rule in force. We analyze the Maastricht Treaty (MT) and the Stability and Growth Pact (SGP) with break points in 1992 and 1999, respectively.*

eral economic expansion starting in the mid-1990s and only minimal observations with negative variations of the output gap. Therefore, governments were more restrictive in the business cycle upturn, noticeable by comparing the output gap coefficients in good economic times for the pre-MT and pre-SGP case. The cyclical response in the downturn becomes again significantly procyclical in the post-SGP period. Generally, there are only minor differences regarding the effect of lagged debt and the lagged dependent variable between columns (1)-(4) in Table 6.

8 Conclusion

The present paper tackles the question of how discretionary fiscal policy behaves with regard to the output cycle in the euro area and whether this relationship has been affected by the implementation of fiscal rules. Fiscal policy and its cyclical performance are particularly important for EMU member countries because of the loss of other macroeconomic instruments for stabilization. Therefore, various fiscal reaction functions for a panel of 11 EMU member countries have been estimated to analyze the cyclical orientation of discretionary fiscal policy in the euro area and the potential impact of changes to fiscal frameworks. Special attention was given to determine the reaction for periods of economic contraction and expansion and major components of the budget.

Overall, discretionary fiscal policy is marginally procyclical. However, it is characterized by strongly destabilizing activity in the downturn, while the response in economic expansions is disconnected from the business cycle. Further disaggregation shows evidence that procyclical policy is mainly determined by public expenditures' discretionary reaction, not revenues.

The effect of rules-based fiscal constraints on cyclical behavior is rather limited. Fiscal rules somewhat decrease procyclical policy responses in the upturn. They are thus fulfilling their primary objective in fighting the deficit bias. However, this paper's empirical results also show that balanced-budget and debt rules come at the cost of more destabilizing policies in the downturn. This can be particularly harmful given new empirical findings for regime-dependent macroeconomic effects on output both in the short- and long-run. Consequently, if fiscal rules reinforce fiscal consolidation in the downturn, they do not just fail to achieve their secondary objective of economic stabilization but potentially also their first – long-term debt sustainability – because of the detrimental effects on (potential) growth. Interestingly, expenditure rules perform comparably better concerning the stabilization objective than other types of fiscal constraints. This may not come as a surprise because expenditures are observable and in direct control of the government while the public balance and debt ratio result from various endogenous dynamics.

Therefore, the empirical evidence in this paper supports the proposals of different institutions pushing for a focus on expenditure rules in the EMU's fiscal framework, instead of the opaque set of cyclically-adjusted budget balance and debt rules.

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