WORKING paper

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Fiscal policy orientation in the euro area in real-time

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ABSTRACT

This paper analyses the orientation of fiscal policy in the euro area in real-time, using a new real-time dataset including 11 euro area countries for the 1999-2019 period. We compare the cyclicality of the fiscal stance, measured as the change in the cyclically-adjusted total and primary budget balance, established during budgetary planning with their ex-post outturns. We find empirical evidence for pro-cyclical fiscal plans and a more a-cyclical behaviour of fiscal outcomes on average for euro area countries. We show hence that the tendency to run a pro-cyclical policy is already anchored in fiscal plans and not just an outcome of surprises on cyclical conditions. This result is robust to different specifications and estimation methods. We observe pro-cyclicality at budget planning especially during tightening episodes and a more a-cyclical fiscal stance during fiscal loosening. We also find that fiscal plans are pro-cyclical outside of crisis years of the Global Financial crisis and the European Debt crisis. We detect strong country heterogeneity in the orientation of fiscal policy ex-ante and ex-post in the euro area.[‡]

Keywords: Fiscal Policy, Cyclicality, Real-Time Data, Fiscal Forecast.

JEL classification: C33, E32, E63

NON-TECHNICAL SUMMARY

This paper analyses the fiscal stance in euro area countries in real-time. The fiscal stance reflects the discretionary, i.e. non-automatic, reaction of the budget balance to cyclical conditions. The fiscal stance is said to be counter-cyclical if the non-automatic part of the budget balance goes in the same direction as the change in the output gap (e.g. deteriorating the balance to face economic downturns), pro-cyclical if both evolve in opposite directions and a-cyclical if the non-automatic part of the budget balance does not respond to the output gap.

One of the objectives of fiscal policy is to stabilize the economy along its potential, i.e. to conduct a counter-cyclical policy rather than a pro-cyclical one. However, assessing in real time the position in the economic cycle is a difficult exercise. It depends on the forecasts of GDP (which can be revised later) and potential GDP (also subject to large measurement uncertainties and revisions). Fiscal stance measures, based on estimates of cyclical conditions, underlie the same uncertainties and revisions. Hence, the fiscal stance at the time of budgetary decisions may be different from the fiscal stance observed in outcome data. It is therefore interesting to examine the fiscal stance separately at the moment of budget planning, showing the intentions of fiscal policy makers, compared to final outcomes.

This paper evaluates the fiscal stance in a panel of 11 euro area countries between 1999 and 2019 (before the Covid crisis) at the time of the budget forecasts and compares it with the fiscal stance according to outcome data. To do this, we use a new real-time dataset for the 1999-2019 period based on European Commission data. We regress the change in the cyclically-adjusted budget balance on the output gap, controlling for different other variables affecting the budget balance, first using budgetary planning data, then using the same variables observed after the completion of the year. We find that, on average for these 11 euro area countries, the fiscal stance is pro-cyclical during budget planning and a-cyclical in fiscal outcomes. Hence, the tendency to run a pro-cyclical policy is already anchored in fiscal plans and not just an outcome of surprises on cyclical conditions.

We use both a fixed effect estimator and an instrumental variable approach as an empirical strategy. Our results are robust to different econometric approaches and model specifications. They are also robust when controlling for the two crisis periods, the Global Financial crisis and the European Debt crisis, that hit the euro area during the examined period. Fiscal plans were also pro-cyclical outside of the crisis years, and, according to our empirical results, counter-cyclical (but not significant) during the Great Financial crisis and significantly pro-cyclical during the European Debt crisis.

A possible explanation for the pro-cyclicality of fiscal plans could be for governments to signal a tighter policy stance than is implemented in the end. We show that pro-cyclicality at the budget planning phase is more frequent and more significant during tightening episodes, whereas the fiscal stance tends to be more a-cyclical during fiscal loosening episodes on average for these 11 euro areas countries. This supports the claim that forced consolidation due to market stress or the intention of the governments to signal a tighter fiscal policy in difficult economic times may explain this pro-cyclical behaviour.

We also show that the fiscal orientation is not uniform in the euro area and that the average result is driven by some countries with a strong pro-cyclical ex ante fiscal policy orientation. We observe a more pro-cyclical behaviour of fiscal plans for countries such as Greece, France, Italy, Spain, and Finland and a more counter-cyclical behaviour in fiscal plans for a group of countries covering Ireland, Germany, Austria, and to a lesser extent the Netherlands and Belgium. The heterogeneity of the cyclicality of fiscal policy is important in the euro area.

Coefficient of the cyclical condition (output gap) during budget planning and for first outcomes
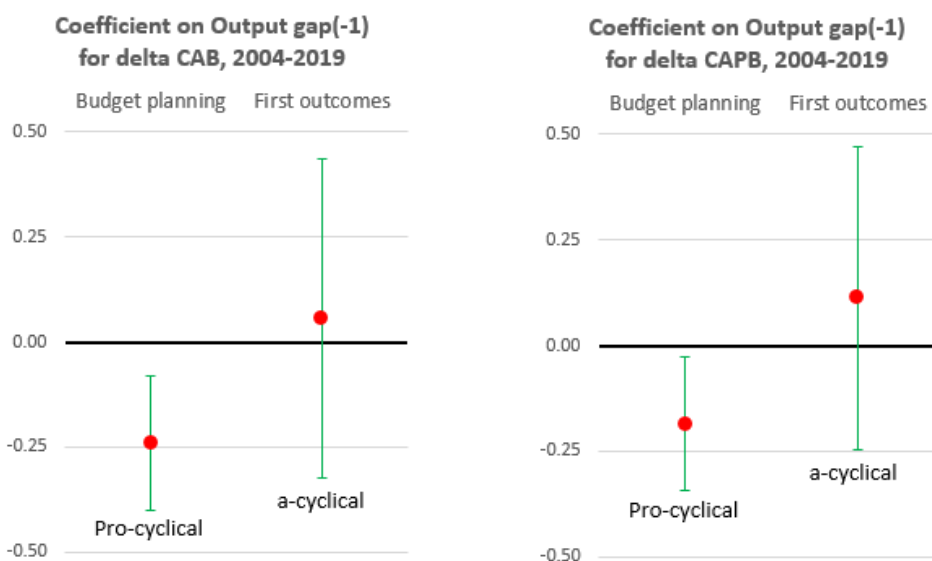
Note: Coefficient of the output gap(-1) and 95% confidence interval in fiscal reaction functions in the euro area with the LS-fixed effect estimator; cross section SUR panel corrected standard errors.

L'orientation de la politique budgétaire dans la zone euro en temps réel

Résumé

Ce papier analyse l'orientation de la politique budgétaire dans la zone euro en temps réel, en utilisant une nouvelle base de données en temps réel comprenant 11 pays de la zone euro pour la période 1999-2019. Nous comparons la cyclicité de l'orientation budgétaire, mesurée comme la variation du solde budgétaire total et primaire corrigé des variations cycliques automatiques, établie lors de la planification budgétaire avec celle qui résulte des données observées ex post. Nos résultats empiriques supportent des plans budgétaires pro-cycliques et un comportement plus a-cyclique des résultats budgétaires en moyenne pour les pays de la zone euro. Nous montrons donc que la tendance à mener une politique pro-cyclique est déjà ancrée dans les plans budgétaires et n'est pas seulement le résultat de surprises sur les conditions économiques. Ce résultat est robuste aux différentes spécifications et méthodes d'estimation. Nous observons une pro-cyclicité au niveau de la planification budgétaire, en particulier lors des épisodes de resserrement, et une orientation budgétaire plus a-cyclique lors des épisodes d'assouplissement. Nous constatons également que les plans budgétaires sont pro-cycliques en dehors des années de crise de la crise financière mondiale et de la crise de la dette européenne. Nous détectons une forte hétérogénéité des pays dans l'orientation de la politique budgétaire ex-ante et ex-post dans la zone euro.

Mots-clés : politique budgétaire, cyclicité, données en temps réel, prévisions budgétaires

1   Introduction

This paper analyses the fiscal stance in euro area countries in real-time. We measure the fiscal stance as the change in the cyclically-adjusted (CAB) or the primary cyclically-adjusted (CAPB) budget balance. This measure reflects the discretionary, i.e. non-automatic, reaction of the budget balance to cyclical conditions. In our analysis, we compare the anticipated fiscal stance at the time of budget planning, which normally takes place in autumn of a given year for the following year, with its realisation a year after. We examine the orientation of fiscal policy throughout the cycle, i.e. its counter- or pro-cyclicality, both at the time of budget planning and at the time of the first outcome. We classify fiscal policy as counter-cyclical if the change in the cyclically-adjusted (primary) budget balance and the output gap have the same sign (i.e. a positive output gap goes along with a tightening of fiscal policy and a negative output gap with a loosening of fiscal policy), pro-cyclical if they have the opposite sign, and acyclical if they are broadly neutral.

One of the objectives of fiscal policy is to stabilise the economy along its potential (Musgrave, 1959). When economic activity falls short of its potential, policymakers should implement an expansionary fiscal stance to support demand and vice versa, beyond the automatic impact of cyclical conditions on the budget balance via automatic stabilisers. However, during the budget planning process, decision-makers are confronted with uncertainties about the exact cyclical position of the economy. Output gap estimates, which are frequently used to quantify the cycle, are surrounded by high estimation uncertainties, particularly in real-time. Indeed, they are based on the real-time values of potential GDP, an unobservable variable, and suffer from frequent and sometimes large ex-post revisions. The same uncertainties and ex-post revisions then also affect the cyclically-adjusted budget balance, which is derived from output gap measures. By construction, a revision of the output gap of a given sign (say, an increase), brings about a simultaneous revision of the cyclically-adjusted balance of the opposite sign (in this case, a deterioration), all other things being equal, given that the cyclically-adjusted balance is negatively linked to the output gap. Some authors suggest (see, for an overview, Cimadomo, 2016) that these output gap revisions may increase the degree of pro-cyclicality in ex-post data. This paper aims to examine this question in distinguishing between the ex-ante and the ex-post assessment of the fiscal stance.

Several papers (Commission, 2004; Fatas and Mihov, 2010; Bankowski and Ferdinandusse, 2017) have analysed the question of the cyclicality of the fiscal stance in the euro area. They generally find a pro-cyclical fiscal orientation, at least periodically, of fiscal policy since the start of the European Monetary Union (EMU). Their assessment is based on the analysis of ex-post data, as they do not take into account the information actually available to policy-makers in real-time. Forni and Momigliano (2005), Golinelli and Momigliano (2009) and Cimadomo (2012) show however that estimating the fiscal stance based on ex-post revised data might give a misleading picture of the sensitivity of fiscal policies to cyclical conditions due to revisions of output gap estimates.

Uncertainty about the cyclical position is of course only one possible explanation for a pro-cyclical orientation of fiscal policy. The literature has proposed some other explanations: (1) a general deficit bias of fiscal policy due to political agency problems (see, among others, Alesina and Tabellini, 2005), which might lead to an insufficiently counter-cyclical fiscal policy in particular at the height of the cycle, (2) forced consolidation during periods of financial stress, where markets push countries to consolidate and thus encourage pro-cyclical behaviour during these periods, and (3) borrowing constraints which prevent countries to achieve sufficient counter-cyclical fiscal policy especially during bad macroeconomic times (see, among others, Gavin and Perotti, 1997). The later argument is especially present in the literature on developing countries and should play a smaller role in our panel - apart from isolated periods during the European Debt crisis. From a theoretical point of view, procyclical fiscal policy remains a puzzle.[1]

This paper looks anew into the question of the cyclicality of fiscal policy for euro area countries in real-time over a long time horizon since the start of EMU in 1999 up to 2019, based on a newly constructed dataset from European Commission data. This time span includes notably the Great Financial crisis (GFC) and the European Debt crisis (EDC), during which the role of fiscal stabilisation have received renewed attention. The pro-cyclical nature of fiscal tightening during the European Debt crisis has been widely associated with an aggravation of the crisis. We examine whether fiscal policy turned out to be particularly pro-cyclical in real-time during the EDC.

The rest of the paper is organised as follows. Section 2 presents an overview of the relevant literature and how our research relates to it. Section 3 describes the data and the construction of the real-time dataset. Section 4 presents a descriptive analysis of the relationship between the fiscal stance and the cycle, while section 5 provides the empirical estimates. Finally, Section 6 concludes the paper.

2   Literature Review

The literature on the assessment of the stance of fiscal policy over the business cycle has produced a large body of research, with sometimes contradicting results. We focus here on the literature for the euro area.

Ex-post analysis of the cyclicality tend to provide evidence of a pro-cyclical fiscal stance for euro area countries (Commission, 2004; Bankowski and Ferdinandusse, 2017). Since the work of Orphanides (2001), who found that substantial errors in the real-time assessment of cyclical conditions induce misleading conclusions on the stance of monetary policy, real-time assessment of cyclicality has also found its way into fiscal policy analysis. Forni and Momigliano (2005), Golinelli and Momigliano (2006) and Golinelli and Momigliano (2009) find a weakly counter-cyclical behaviour of the primary cyclically-adjusted balance with real-time data and a broadly a-cyclical behaviour with ex-post data for OECD countries. Cimadomo (2012) also shows a slightly

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[1]In neoclassical models, the optimal fiscal policy stance is either a-cyclical or counter-cyclical. In Keynesian models, on the other hand, with the presence of sticky prices, the optimal fiscal policy stance is counter-cyclical.

counter-cyclical behaviour with real-time data, especially during buoyant economic times, that turns pro-cyclical ex-post. Beetsma and Giuliodori (2010) reach similar conclusions, showing that countries follow a more counter-cyclical fiscal policy at budget planning than during the implementation process. All four papers base their analysis on the December issues of the OECD Economic Outlook for the period between 1994 and the early 2000s and confirm hence that a misjudgment on the cyclical position weighs on the effectiveness of fiscal stabilisation. Pina (2009) examines the orientation of fiscal policy in real-time for euro area countries based on a database from the European Commission's autumn forecast. He confirms earlier results of a counter-cyclical orientation of planned fiscal policy, which turns a-cyclical ex-post, given that fiscal policy does not react significantly to updates in cyclical conditions. This contrasts with the results from Marinheiros (2008) based also on European Commission's data for the period from 1999 to 2006 who finds that discretionary fiscal policy has been designed to be pro-cyclical. Holm-Hadulla, Hauptmeier, and Rother (2010) undertake a similar analysis for one part of the budget balance, namely government expenditures, and find a pro-cyclical slippage in overall expenditure to surprises in the output gap. Cimadomo (2016) provides the most recent survey of the literature on the real-time assessment of fiscal policy.

In the most relevant work since the GFC, and using a large country panel of advanced and emerging economies, Poghosyan and Tosun (2019) find that discretionary fiscal policy in advanced economies is counter-cyclical at the planning stage, which disappears largely at budget implementation. Budget implementation even turned pro-cyclical after the GFC. Gootjes and de Haan (2022) find, for a sample of 27 EU countries over the 2000-2015 period, an a-cyclical orientation of fiscal policy at the planning stage and a slightly pro-cyclical policy at the implementation phase, basing their analysis on the European Commission's spring forecast. This result is however partly driven by non-euro area EU countries, while euro area EU countries are shown to have a higher degree of counter-cyclicality at the planning stage. Aldama and Creel (2021), based on a long sample of 19 OECD countries between 1997-2018, find, in contrast with the rest of the literature, a pro-cyclical fiscal orientation already at the planning stage. They do not analyse the realization of the fiscal policy orientation.

For EU countries in particular, the Stability and Growth Pact (SGP) recommends that fiscal consolidation should be counter-cyclical during expansion phases in order to meet the Medium-Term objective. Some commentators, however, have argued that the deficit of 3% or less enshrined in the SGP may force governments to cut expenditures or increase taxes during downturns, resulting in a pro-cyclical fiscal policy (see for instance Eichengreen and Wyplosz, 1998). This hypothesis seems to hold true using ex-post data: studies tend to show that fiscal policy outcomes have been at best a-cyclical or even pro-cyclical after the introduction of the euro (Cimadomo, 2012).

Conclusions regarding the cyclicality of fiscal policy are therefore not clear-cut in the literature and hinge on a variety of factors. On the one hand, the distinction between ex-ante plans and ex-post outcome is important. On the other hand, the definition of fiscal policy itself matters. The choice of using cyclically-adjusted balances or nominal balances is not benign (Bernoth, Hughes, and Lewis, 2008). The former indeed requires an assessment of the output

gap, which is unobservable and subject to revisions. In contrast, the nominal balance makes it difficult to assess the cyclical orientation of discretionary fiscal policy due to the role of automatic stabilisers, which react counter-cyclically by nature. On the empirical side, results depend on modelling choices and datasets, especially the analysed time period.

3   Data and Methodology

We create a real-time fiscal and macro dataset based on the two detailed annual forecasts of the European Commission, namely the spring and the autumn forecast. We base our analysis on the European Commission forecast because it has the advantage of using the same methodology for all countries in the sample. For some variables, our dataset starts with the forecast vintage of autumn 1997, for others it starts with the vintage of autumn 2002, going up to the forecast vintage of autumn 2020. The sample for which we have both numbers for budget planning and the first outcome covers 21 years in the long sample (1999-2019) and 14 years in the shorter sample (2004-2019). We use the short sample in our baseline analysis and the long sample for robustness checks.

The country panel consists of the 11 original euro area countries excluding Luxembourg[2] (labelled EA11). The dataset includes the main fiscal and macro variables that are necessary to assess the fiscal stance and the cyclical position of the economy: the budget balance (labelled BAL), the cyclically-adjusted budget balance (CAB), the cyclical component of the budget balance (CYC), the primary budget balance (PBAL), public debt (DEBT), nominal and real GDP (GDP), potential GDP (POT), and the output gap (GAP), all in annual frequency. The fiscal variables are expressed in per cent of GDP or potential GDP. The output gap measures the gap between actual and potential GDP, in per cent of potential GDP. Potential GDP is estimated according to the EU's commonly agreed methodology based on a production function approach. The CAB, as measured by the European Commission and used in this paper, is derived from subtracting the cyclical balance from the total budget balance (Mourre, Astarita, and Princen, 2004). We calculate interest payments as the difference between the total and the primary balance, and derive the cyclically-adjusted primary balance (CAPB) from subtracting interest payments from the total cyclically-adjusted budget balance. For the CAB, we have data for the long sample period (1999-2019), while the CAPB (as well as PBAL and POT) are only available for the shorter period (2004-2019)

The data stem from the European Commission's forecast webpage for data starting in spring 2013, from Firstrun[3] for the period from 2002 to 2013 and from old forecast documents for the period from 1997 to 2002. We perform extensive checks to ensure the consistency of the overall dataset across the different sources. For the purpose of our analysis, we define the autumn forecast in year *t-1* for *t* as the one which corresponds to information at the time of budget planning (also labelled $E_{t-1}(x_t)$ with x the variable in question), given that the budget plans

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[2]Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Netherlands and Portugal. Data limitations do not allow for the inclusion of Luxembourg and later euro area entrants

[3]see http://www.firstrun.eu/

are elaborated in the autumn of a year for the following year. First realised ex-post outcomes correspond to the data in the spring vintage of year $t+1$ for t (labelled $x_{t|t+1}$) which corresponds to the first notification of realised values for the year t. Finally, the latest vintage of the dataset of autumn 2020 is considered the "final" (no longer revised) estimate of past fiscal and macro variables (labelled $x_{t|T}$).

4   Descriptive Analysis

4.1   Cyclicality of the fiscal stance ex-ante and ex-post

In this section, we perform a graphical analysis of the relationship between the economic cycle and the fiscal stance. We use the output gap as measure for the economic cycle. A negative output gap is associated with output below potential, a positive one with output above potential and a closed output gap with output equalling potential. We compare the fiscal stance, measured as the change in the cyclically-adjusted (total or primary) budget balance (CAB and CAPB), with the level of the output gap, i.e. whether a fiscal accommodation or contraction takes place in a situation where the economy is above or below potential. Some papers also use the variation of the output gap as an indicator for the cycle; a concept which shows the acceleration or deceleration of real growth compared to potential growth (see for a discussion Commission, 2004; Golinelli and Momigliano, 2009). We report the comparison of the change in CAB/CAPB with the change in output gap in the Appendix A.

Figure 1 plots the variation in the CAB with the level of output gap at the time of budget planning (left-hand panel) and at the time of first outcomes (right-hand panel) for the 2004-2019 period (16 years). The figure shows only a weak link between the two variables, both at the time of budget planning and for first outcomes, which is confirmed by a low correlation coefficient. The graphical analysis hence does not point to a clear pro- or counter-cyclical orientation of fiscal policy, neither during budget planning nor for first outcomes.

Defining four regimes corresponding to the four quadrants of figure 1 and counting the observations in each of the quadrants is also informative. We find that fiscal policy is more often pro-cyclical than anti-cyclical in general (more data points in the top-left and bottom-right quadrants than in the other two, see table 1). Moreover, fiscal policy is not more pro-cyclical or counter-cyclical ex-ante than ex-post, but we observe more pro-cyclical tightening episodes ex-ante and more pro-cyclical loosening episodes ex-post. We observe especially many planned pro-cyclical tightening episodes during the European Debt crisis.

	Pro-cycl. tight.	Anti-cycl. tight.	Pro-cycl. loosen.	Anti-cycl. loosen.
$E_{t-1}(x_t)$	81	17	21	57
$x_{t|t+1}$	72	19	29	56

Table 1: Fiscal stance regimes for ΔCAB and GAP

Figure 1: Fiscal stance throughout the cycle (ΔCAB and GAP)

Note: a tightening fiscal policy corresponds to an increase in the CAB

We reach very similar conclusions when analysing the cyclicality of the cyclically-adjusted primary balance (CAPB) instead of the CAB, see figure 2 and table 2.
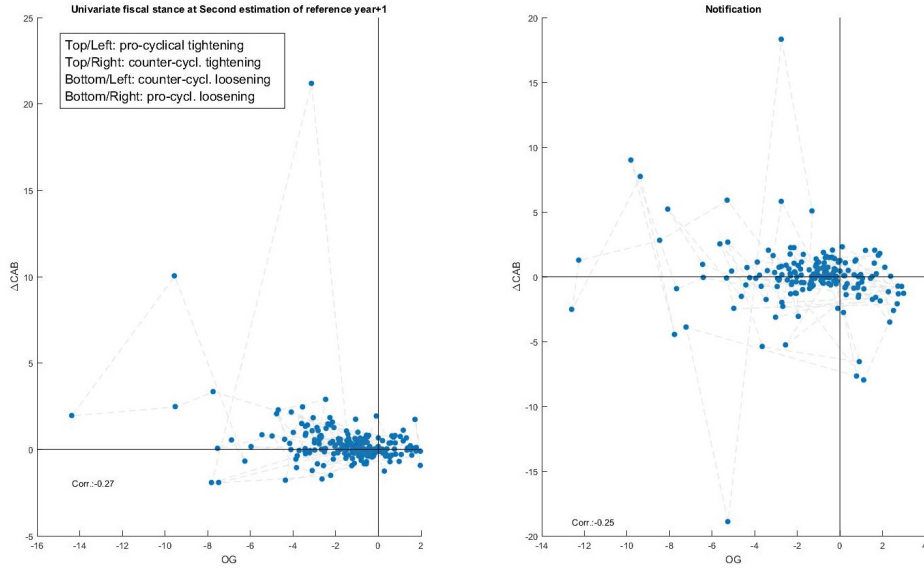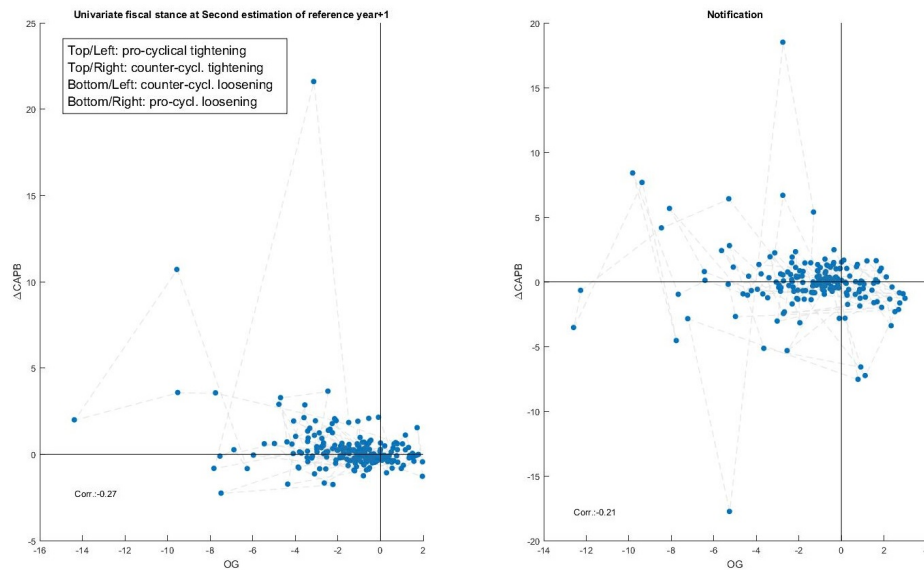

Figure 2: Fiscal stance throughout the cycle ($\Delta CAPB$ and GAP)

Note: a tightening fiscal policy corresponds to an increase in the CAPB

	Pro-cycl. tight.	Anti-cycl. tight.	Pro-cycl. loosen.	Anti-cycl. loosen.
$E_{t-1}(x_t)$	82	12	26	56
$x_{t\|t+1}$	67	13	35	61

Table 2: Fiscal stance regimes for $\Delta CAPB$ and GAP

4.2 Forecast errors for cyclical conditions and the fiscal stance

Since one interest of this paper is to determine how surprises on cyclical conditions affect the fiscal stance, we analyse in this section the forecast errors (or surprises) of the different variables. The forecast errors are defined as the difference between the one-year ahead forecast for year t made in autumn of year t-1 and the realised outcome for year t observed in spring of year $t+1$, more precisely we show $\frac{1}{T}\sum_{t=1}^{T}(x_{t|t+1} - E_{t-1}(x_t))$. A positive (respectively, negative) forecast error shows a positive (negative) surprise. Figure 3 shows the mean and interquartile range of the forecast errors for the full set of variables. We group these statistics by country and present them per year to give an idea of their temporal evolution. During our sample, the years 2008 and 2009 saw the largest forecast errors for all the variables considered.
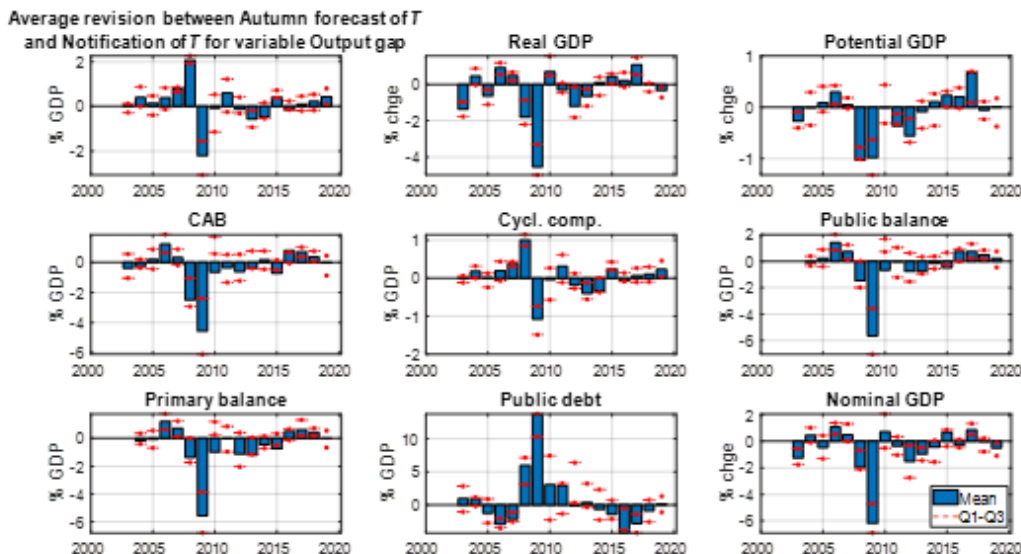
Figure 3: Average revision between forecast and outcome for a selection of variables

The largest forecast errors (in relation to the variability of the respective variable) come from measures related to the CAB, BAL and real GDP growth (see different measures of dispersion pooled by year and country in table 3). The output gap is somewhat less revised on average than the overall budget balance and the cyclically-adjusted balance. Revisions are the lowest for government debt.

Figure 4 resumes the distribution of forecast errors for our two main variables of interest, i.e. the change in the cyclically-adjusted budget balance and the output gap (see Appendix B for the distribution of forecast errors in the change in the cyclically-adjusted primary budget balance). For the output gap, the average forecast error turns out to be positive (error of 0.12

	GAP	Real GDP growth	POT growth	CAB	CYC	BAL	PBAL	DEBT
RMSE	1.20	1.75	0.69	2.48	0.60	2.57	2.58	6.96
MAE	0.86	1.15	0.46	1.38	0.43	1.45	1.41	4.31
nRMSE	0.53	0.72	0.34	0.89	0.51	0.80	0.94	0.22
nMAE	0.38	0.47	0.22	0.49	0.37	0.45	0.52	0.13

Table 3: Dispersion measures for a selection of variables

MAE = mean average error, RMSE = root mean squared error, nMAE = normalized mean average error, nRMSE = normalized root mean squared error

over the full country sample and the 2004-2019 period). The distribution of forecast errors is tilted to the positive side, i.e. we observe more often (106 episodes out of 176) more favorable cyclical conditions than expected. That means that real-time estimates of the output gap tend to overestimate economic downturns and/or underestimate economic upturns. This finding is in line with Larch, Kumps, and Cugnasca (2021), who also show that real-time estimates of the output gap tend to have a pessimistic bias. Fiscal policy is hence inclined to provide too much fiscal support based on real-time output gap estimates. For the change in CAB, we observe a small negative average forecast error (error of -0.20 over the full country sample and the 2004-2019 period), i.e. the cyclically-adjusted balance improves on average less or deteriorates more than expected. This result is however driven by some very large negative forecast errors on the CAB, the distribution is also tilted slightly to the positive side with a higher number of positive surprises (100 episodes out of 176) than negative ones. This result speaks rather against a pro-cyclical bias of fiscal policy orientation in ex-post outcomes compared to ex-ante plans. On the contrary, fiscal outcomes seem more often better than expected.
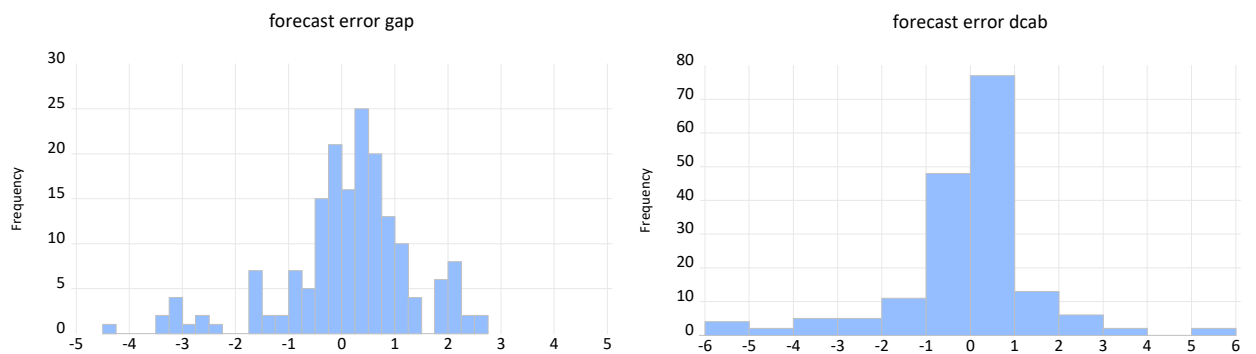

Figure 4: Distribution of output gap and cyclically-adjusted balance forecast errors, 2004-2019

Appendix B shows the average forecast error of the forecast error of GAP and ΔCAB for the different countries in the sample.

5 Empirical Analysis

We now turn to the empirical analysis and estimate the cyclicality of the fiscal stance using a dynamic panel approach. We examine the budget implementation and the outcome phase separately. We perform several robustness checks for the country panel and the time period, paying special attention to the influence of the Great Financial crisis and the European Debt crisis on the results.

5.1 Model specification

Following Forni and Momigliano (2005) and Golinelli and Momigliano (2009), we estimate the following fiscal reaction function for the cyclically-adjusted (total or primary) budget balance, both for the budget planning and the outcome phase:

$$\Delta CAB_{i,t} = \alpha + \beta_{CAB} CAB_{i,t-1} + \beta_{GAP} GAP_{i,t} + \beta_{DEBT} DEBT_{i,t-1} + \mu_i + \theta_t + \epsilon_{i,t} \qquad (1)$$

where the subscript t indicates the time and i the country. $CAB_{i,t}$ stands for the cyclically-adjusted budget balance (or alternatively, $CAPB_{i,t}$ the cyclically-adjusted primary balance). β_{CAB} captures the persistency in the budget balance. $GAP_{i,t}$ is our main variable of interest and shows the cyclical position of the economy. A positive value of β_{GAP} indicates a counter-cyclical stance, while a negative one indicates a pro-cyclical fiscal stance. $DEBT_{i,t-1}$ controls for the level of government debt. A positive value of β_{DEBT} indicates that the higher the initial debt level, the greater the tightening of fiscal policy. μ_i and θ_t are country and time fixed effects. We always include country fixed effects into the model to capture all remaining time-invariant and unobserved country-specific factors. Concerning time fixed effects, we estimate specifications with and without them. Time fixed effects capture common influences of variables not included in the model, however, they are also difficult to interpret and affect the size of the cyclical parameter β_{GAP}[4].

We estimate our baseline model for the 11 euro area countries over the 2004-2019 period (16 observations), using the fixed effect estimator, both for the budget planning and the outcome period. For CAB, we also estimate the model over the long horizon starting from EMU up to 2019 (1999-2019). A possible endogeneity problem might arise from the fact that the cyclical condition $GAP_{i,t}$ is not fully independant from the fiscal stance in a given year t, as government spending is a part of aggregate demand. We employ two empirical strategies to deal with this problem. We use either the lagged value of the output gap $GAP_{i,t-1}$ as a proxy for the output gap in t (the output gaps in t and $t-1$ are highly correlated), which is fully independant of the fiscal policy stance in t, and employ the least square estimator (FE-LS). Alternatively, we use the

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[4]The literature is not conclusive whether to include time fixed effects or not. Some of the studies include them, others do not.

contemporaneous output gap $GAP_{i,t}$ directly and employ an instrumental variables estimator (FE-IV) controlling for the presence of potentially endogenous variables. Concerning the first strategy, Forni and Momigliano (2005) also give an economic reasoning for using the lagged value of $GAP_{i,t-1}$, suggesting that policy-makers, during the budget planning phase, simply react to current cyclical conditions and not to expected ones. Our results prove robust to both strategies.

In what regards the IV estimator, finding valid instruments for macroeconomic variables is challenging, given the high persistence in the data. Several instruments have been proposed in the literature to control for a possible endogeneity of the output gap, notably lagged values of the output gap and the (GDP-weighted or unweighted) average output gap of the other countries in the sample (see, for example, Forni and Momigliano, 2005; Pina, 2009; Beetsma and Giuliodori, 2010; Cimadomo, 2012). Holm-Hadulla et al. (2010) also use the trend GDP as an instrument. We select five instruments: (i) the nowcast of the output gap, (ii) the forecast of potential output, (iii) the nowcast of potential output, (iv) the forecast of GDP-weighted average gap of the other countries in the sample, and (v) the nowcast of GDP-weighted average gap of the other countries in the sample. To check the relevance of our instruments, we run auxiliary regressions for the potential endogenous output gap variable. We also test for weak instruments using the F-test and perform a Sargan test of the overidentifiying restrictions.

Our panel model includes the lagged value of the dependant variable $CAB_{i,t-1}$, which induces a potential bias into the fixed effet estimator, also called "Nickell"-bias (Nickell, 1981). The "Nickell" bias is decreasing with the number of time observations T. We argue that the bias is relatively small as the number of time observation is large compared to the number of cross sections N in our model, in particular in the long panel ($T > 20$). Also, it has been shown that alternative estimators, notably the GMM estimator, would not alleviate the problem in our case where $T > N$ (see also Judson and Owen, 1999 and Checherita-Westphal and Zdarek, 2017).

We check for cross-sectional dependance in the residuals, using the Breush-Pagan LM test (Breusch and Pagan, 1980)[5]. It indicates some cross-sectional dependence in the residuals in the model, both for the budget planning and the first outcome phase. Hence, we cluster standard errors at the period level using the cross section SUR Panel Corrected Standard Error (PCSE). This setting controls for contemporaneous correlations between the residuals for cross-sections. Having in mind that this gives conservative values for standard errors, we also comment, when appropriate, the results with ordinary standard errors.

The variables in the specification for each, the budget planning and the first outcome, all come from the same vintage in order to assure a common information set and avoid eventual problems due to methodological changes. For example, for the planning phase, the dependant variable is defined as the first difference of the expected value of CAB in $t - 1$ for t and the expected value of CAB in $t - 1$ for $t - 1$. The lagged independent variables of CAB, GAP and DEBT represent the expected values in $t - 1$ for $t - 1$. The output gap in the FE-IV is the expected gap in $t - 1$ for t. All variables hence come from the same vintage of $t - 1$ during the

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[5]The Breush-Pagan LM test is more suitable than the Pesaran CD test (Pesaran, 2004) in this case, because T>N.

budget planning phase (precisely, the autumn forecast of the European Commission).

5.2 Main empirical results

Table 4 provides estimates of our different specifications for $\Delta CAB_{i,t}$. Columns (1) to (3) show results of ex ante fiscal reaction functions, while columns (4) to (6) provide estimates of the fiscal reaction functions with first outcome data. In the specifications with the lagged output gap (columns (1) and (2) of table 4), the coefficient of the cyclical condition is negative, indicating a pro-cyclical orientation of fiscal policy during budget planning. The coefficient is significant in the specification with time fixed effects[6]. The estimated coefficient in (2) implies that a (positive) output gap of 1 per cent leads to a worsening of the CAB by 0.24 per cent of GDP on average for euro area countries. The coefficient of the lagged CAB has the expected negative sign and is highly significant. The initial debt level does not have a significant impact on the fiscal policy orientation during the budget planning phase. The results are similar when analyzing the different specifications for $\Delta CAPB_{i,t}$ (see table 5). The coefficients of the lagged output gap (columns 1 and 2 of table 5) are negative and significant in what regards the specification with time fixed effects: an output gap of 1 per cent reduces the CAPB by about 0.19 per cent of GDP on average for euro area countries, implying a pro-cyclical fiscal policy stance. The lagged dependant variable has a significant and negative influence on the fiscal stance and the debt level a not significant one.

The IV specifications broadly confirm these results (columns (3) of respectively table 4 and table 5). The contemporanous output gap has a significant negative sign, indicating a pro-cyclical stance of fiscal policy. The coefficient is close in size to the OLS specifications, the significance is however slightly reduced. To check that our instruments are strong, we estimate the so-called first-stage regression (*i.e.* we regress the potentially endogeneous variable $GAP_{i,t}$ on the selected set of instruments and other exogenous variables). Table 6 shows the results of a FE-LS estimate for the first-stage regression with time and country fixed effects. The estimated coefficients on all instruments are statistically different from 0, we hence conclude that they are relevant and strong[7]. Then we perform a Sargan test of the overidentifying restrictions when the number of instruments exceeds the number of endogenous regressors, which is the case for the IV-FE estimate at the budget planning stage[8].

Turning to the ex post realisation, we obtain either a small negative (column (4) of table 4) or a small positive coefficient (column (5) of table 4) on the output gap, which is not significant in any of the specifications[9]. We hence conclude on a broadly a-cyclical fiscal policy orientation in outcome data. The results are similar for $\Delta CAPB_{i,t}$ (columns (4) and (5) of table 5).

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[6]The coefficient is also significant in the specification using only country fixed effects with ordinary standard errors. The size of the estimated coefficient is slightly smaller than in the specification with country and time fixed effects.

[7]The F-stat of the joint nullity test is 232.756

[8]The p-value of the Sargan test is 0.125 for the IV-FE specification for ΔCAB at the budget planning stage (column (3) of table 4) and 0.177 for the IV-FE specification for $\Delta CAPB$ at the budget planning stage (column (3) of table 5), meaning that the overidentifying restrictions are valid.

[9]The coefficients are also not significant when using ordinary standard errors

	Budget planning			First outcome		
	(1)	(2)	(3)	(4)	(5)	(6)
Method	LS-FE	LS-FE	IV-FE	LS-FE	LS-FE	IV-FE
$CAB_{i,t-1}$	-0.416***	-0.512***	-0.303***	-0.297**	-0.348**	-0.122
	[-5.929]	[-7.078]	[-2.683]	[-2.399]	[-2.523]	[-0.545]
$GAP_{i,t-1}$	-0.109	-0.240***		-0.026	0.056	
	[-1.351]	[-2.921]		[-0.194]	[0.291]	
$GAP_{i,t}$			-0.209*			-0.104
			[-1.800]			[-0.619]
$DEBT_{i,t-1}$	0.003	-0.003	0.009	0.024	0.029	-0.032
	[0.240]	[-0.263]	[0.454]	[1.070]	[0.996]	[-1.068]
Constant	-0.928	-0.858	-1.354	-2.587	-3.014	2.485
	[-1.029]	[-0.879]	[-0.909]	[-1.377]	[-1.280]	[0.995]
Nb. of obs.	176	176	176	176	176	176
Adj. R^2	0.539	0.699	0.579	0.133	0.257	0.088
Country FE	yes	yes	yes	yes	yes	yes
Time FE	no	yes	yes	no	yes	yes

Table 4: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAB_{i,t}$

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported. Equation (6) includes only the lagged output gap and the forecast and nowcast of the lagged output gap of other countries as instruments, as the potential POT is not significant in the first-stage auxiliary regression.

The coefficients of the lagged CAB/CAPB are close to those with real-time data and highly significant. The initial debt level, insignificant in three of the four specifications, shows a small significant positive impact on CAPB in the specification with country and time fixed effects (column (5) of table 5). A debt level of 1 per cent of GDP indicates a fiscal tightening of the cyclically-adjusted primary balance of 0.04 per cent of GDP. The fit of the ex post regressions is generally worse than the one using real-time information. We conclude that the expected orientation of fiscal policy can be relatively well explained with cyclical conditions and starting levels of budget balances, while ex post outcomes are less well explained by our model. We also examine to what extent further revisions affect these ex post results and estimate the model with the latest available "final" vintage of data (more specifically, the autumn 2020 forecast). These results attest an a-cyclical (not significant) ex post fiscal orientation both for ΔCAB and $\Delta CAPB$, see Appendix C.

We reach the same conclusions if we look at the change instead of the level of the output gap. Fiscal policy has been pro-cyclical in the planning phase during cyclical downturns or upswings, i.e. showing an opposite sign to a change of a given sign of the output gap, and a-cyclical (not significant) in first outcomes, see Appendix C.

To conclude, our baseline results show that fiscal policy in the euro area has on average been pro-cyclical at the planning stage over the analysed period and that this pro-cyclical orientation does not result from a distorted or incorrect perception of the cyclical situation. On the contrary,

the actual results are better from a fiscal stabilisation perspective than planned ones, pointing to an a-cyclical orientation of fiscal policy.

These results contrast somewhat with earlier studies on real-time data, which predominantly find a counter-cyclical orientation of fiscal policy in real-time (see Forni and Momigliano, 2005; Golinelli and Momigliano, 2009; Pina, 2009; Cimadomo, 2012). They are in line with these studies for ex-post outcomes, which also predominantly show an a-cyclical (non significant) fiscal policy orientation. This difference could be explained by several factors, the most important being the different dataset (most of the earlier studies, except for Pina (2009), use OECD data instead of Commission data) and the different time period (most of the earlier studies use data up to the early 2000s). To test this hypothesis, we estimate the CAB specification[10] (2) of table 4 from the earliest date available (1997) and, alternatively, from the start of EMU (1999) up to the GFC (2007). The coefficient of the output gap turns indeed very slightly positive, but it is not significant in any of the specifications. We hence cannot confirm a significant counter-cyclical fiscal policy in real-time on an earlier time sample with our data[11]. Our results confirm however the findings from Aldama and Creel (2021), who also find a pro-cyclical fiscal policy in real-time in 15 EU-countries over the period 1995-2017. They do not perform ex post estimations. More surprisingly is the difference of our results with those of Gootjes and de Haan (2022), who also use Commission data and a similar country (in the specification for euro area countries) and time sample (2000-2015), finding a counter-cyclical fiscal policy ex ante.

Also, our result shows the average reaction for the 11 euro area countries included in the sample. Some countries show a more pro-cyclical fiscal stance at the budget planning stage than others which have a more counter-cyclical fiscal stance (see section 5.3.3). Including or excluding these countries from our sample would drive the average outcome in one direction or the other.[12]

5.3   Extensions and robustness checks

5.3.1   Results since the start of EMU

As a first robustness check, we estimate the equations for the change in CAB over the long horizon since the start of EMU (1999-2019), see table 7. In addition to showing the fiscal orientation in the euro area since the start of EMU, this also provides a robustness check for the "Nickell"-bias, which decreases with the number of time series observations T, which amounts to above 20 in the long sample (see Judson and Owen, 1999).

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[10]The cited studies use mostly the cyclically-adjusted primary balance CAPB as an indicator for the fiscal stance, for which we have however only data starting in 2004.

[11]We do not report results here given the short estimation period which renders results fragile.

[12]In particular, Greece and Ireland are the countries with the strongest fiscal reaction to the output gap according to our individual regressions. These countries are also those where the output gap and the change in CAB (or CAPB) have larger amplitudes. When removing these two euro area countries from our sample, we find an a-cyclical fiscal stance in the other 9 countries, both at the planning phase and with first outcomes. This is not driven just by the European Debt crisis, which we show in section 5.3.2.

| | Budget planning | | | First outcome | | |
Method	(1) LS-FE	(2) LS-FE	(3) IV-FE	(4) LS-FE	(5) LS-FE	(6) IV-FE
$CAPB_{i,t-1}$	-0.482***	-0.562***	-0.423***	-0.351***	-0.400***	-0.219
	[-7.041]	[-8.250]	[-3.471]	[-2.738]	[-6.127]	[-0.767]
$GAP_{i,t-1}$	-0.124	-0.186**		-0.020	0.112	
	[-1.540]	[-2.296]		[-0.147]	[1.072]	
$GAP_{i,t}$			-0.219*			-0.120
			[-1.907]			[-0.702]
$DEBT_{i,t-1}$	0.007	0.017	0.014	0.024	0.042***	-0.036
	[0.634]	[1.442]	[0.744]	[1.074]	[2.795]	[-1.151]
Constant	-0.083	-1.015	-0.821	-1.802	-3.107**	3.086
	[-0.090]	[-1.065]	[-0.541]	[-0.984]	[-2.537]	[1.198]
Nb. of obs.	165	165	165	176	176	176
Adj. R^2	0.610	0.733	0.696	0.159	0.303	0.136
Country FE	yes	yes	yes	yes	yes	yes
Time FE	no	yes	yes	no	yes	yes

Table 5: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAPB_{i,t}$

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported. Equation (6) includes only the lagged output gap and the forecast and nowcast of the lagged output gap of other countries as instruments, as the potential POT is not significant in the first-stage auxiliary regression.

The results show a significant pro-cyclical fiscal orientation in real-time since the start of EMU, in what regards the specification with country and time fixed effects. The coefficient in (2) means that a (positive) output gap of 1 per cent leads to a worsening of the CAB by 0.15 per cent of GDP, compared to a worsening of the CAB of 0.24 in the shorter sample. The coefficient of the other variables are also comparable in size and in significance to the ones in the shorter sample.[13] The coefficient on the output gap in outcome data is slightly positive but never significant. We hence also conclude on a broadly a-cyclical stance in fiscal outcomes over the long period since 1999.

5.3.2 Impact of the crisis periods

In order to analyse the influence of the crisis years on the above results, we perform two exercises: In a first step, we estimate the above specifications with the lagged output gap with time dummies for the crisis years[14], namely $dummy_{GFC} = 1$ for the years 2008 and 2009 and $dummy_{EDC} = 1$ for the years 2012 and 2013[15], and 0 otherwise. Column (1) of table 8 shows

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[13]We don't comment the IV-specification in table 7, given that the coefficients of the lagged CAB variable have an unexpected sign. There are shown for the purpose of completeness only.

[14]The specifications with time fixed effects already control for time specific factors. The interest in using specific time dummies lies in testing the influence of the crises years jointly.

[15]We define common dummies for the full country set. There are set 1 for years where real GDP growth was negative in the euro area as a whole, and 0 otherwise.

Method	LS-FE
$GAP_{i,t-1}$	0.867***
	[18.344]
$POT_{i,t}$	0.351**
	[2.181]
$POT_{i,t-1}$	-0.360**
	[-2.600]
$OTHER\_GAP_{i,t}$	-6.505***
	[-6.973]
$OTHER\_GAP_{i,t-1}$	5.247***
	[6.351]
$CAB_{i,t-1}$	-0.006
	[-0.242]
$DEBT_{i,t-1}$	0.007
	[1.315]
Constant	-1.822**
	[-2.178]
Nb. of obs.	176
Adj. R^2	0.936
Country FE	yes
Time FE	yes

Table 6: First-stage regression in real-time

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Ordinary standard errors. Country and time fixed effects are not reported.

	Budget planning			First outcome		
	(1)	(2)	(3)	(4)	(5)	(6)
Method	LS-FE	LS-FE	IV-FE	LS-FE	LS-FE	IV-FE
$CAB_{i,t-1}$	-0.386***	-0.457***	0.0545	-0.266**	-0.323***	0.066
	[-6.304]	[-7.040]	[0.380]	[-2.578]	[-2.903]	[0.281]
$GAP_{i,t-1}$	-0.042	-0.153**		0.016	0.089	
	[-0.586]	[-1.989]		[0.141]	[0.605]	
$GAP_{i,t}$			-0.169*			-0.079
			[-1.632]			[-0.528]
$DEBT_{i,t-1}$	0.003	0.002	0.001	0.020	0.025	-0.035
	[0.341]	[0.189]	[0.081]	[1.124]	[1.281]	[-1.095]
Constant	-0.665	-0.830	0.124	-1.893	-2.372	3.064
	[-0.944]	[-1.139]	[0.086]	[-1.345]	[-1.538]	[1.192]
Nb. of obs.	231	231	231	231	231	231
Adj. R^2	0.497	0.618	0.040	0.111	0.249	-0.086
Country FE	yes	yes	yes	yes	yes	yes
Time FE	no	yes	yes	no	yes	yes

Table 7: Fiscal reaction functions in the euro area (1999-2019) for $\Delta CAB_{i,t}$

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported. Equation (3) and (6) include the lagged output gap and the forecast and nowcast of the lagged output gap of other countries as instruments, as the potential POT is not available over the long period.

that adding time dummies for the crisis periods does not alter the conclusions of the baseline results, the coefficient of the output gap remains negative[16] and close in size to table 4 for the budget planning phase. The crises dummies reveal a planned fiscal tightening during the GFC and a small planned fiscal loosening during the EDC, both coefficients being however not significant. In a second step, we verify the influence of the crisis years on the conclusion on the cyclicality of the fiscal stance by interacting the time dummies with the output gap. Column (2) of table 8 confirms the pro-cyclicality of the fiscal stance during the budget planning period outside of the crisis years. The coefficient indicates that a (positive) output gap of 1 per cent leads to a worsening of the CAB by 0.30 per cent of GDP during non-crisis years, which is even slightly higher in absolute terms than in our baseline results. During the GFC, the coefficient of the output gap shows a non-significant counter-cyclical stance, while we observe a weakly significant pro-cyclical fiscal stance (tightening) during the EDC. We conclude hence that the baseline findings of a pro-cyclical fiscal orientation in real-time are not driven by the two crisis periods[17]. The fiscal orientation duing the EDC was however also clearly oriented in a pro-cyclical manner. These results are confirmed when performing the same analysis over the long time sample (see Appendix C).

In what regards the first outcomes, column (3) of table 8 confirms an a-cyclical orientation of

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[16]The coefficient is not significant in the estimation with robust standard errors and strongly significant with ordinary standard errors.

[17]The conclusions are the same and coefficients very close to table 8 when using the contemporanous output gap instead of the lagged one

| | Budget planning | | First outcome | |
| | (1) | (2) | (3) | (4) |
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAB_{i,t-1}$	-0.423***	-0.516***	-0.308***	-0.361**
	[-5.897]	[-7.334]	[-2.691]	[-2.536]
$GAP_{i,t-1}$	-0.123		0.115	
	[-1.541]		[0.858]	
$DEBT_{i,t-1}$	0.006	-0.007	0.019	0.027
	[0.515]	[-0.540]	[0.974]	[0.848]
$dummy_{GFC}$	0.566		-2.580***	
	[0.938]		[-3.099]	
$dummy_{EDC}$	-0.135		-0.135	
	[-0.242]		[-0.197]	
$GAP_{i,t-1} * dummy_{GFC}$		0.392		0.081
		[1.008]		[0.113]
$GAP_{i,t-1} * dummy_{EDC}$		-0.196*		0.227
		[-1.975]		[0.873]
$GAP_{i,t-1} * (1 - dummy_{GFC} - dummy_{EDC})$		-0.295***		-0.020
		[-3.229]		[-0.090]
Constant	-1.295	-0.663	-1.642	-2.804
	[-1.331]	[-0.704]	[-0.996]	[-1.186]
Nb. of obs.	176	176	176	176
Adj. R^2	0.543	0.678	0.205	0.256
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 8: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAB_{i,t}$ controlling for crisis years

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

	Budget planning		First outcome	
	(1)	(2)	(3)	(4)
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAPB_{i,t-1}$	-0.492***	-0.566***	-0.357***	-0.408***
	[-6.878]	[-8.562]	[-3.022]	[-2.896]
$GAP_{i,t-1}$	-0.134*		0.117	
	[-1.682]		[0.865]	
$DEBT_{i,t-1}$	0.012	0.014	0.019	0.039
	[0.983]	[1.197]	[0.966]	[1.304]
$dummy_{GFC}$	0.827		-2.479**	
	[1.309]		[-2.798]	
$dummy_{EDC}$	0.310		-0.025	
	[0.537]		[-0.034]	
$GAP_{i,t-1} * dummy_{GFC}$		0.467		0.126
		[1.384]		[0.184]
$GAP_{i,t-1} * dummy_{EDC}$		-0.225**		0.330
		[-2.044]		[1.325]
$GAP_{i,t-1} * (1 - dummy_{GFC} - dummy_{EDC})$		-0.221**		0.023
		[-2.496]		[0.111]
Constant	-0.634	-0.805	-0.861	-2.856
	[-0.630]	[-0.871]	[-0.535]	[-1.241]
Nb. of obs.	165	165	176	176
Adj. R^2	0.623	0.740	0.224	0.308
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 9: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAPB_{i,t}$ controlling for crisis years

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

fiscal policy when controlling for the two crisis periods. The crisis dummies reveal a sizeable and significant fiscal loosening during the GFC and a small but non-significant loosening during the EDC. The conclusions on the cyclicality of fiscal policy are not altered when considering only non-crisis years (see column (4) of table 8): we observe a small but non significant coefficient on the output gap, indicating a broadly a-cyclical fiscal stance for first fiscal outcomes. During the crisis years, the coefficient of the output gap is slightly positive but also non significant. Ex-post we hence do not confirm the pro-cyclical nature of fiscal policy during the EDC. See Appendix C for the estimations over the long time sample.

Table 9 presents the replication of the analysis for $\Delta CAPB_{i,t}$, confirming largely the above findings for $\Delta CAB_{i,t}$.

Group	Country	Budget planning	First outcome
Group 1 (negative sign on $GAP_{i,t-1}$ in budget planning)	GR	-0.449** [-2.230]	-0.034 [-0.086]
	FR	-0.337** [-2.335]	-0.348* [-1.981]
	IT	-0.145 [-0.943]	-0.013 [-0.136]
	ES	-0.086 [-1.027]	-0.327 [-1.463]
	FI	-0.040 [-0.226]	-0.106 [-1.340]
	PT	-0.004 [-0.032]	0.033 [0.126]
Group 2 (positive sign on $GAP_{i,t-1}$ in budget planning)	BE	0.096 [0.599]	-0.462* [-1.945]
	NL	0.134 [0.621]	-0.240 [-1.161]
	AT	0.315* [2.049]	0.076 [0.569]
	DE	0.521*** [3.956]	0.158 [1.393]
	IE	1.129*** [4.323]	1.067 [1.429]

Table 10: Individual fiscal reaction functions (2004-2019) for $\Delta CAB_{i,t}$: coefficient on lagged output gap

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Ordinary least squares. Ordinary standard errors.

5.3.3 Heterogeneity inside the euro area

In this section we look deeper in the question whether Euro area countries or groups of countries differ in terms of their fiscal stance. We estimate our fiscal reaction functions for ΔCAB with the lagged output gap for each country individually by OLS. Then we group countries according to their ex ante fiscal stance. In a first group we gather the countries whose fiscal policy is pro-cyclical ex ante (or a-cyclical with a negative coefficient on the lagged output gap), whereas the other group contains countries with a counter-cyclical ex ante fiscal stance (or a-cyclical with a positive coefficient on the lagged output gap). The two groups are presented in table 10 with the coefficients on the output gap obtained by an OLS estimate of the fiscal reaction function with ex ante information (column 1) and first outcome data (column 2).

The group of countries with an ex ante pro-cyclical fiscal stance is made up of Greece, France, Italy, Spain, Finland and Portugal. Apart from France and Finland, these countries were those most affected by the EDC. France also had a deficit above the 3 % threshold during this period and might have run a pro-cyclical fiscal policy in order not to aggravate its fiscal position. On

Group of countries	Group 1 (pro-cyclical)		Group 2 (counter-cyclical)	
Data vintage	Budget planning	First outcome	Budget planning	First outcome
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAB_{i,t-1}$	-0.359***	-0.370***	-0.805***	-0.537*
	[-4.627]	[-2.904]	[-9.810]	[-1.766]
$GAP_{i,t-1}$	-0.213**	0.001	0.642***	1.002
	[-2.375]	[0.006]	[2.912]	[1.090]
$DEBT_{i,t-1}$	0.012	0.061**	-0.043**	0.025
	[1.032]	[2.193]	[-2.613]	[0.370]
Constant	-2.053*	-6.466**	2.511**	-2.264
	[-1.846]	[-2.407]	[2.107]	[-0.479]
Nb. of obs.	96	96	80	80
Adj. R^2	0.550	0.376	0.841	0.257
Country FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes

Table 11: Fiscal reaction functions in subgroups of euro area countries (2004-2019) for $\Delta CAB_{i,t}$

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

the other side, Belgium, the Netherlands, Austria, Germany and Ireland have a planned counter-cyclical fiscal stance. The euro area estimate presents the average results of the 11 individual estimates. Hence, our result of an ex ante pro-cyclical fiscal stance in the euro area countries is driven mostly by Greece, France, and to a lesser extent Italy, Spain, Finland and Portugal, while the other countries, and in particular Ireland and Germany, temper this result.

Most countries keep the same fiscal orientation (*i.e.* the sign of the coefficient on lagged output gap) in the first release as planned in the budget, with the exception of the Netherlands (whose coefficients are not significant), Portugal (whose coefficients are very low and not significant) and Belgium. Except for France and Belgium, the coefficient is not significant in the first outcome for none of the countries.

We then estimate the panel specification (2) (with the lagged output gap and time and country fixed effects) for each of the identified groups of countries and for the two vintages of data: budget planning and first outcome, see table 11. Again, the ex ante estimates explain more variance than the ex post estimates.

Countries that are pro-cyclical ex ante become a-cyclical (with a positive but non significant coefficient) ex post. The coefficient on debt, which is not significant ex ante, becomes significant ex post. It is positive, indicating a tendency for the fiscal balance to improve as the debt increases. Countries that have a counter-cyclical fiscal policy ex ante also are a-cyclical ex post (the coefficient on the lagged output gap becomes insignificant, although it increases relative to the ex ante estimate). While the coefficient on debt is negative ex ante, indicating an inverse relationship between the debt level and the fiscal orientation, it becomes non significant ex post.

We obtain very similar results when we estimate individual fiscal reaction functions for $\Delta CAPB$ instead of ΔCAB (see tables 20 and 21 at the end of appendix C).

5.3.4 Tightening and loosening episodes

An important question is what could explain the intention of governments to implement a pro-cyclical fiscal policy, which is sub-optimal from a macroeconomic stabilisation point of view. Two possible explanations proposed in the introductory section are a general deficit bias of fiscal policy or forced fiscal consolidation during times of market stress. The first would rather be in line with pro-cyclical loosening episodes while the later would rather occur during tightening episodes. We hence examine the cyclicality during tightening and loosening episodes seperately in this section.

We run our baseline regressions with and without time fixed effects with the FE-LS estimator, controlling for episodes of tightening and loosening, on the full sample of countries from 2004 to 2019. In concrete terms, we interact the output gap with a dummy for tightening episodes and a dummy for loosening episodes. Results are shown in table 12 for the change in CAB and in table 13 for the change in CAPB.

We find that the fiscal stance is pro cyclical ex ante during tightening episodes, and rather a-cyclical during loosening episodes at the budget planning phase, both for the change in CAB and the change in CAPB (see columns (2) of table 12 and table 13). In our prefered specification with time fixed effects (see columns (4) of table 12 and table 13), the fiscal stance is a-cyclical ex post during tightening episodes and either a-cyclical (for the change in CAB) or even counter-cyclical (for the change in CAPB) during loosening episodes. We hence argue that the pro-cylicality of ex ante fiscal policy during tightening episodes is related to forced consolidation due to market stress or the intention of governments to signal a "stronger" tightening in their fiscal balances in difficult economic times compared to what is really implemented in the end.

6   Conclusions

In this paper, we analyse the cyclical orientation of fiscal policy in the euro area since 1999 and 2004 until 2019 during budget planning and for first outcomes, using a new real-time dataset based on the European Commission's biannual forecasts. Our empirical results indicate a pro-cyclical behaviour of fiscal plans on average for the euro area, for both the cyclically-adjusted total balance and the cyclically-adjusted primary balance. These results are robust to different specifications and estimation methods. In our preferred baseline specification over the 2004-2019 period, a (positive) output gap of 1 per cent worsens the cyclically-adjusted balance by about -0.24 per cent and the cyclically-adjusted primary balance by about -0.19 per cent during budget planning. Over the longer 1999-2019 period, a (positive) output gap of 1 per cent is associated with a worsening of the cyclically-adjusted balance by about -0.15 per cent. Turning to first

	Budget planning		First outcome	
	(1)	(2)	(3)	(4)
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAB_{i,t-1}$	-0.384***	-0.492***	-0.206*	-0.260*
	[-5.855]	[-6.726]	[-1.679]	[-1.882]
$GAP_{i,t-1} * (\Delta CAB_{i,t} > 0)$	-0.230***	-0.306***	-0.345**	-0.243
	[-2.794]	[-3.711]	[-2.448]	[-1.329]
$GAP_{i,t-1} * (\Delta CAB_{i,t} < 0)$	0.118	-0.089	0.218	0.303
	[1.133]	[-0.811]	[1.551]	[1.538]
$DEBT_{i,t-1}$	0.001	-0.004	0.026	0.030
	[0.098]	[-0.364]	[1.234]	[1.087]
Constant	-0.706	-0.696	-2.729	-3.049
	[-0.897]	[-0.726]	[-1.534]	[-1.365]
Nb. of obs.	176	176	176	176
Adj. R^2	0.596	0.686	0.235	0.356
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 12: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAB_{i,t}$ controlling for tightening and loosening episodes

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

	Budget planning		First outcome	
	(1)	(2)	(3)	(4)
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAPB_{i,t-1}$	-0.442***	-0.539***	-0.240*	-0.289**
	[-6.843]	[-7.681]	[-1.943]	[-2.138]
$GAP_{i,t-1} * (\Delta CAPB_{i,t} > 0)$	-0.249***	-0.264***	-0.418***	-0.270
	[-3.028]	[-3.206]	[-3.038]	[-1.574]
$GAP_{i,t-1} * (\Delta CAPB_{i,t} < 0)$	0.086	-0.065	0.237*	0.366**
	[0.868]	[-0.655]	[1.733]	[2.101]
$DEBT_{i,t-1}$	0.006	0.017	0.028	0.044*
	[0.614]	[1.389]	[1.323]	[1.660]
Constant	-0.032	-0.987	-2.354	-3.503*
	[-0.041]	[-1.044]	[-1.367]	[-1.668]
Nb. of obs.	165	165	176	176
Adj. R^2	0.661	0.748	0.291	0.430
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 13: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAPB_{i,t}$ controlling for tightening and loosening episodes

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

outturns, our results suggest a broadly a-cyclical behaviour of fiscal policy in the euro area, with non-significant coefficients of the output gap in the estimations, both for the longer and the shorter period. We do not find any evidence for an impact of debt levels on the fiscal policy orientation, neither during fiscal planning nor in first outcomes.

These findings are confirmed when controlling for the Great Financial crisis or the European Debt crisis, which occurred during the sample period. Fiscal plans were also pro-cyclical excluding these crisis years, and, according to our empirical results, counter-cyclical (but not significant) during the Great Financial crisis and significantly pro-cyclical during the European Debt crisis. Our results contrast somewhat with earlier studies on the fiscal policy orientation in real-time, which find that fiscal plans were conceived counter-cyclically and that surprises on the economic conditions led to a broadly a-cyclical orientation ex-post (notably Forni and Momigliano, 2005; Golinelli and Momigliano, 2009; Pina, 2009; Cimadomo, 2012), given an optimistic bias on the output gap estimate in real-time. Our findings are in line with the findings of a more recent paper by Aldama and Creel (2021), who also find a pro-cyclical fiscal orientation during budget planning in OECD countries (covering a large panel of euro area countries). We also show that the fiscal orientation is not uniform in the euro area that the average result is driven by some countries with a strong pro-cyclical ex ante fiscal policy orientation. We observe a more pro-cyclical behaviour of fiscal plans for countries such as Greece, France, Italy, Spain, and Finland and a more counter-cyclical behaviour in fiscal plans for a group of countries covering Ireland, Germany, Austria, and to a lesser extent also the Netherlands and Belgium. The heterogeneity of the cyclicality of fiscal policy is very important in the euro area.

Our results imply that, on average for euro area countries, the cyclical orientation of fiscal policy is already suboptimal from a macroeconomic stabilisation perspective during budget planning and it is not just the misjudgement on cyclical conditions that drives the result of an a- or pro-cyclical behaviour in fiscal outturns in the euro area. We also find an optimistic bias on cyclical conditions in real-time, which might motivate fiscal policy to provide too much fiscal support ex ante. However, this effect is overlaid by other factors, which explains why fiscal policy is finally less pro-cyclical ex-post than fiscal plans. A possible explanation for the pro-cyclicality of fiscal plans could be for governments to signal a tighter policy stance than will actually be implemented in the end. The reasons for pro-cyclical fiscal policy, commenly documented in empirical studies, remains an area for further research.

A   Appendix: Cyclicality of the fiscal stance

Figures 5 and 6, and tables 14 and 15 replicate the figures and tables in section 4.1 with the change in the output gap instead of the level of output gap.

Figure 5: Fiscal stance throughout the cycle over 2004-2019 (ΔCAB and ΔOG)

Note: a tightening fiscal policy corresponds to an increase in the CAB

	Pro-cycl. tight.	Anti-cycl. tight.	Pro-cycl. loosen.	Anti-cycl. loosen.
$E_{t-1}(x_t)$	44	54	52	26
$x_{t|t+1}$	38	53	61	24

Table 14: Fiscal stance regimes for ΔCAB and ΔOG over 2004-2019

	Pro-cycl. tight.	Anti-cycl. tight.	Pro-cycl. loosen.	Anti-cycl. loosen.
$E_{t-1}(x_t)$	47	47	59	23
$x_{t|t+1}$	36	44	70	26

Table 15: Fiscal stance regimes for $\Delta CAPB$ and ΔOG over 2004-2019
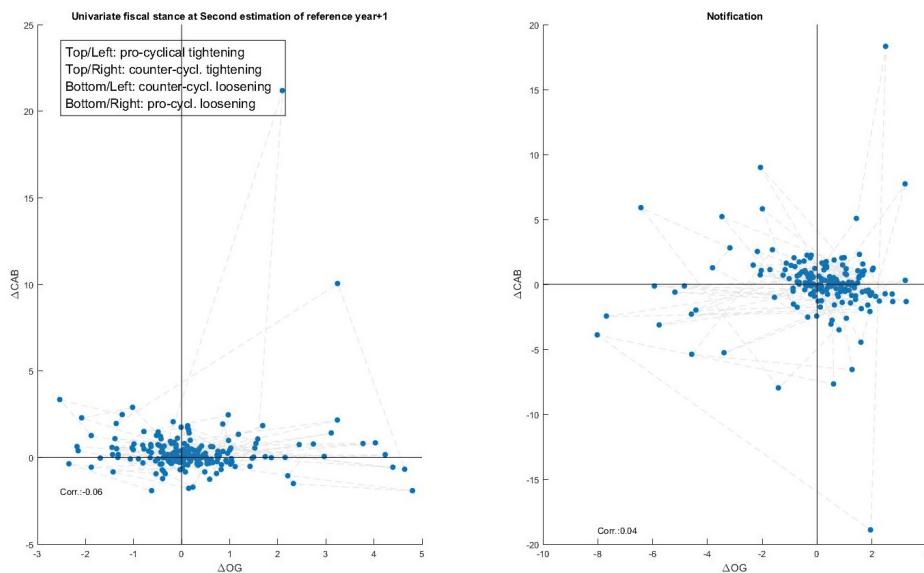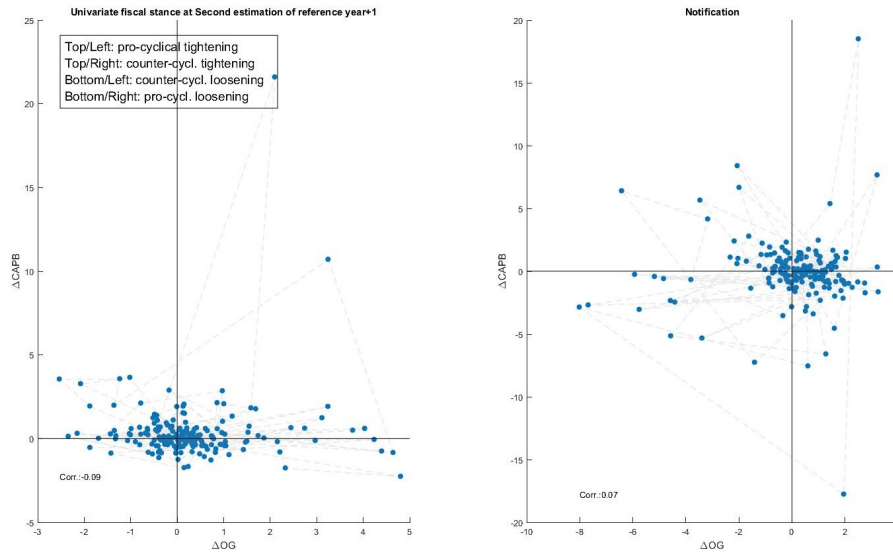

Figure 6: Fiscal stance throughout the cycle over 2004-2019 ($\Delta CAPB$ and ΔOG)

Note: a tightening fiscal policy corresponds to an increase in the CAPB

B Appendix: Forecast errors

Figure 7 shows the distribution of output gap and cyclically-adjusted primary balance forecast errors over 2004-2019.
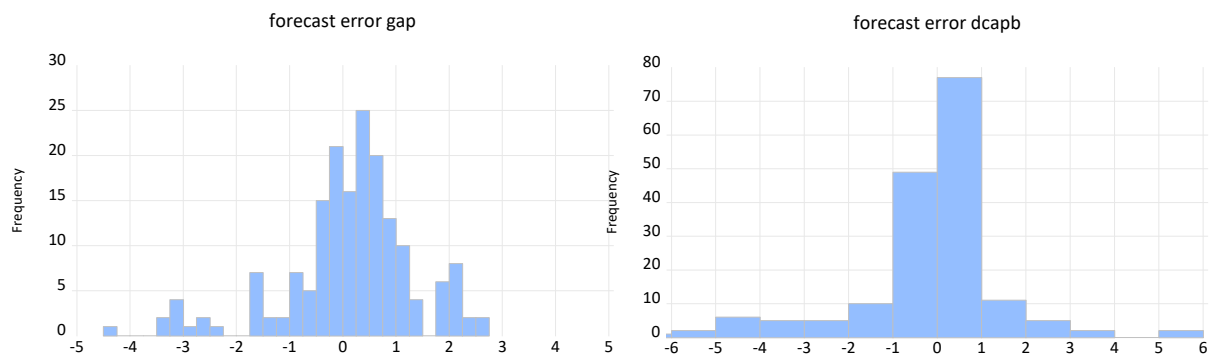
Figure 7: Distribution of output gap and cyclically-adjusted balance forecast errors, 2004-2019

Table 16 shows the forecast errors of ΔCAB and GAP grouped per country.

	AT	BE	DE	ES	FI	FR	GR	IE	IT	NL	PT
Error GAP	0.28	0.31	0.40	-0.42	0.01	0.31	-0.59	0.64	-0.30	0.27	0.45
Error dCAB	0.03	0.20	0.37	-0.72	0.13	-0.08	-0.61	-1.65	0.13	0.07	-0.03
Nb error GAP > 0	9	13	13	5	10	12	6	13	3	10	12
Nb error dCAB > 0	10	9	14	7	10	9	5	7	9	9	11

Table 16: Average forecast errors of ΔCAB and GAP

C   Appendix: Additional estimation results

	dependant: $\Delta CAB_{i,t}$		dependant: $\Delta CAPB_{i,t}$	
	(1)	(2)	(3)	(4)
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAB_{i,t-1}$ or $CAPB_{i,t-1}$	-0.332***	-0.382***	-0.398***	-0.441***
	[-2.650]	[-2.713]	[-3.014]	[-3.053]
$GAP_{i,t-1}$	-0.018	-0.038	-0.014	-0.003
	[-0.143]	[-0.214]	[-0.116]	[-0.018]
$DEBT_{i,t-1}$	0.036	0.033	0.036	0.046
	[1.561]	[1.124]	[1.560]	[1.541]
Constant	-3.860*	-3.807	-3.030	-3.849
	[-1.971]	[-1.545]	[-1.594]	[-1.582]
Nb. of obs.	176	176	176	176
Adj. R^2	0.180	0.267	0.208	0.309
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 17: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAB_{i,t}$ and $\Delta CAPB_{i,t}$ with final data

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported. The coefficient of $GAP_{i,t-1}$ is also not significant in (1)-(4) when using ordinary standard errors.

	dependant: $\Delta CAB_{i,t}$		dependant: $\Delta CAPB_{i,t}$	
Data vintage	Budget planning	First outcome	Budget planning	First outcome
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAB_{i,t-1}$ or $CAPB_{i,t-1}$	-0.474***	-0.352***	-0.541***	-0.406***
	[-6.668]	[-2.674]	[-8.467]	[-2.978]
$\Delta GAP_{i,t-1}$	-0.456**	0.183	-0.530**	0.211
	[-2.067]	[0.676]	[-2.610]	[0.797]
$DEBT_{i,t-1}$	0.023**	0.021	0.042***	0.030
	[2.100]	[0.871]	[3.929]	[1.191]
Constant	-2.564***	-2.357	-2.724***	-2.136
	[-2.752]	[-1.112]	[-3.059]	[-1.031]
Nb. of obs.	176	176	165	176
Adj. R^2	0.652	0.262	0.741	0.306
Country FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes

Table 18: Fiscal reaction functions in the euro area (2004-2019) for $\Delta CAB_{i,t}$ and $\Delta CAPB_{i,t}$ with the change in the output gap

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

| | Budget planning | | First outcome | |
Method	(1) LS-FE	(2) LS-FE	(3) LS-FE	(4) LS-FE
$CAB_{i,t-1}$	-0.388***	-0.459***	-0.294***	-0.330***
	[-6.267]	[-7.200]	[-3.115]	[-2.906]
$GAP_{i,t-1}$	-0.046		0.123	
	[-0.627]		[1.164]	
$DEBT_{i,t-1}$	0.004	-0.000	0.017	0.023
	[0.441]	[-0.031]	[1.167]	[1.195]
$dummy_{GFC}$	0.159		-2.708***	
	[0.314]		[-4.045]	
$dummy_{EDC}$	-0.158		-0.138	
	[-0.321]		[-0.231]	
$GAP_{i,t-1} * dummy_{GFC}$		0.472		0.092
		[1.149]		[0.147]
$GAP_{i,t-1} * dummy_{EDC}$		-0.150		0.250
		[-1.505]		[1.130]
$GAP_{i,t-1} * (1 - dummy_{GFC} - dummy_{EDC})$		-0.187**		0.034
		[-2.226]		[0.208]
Constant	-0.751	-0.706	-1.371	-2.273
	[-1.030]	[-1.000]	[-1.159]	[-1.484]
Nb. of obs.	231	231	231	231
Adj. R^2	0.494	0.625	0.205	0.248
Country FE	yes	yes	yes	yes
Time FE	no	yes	no	yes

Table 19: Fiscal reaction functions in the euro area (1999-2019) for $\Delta CAB_{i,t}$ controlling for crisis years

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported. The coefficient of $GAP_{i,t-1} * dummy_{GFC}$ and $GAP_{i,t-1} * dummy_{EDC}$ are weakly significant in (2) when using ordinary standard errors. They remain insiginificant in (4) in this case.

Table 20 provides the coefficients on the lagged output gap for individual fiscal reaction functions estimated for $\Delta CAPB_{i,t}$, as we did for $\Delta CAB_{i,t}$ in section 5.3.3. The conclusions are similar as those obtained for $\Delta CAB_{i,t}$ except that the coefficients for the Netherlands is now negative (although still non significant).

Group	Country	Budget planning	First outcome
Group 1 (negative sign on $GAP_{i,t-1}$ in budget planning)	GR	-0.505**	0.097
		[-2.606]	[0.225]
	FR	-0.390**	-0.385
		[-2.911]	[-1.781]
	IT	-0.185	-0.042
		[-0.895]	[-0.281]
	ES	-0.161	-0.342
		[-1.665]	[-1.493]
	PT	-0.092	-0.057
		[-0.550]	[-0.210]
	NL	-0.043	-0.267
		[-0.206]	[-1.186]
	FI	-0.035	-0.121
		[-0.217]	[-1.606]
Group 2 (positive sign on $GAP_{i,t-1}$ in budget planning)	BE	0.010	-0.580**
		[0.072]	[-2.482]
	AT	0.297*	0.044
		[2.192]	[0.315]
	DE	0.587***	0.169
		[4.851]	[1.473]
	IE	0.920***	1.169
		[3.665]	[1.316]

Table 20: Individual fiscal reaction functions (2005-2019) for $\Delta CAPB_{i,t}$: coefficient on lagged output gap

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Ordinary least squares. Ordinary standard errors.

The fiscal reaction functions estimated in panel of group-1 and group-2 countries for $\Delta CAPB_{i,t}$ are again similar to those obtained in section 5.3.3 for $\Delta CAB_{i,t}$: whatever the ex ante fiscal stance (procyclical in group 1, countercyclical in group 2), the fiscal policy is acyclical ex post.

Group of countries	Group 1 (pro-cyclical)		Group 2 (counter-cyclical)	
Data vintage	Budget planning	First outcome	Budget planning	First outcome
Method	LS-FE	LS-FE	LS-FE	LS-FE
$CAPB_{i,t-1}$	-0.441***	-0.459***	-0.837***	-0.553
	[-5.627]	[-3.461]	[-10.29]	[-1.614]
$GAP_{i,t-1}$	-0.182**	0.064	0.784***	1.156
	[-2.026]	[0.424]	[2.979]	[0.961]
$DEBT_{i,t-1}$	0.023**	0.063**	-0.008	0.063
	[2.247]	[2.573]	[-0.566]	[0.868]
Constant	-1.705*	-5.088**	1.974	-4.384
	[-1.961]	[-2.405]	[1.647]	[-0.790]
Nb. of obs.	105	105	60	60
Adj. R^2	0.613	0.421	0.885	0.292
Country FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes

Table 21: Fiscal reaction functions in subgroups of euro area countries (2005-2019) for $\Delta CAPB_{i,t}$

Asterisks *, ** and *** denote significance at 10%, 5% and 1% significance levels, respectively. T-statistics are given in parentheses. Robust standard errors (cross-section SUR PCSE). Country and time fixed effects are not reported.

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