Lisbon School of Economics & Management
Universidade de Lisboa

MASTER

MONETARY AND FINANCIAL ECONOMICS

MASTER´S FINAL WORK

DISSERTATION

CYCLICALITY OF FISCAL POLICY: HOW DO EUROZONE'S FISCAL STANCES CHANGE DURING RECESSIONS?

FRANCISCO TIAGO DOS SANTOS CARVALHO

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SUPERVISION:
PROF. ANTÓNIO AFONSO

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To my family. It really took a village.

GLOSSARY

CAPB – Cyclically Adjusted Primary Balance

COVID-19 – Corona Virus Disease 2019

EA – Euro Area

EC – European Commission

ECB – European Central Bank

EMU – European Monetary Union

EU – European Union

GDP – Gross Domestic Product.

GFC – Global Financial Crisis

IMF – International Monetary Fund

KA – Capital Account

MTO – Medium Term Objective

OBB – Overall Budget Balance

OECD – Organization for Economic Co-operation and Development

OLS – Ordinary Least Squares

SGP – Stability and Growth Pact

ZLB – Zero Lower Bound

ABSTRACT, KEYWORDS AND JEL CODES

This dissertation presents findings about the cyclicality of fiscal policy in the 19 Eurozone countries during recessions, for the period from 1995 to 2020. A time-varying measure of cyclicality is used to describe both overall and discretionary fiscal policy. The results suggest that during recessions discretionary fiscal policy becomes more pro-cyclical, but overall fiscal policy becomes more counter-cyclical. The results also suggest that the pursuing of a Ricardian fiscal regime by more indebted countries leads to higher counter-cyclicality of fiscal policy.

KEYWORDS: Fiscal Policy; Cyclicality; Ricardian Regime; Recessions; Time-varying.

JEL CODES: C23; E62; H30; H62.

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ACKNOWLEDGMENTS

I wish to thank my family for all their support during my academic path and for never doubting my abilities. Particularly, I wish to thank my grandmother, Celeste Carvalho, for all the love and hard work employed in making sure I could focus on my goals. Nevertheless, the most special thanks must go to my mother, Ana Tiago, and my father, Mário Carvalho, who are the reason for me being where I stand. Thank you for all the love, care and support, in all the possible meanings of these words, that I felt throughout the years. This is also yours.

I am also grateful to Mariana Afonso, who was there in the most difficult times and helped me with her infinite care and understanding.

Additionally, I want to express my gratitude towards my colleagues at Associação Portuguesa de Seguradores, who made sure my after-work studies went as smooth as possible. Likewise, I am thankful to my colleagues at ISEG, whose support was determinant to successfully finish this degree.

Finally, I wish to thank all the professors that inspired throughout my studies and especially to Professor António Afonso for his help and guidance in writing this dissertation.

CYCLICALITY OF FISCAL POLICY: HOW DO EUROZONE'S FISCAL STANCES CHANGE DURING RECESSIONS?

1. INTRODUCTION

If topics regarding the cyclicality of fiscal policy were revisited after the financial crisis, the COVID-19 pandemic and the imminent response from authorities to the economic shutdown imposed by lockdown measures brought to a new spotlight the ability and willingness of governments to smooth the business cycle. Those lockdown measures led to an unprecedented fall on GDPs around the world. With that unparalleled fall it seems to be arriving an also unprecedented (i.e., in size) fiscal response from authorities. From Washington, where President Biden announced a $1.9 trillion American Rescue Plan (White House, 2021) to Brussels, where the European Commission (EC) (n.d.) announced a €1.8 trillion stimulus package, authorities seem to be willing to open the tap of public money to ensure the economy does not run dry for too long.

Even though there is a previous experience on what regards a European-wide stimulus package, designed in response to the 2009 Global Financial Crisis (GFC) and that worth around €200 billion, the current EC plan dwarves its forerunner. However, the subsequent events after the 2009 stimulus have shown us that this apparent counter-cyclical behaviour may not be long lasting, since not long after that package the so-called European Sovereign Debt crisis erupted, which led to some pro-cyclical fiscal adjustments in several economies (Jalles, 2021) who for the first time did not have the aid from monetary policy, now under the European Central Banks's (ECB) control.

Fast forward to the present and, although debt levels are still way above what is required in EU Treaties, concerns about debt sustainability due to a further rise in government debt and the disrespect for deficit criteria are not being (for now) raised above the need for stabilization. With interest rates expected to remain low for the next following years and the ECB open market operations ensuring that Eurozone government bonds will be save from investors mistrust, this appears to be a completely different environment from the previous crisis, which started as a financial crisis and quickly led to a banking and sovereign debt crisis. Notwithstanding the hardship of the process, the EU and the Eurozone succeeded to overcome the previous crisis and the hope is that past mistakes are not to be repeated once more.

With those two last shocks in mind, one can ask several questions on what governments do regarding fiscal policy. Do they follow the standard Keynesian approach of running a counter-cyclical fiscal policy or not so much? How do governments usually react to economic slowdowns? Do they change their fiscal stance or simply leave automatic stabilizers to work? All in all, my main research question to which I hope to answer with this dissertation is: "**How do Eurozone countries' fiscal stance change during recessions?**".

Answering this question seems important in today's context because it may help to better understand the difference between governments reactions to good and bad times. If authorities leave fiscal policy reactions merely to moments of crisis and recessions, as they seem to (International Monetary Fund [IMF], 2008) they risk, on one hand, to be exacerbating the business cycle and, on the other, not taking advantage of good times to improve debt sustainability, crucial to ensure the ability of a response once bad times come. Thus, it may be relevant to study if the difference between up-turn and down-turn fiscal stance is statistically significant in the Euro Area (EA) to infer if its 19 countries are committing those mistakes. The choice of studying particularly this sample of countries is due to the particular importance of public finance sustainability and its implications in the context of a monetary union.

Smoothing the business cycle was considered by Musgrave (1959) as one of the three crucial functions of government and for that end, at least until the 1970's, governments tended to implement a very active fiscal policy. However, the inability to solve the problems stemming from the oil shocks and stagflation led some economists to disregard fiscal policy as an effective method to smooth the business cycle (Beetsma & Giuliodori, 2011) and, since then, monetary policy has assumed a more centre-stage position as a stabilization tool. Business cycle stabilization is important because macroeconomic volatility can hamper medium-term growth (Furceri & Jalles, 2018). However, even before the pandemic hit, interest rates were still historically low in Europe, ever since the Sovereign Debt Crisis. With unconventional monetary policy still trying to tackle the Zero Lower Bound (ZLB) problem and inflation persistently below the 2% target, fiscal policy emerges once more as the ultimate tool to help aggregate demand to bounce back. Nevertheless, with debt levels historically high, it is important to be sure that governments using fiscal policy are indeed contributing to smoothing the cycle and not magnifying it,

as stated before. Stimuli must be switched off once economic activity picks up again, hence the importance in shedding a light on the possible different pattern in EA countries' fiscal policy cyclicality during up and down-swings. If counter-cyclical fiscal policy in the past has been only used to boost the economy and not to smooth its booms, it is important for policy makers to be aware of this bias, which has the potential to harm medium-term growth, by increasing output volatility and raising debt sustainability concerns.

Given these caveats around fiscal policy, there is some discussion about its benefits as a stabilization tool. As pointed out, some authors argue that active fiscal policy can indeed amplify the business cycle, if ran on a pro-cyclical basis. This may not be deliberate, but rather a consequence of implementation lags and difficulties or badly designed measures. According to the IMF (2008) there are three criteria to be achieved for stimulus to be effective: timely, targeted and temporary. Answering the research question of this dissertation will allow to assess if the fiscal stance behaviour (i.e., the discretionary part of fiscal policy) has been compatible with these criteria, namely the first and third. If governments end up missing one of the three criteria, they risk being putting off fires with gasoline. As put by Larch, Orseau and van der Wielen (2021), "With the exception of very large shocks, discretionary measures remain ill-timed from a stabilization perspective (…)". On the other hand, some authors also show that pro-cyclicality of fiscal policy does not always rise only from simple incompetence or timing flaws but also from political institutions. The voracity effect explored by Tornell and Lane (1999) predicts a pro-cyclical behaviour of fiscal policy due to fiscal competition among "power blocks" for the absorption of rising fiscal revenues during expansions. Alesina, Campante and Tabellini (2008) attribute pro-cyclical fiscal behaviour, mostly in developing countries, to asymmetric information and political agency problems that lead voters to demand expansionary fiscal policy when observing a boom, to avoid governments from absorbing extra revenues as rents (which voters cannot observe) – in their words, an attempt to "starve the Leviathan". This strand of literature is corroborated by Fatás and Mihov (2003 and 2006) who found that discretionary fiscal policy can induce macroeconomic instability, which harms economic growth, but such can be prevented with political constraints on politicians, as per their work on a sample of US states.

However, most authors are generally in favour of counter-cyclical fiscal policy as a tool to reduce macroeconomic volatility (Jalles, 2021), thus finding the benefits to outweigh the risks. Even though there is still some difference between developed and developing countries, counter-cyclicality seems to be increasing since the 1980's (Jalles, 2018). This can indicate some improvement on the caveats of this tool and it is notwithstanding the more recent findings of Jalles (2021) of pro-cyclical fiscal policy during financial distressed times in developed countries, due to financing constraints, something that was not considered in the literature as a real possibility before the Financial and the European Sovereign Debt Crisis (see, for instance Lane [2003]). Under these findings, it follows that a possible answer to my research question is that downturns may impinge in such a way on public finance that fiscal policy stance does not change significantly in downturns either due to financing constraints.

All in all, even if fiscal policy is not perfect, it is an important tool to promote economic stability and is in place to be used in the following years to deal with the pandemic economic crisis. Thus, it is important for us to know how the fiscal stance changed in response to past economic developments for it might tell us how it is likely to behave once the economy is back on track. Will the stimulus be completely reversed once the shock fades? Will governments forget the "temporary" requirement and leave some pieces of it for their advantage? Exact answers will only be known *a posteriori* but with this dissertation I hope we can have a glimpse on how things may go *a priori*.

To address the research question, I will mostly follow Jalles (2018 and 2021) to estimate country-specific time-varying cyclicality measures for EA countries, using data from 1995 to 2020. To measure the cyclicality of the fiscal stance, i.e., of discretionary measures on the budget, I will use the cyclically adjusted primary balance (CAPB). As a comparison term I compute the overall budget balance cyclicality, which considers automatic stabilizers. To assess how the fiscal stance changes during output slowdowns, I will use a dummy variable to identify such years and assess if its effect is statistically significant different from zero.

The following chapter contains the literature review on the topic of fiscal policy cyclicality. On Chapter 3 are presented the methodology followed and on Chapter 4 the

results obtained. Finally, on Chapter 5 are presented the conclusions taken from those results.

2. LITERATURE REVIEW

The usage of discretionary fiscal policy to smooth the business cycle is a matter of debate given some disagreements in the literature about its capacity to be in fact counter-cyclical and to effectively reduce macroeconomic volatility.

However, before going there, one must first be able to measure cyclicality. On that topic, two main alternative approaches were summarized by Ceron (2020). On the one hand we have those who focus their analysis using specific periods of changes of fiscal and output variables above a certain threshold. This is followed by the said author, who in turn follows Alesina and Perotti (1995 and 1997), among others. On the other hand, there are those who use a regression model to explain how (and why) fiscal variables react to changes in the business cycle and where the sign of the coefficient associated with output will tell us the cyclicality of the fiscal variable. This is the approach followed by Lane (2003) and Galí and Perotti (2003). Recent work allows us to further divide this latter branch on those who study cyclicality on a static way, using a cross country analysis to estimate the average cyclicality coefficient over a sample period and others who, like Jalles (2021) and Furceri and Jalles (2018), analyse cyclicality in a dynamic way, allowing to observe changes through time. I will use this last approach in my analysis for the Eurozone countries.

Still, one can measure the cyclicality of fiscal policy looking at several components of that said policy. Galí and Perotti (2003) divide the budget balance in two components: the cyclical and the structural component. The cyclical component reacts directly to business cycle conditions and thus is outside of policy makers immediate and direct control. In this category are the so-called automatic stabilizers, like unemployment benefits, which raise government spending when there is a downturn in the economy that results in more unemployment. The structural component is then what is left from budget balance after we account for the current business cycle position and it is what indeed reflects the fiscal stance chosen by fiscal authorities. Once we subtract interest payments, we get the Cyclically Adjusted Primary Balance (CAPB). The same authors further decompose the structural component into an endogenous component, that reacts to

expected cyclical conditions in the future and where active fiscal policy falls in, and into an exogenous component that is the result of more pure political actions, not related to the economy. War effort expenditure is often given as an example of this budgetary component. However, I will ignore this latter sub-division and will focus my analysis on the structural component, measured by the CAPB.

Coming back to the predictions about the cyclicality of fiscal policy, they usually depend on whether we are talking about developed or developing countries. As put by Afonso, Agnello and Furceri (2010), "the conventional wisdom that emerges from such literature is that fiscal policy is countercyclical or a-cyclical in most developed countries". This difference is identified, among others, by Gavin and Perotti (1997) and is corroborated by the later work of Lane (2003) who, even if working with an OECD country sample, found that "richer countries enjoy less pro-cyclical government spending". Recent work of Jalles (2021) finds the same relationship on a larger sample of advanced countries. However, notwithstanding the increasing counter-cyclicality over time - which was also found in Furceri and Jalles (2018) - in 15 out of 36 countries, he only finds evidence of total government spending counter-cyclicality in 39% of the countries on that sample. I pretend to build on these recent studies by assessing if the cyclicality coefficients change on years of recessions, in an effort to clarify if authorities change their fiscal stance when facing bad times versus when they face good times.

Besides economic development, other variables, both macroeconomic and institutional have shown explanatory power over cyclicality of fiscal policy. According to Jalles (2021) government spending cyclicality was negatively associated with financial development, as it is easier for governments to raise money during bad times. Also, trade openness was found by the same author to promote pro-cyclicality, which is also pointed out by Lane (2003) and can be explained to higher exposition to external shocks, which may lead countries to use more active fiscal policy. However, Beetsma and Giuliodori (2011) argue that in the context of the EU, to be successful, fiscal efforts must be put together, since fiscal policy put in place by single national governments will leak away via trade. In an European setting this could also raise the contradicting hypothesis that EU countries more open to trade use less active fiscal policy, due to leakage concerns, and use it only when it is a shared effort.

Government size is also positively associated with stabilization which is, also, a result from Lane (2003) and Jalles (2021).

On the topic of political constrains in an European context, Bénétrix and Lane (2013) conduct an analysis on the effects of the Maastricht Treaty and the European Monetary Union (EMU) on member states' fiscal policy. Given that European countries have abdicated from their monetary policy autonomy when joining the euro, that could have implied a stronger reliance on counter-cyclical fiscal policy to smooth output shocks. These authors found that, even though fiscal policy cyclicality became more counter-cyclical after the signing of the Maastricht Treaty, this was reversed after countries actually joined the euro, observing a pro-cyclical fiscal policy in the years preceding the financial crisis. Also, worth noting, a similar behavior was observed regarding government debt stocks, that had a more positive relation with counter-cyclicality after the Maastricht Treaty but whose effect vanished after the concretization of the EMU. An add-on to this work could be to test if the Stability and Growth Pact (SGP) Reform of 2005, where Medium Term Objectives (MTO) and the adjustment path towards it began to be defined in cyclically adjusted terms (González-Páramo, 2005), had a significant impact on Eurozone countries' fiscal policy stance. Aside from those European-specific constraints like the SGP, Furceri and Jalles (2018) found explanatory power regarding cyclicality of fiscal policy of constraints on the executive. According to Fatás and Mihov (2013) these constraints reduce fiscal policy volatility.

Furceri and Jalles (2018) results suggest that the impact of crisis on fiscal counter-cyclicality depends on the type of crisis, having a positive impact if we talk about a banking crisis and a negative impact during currency or sovereign debt crisis, which may be a result coming from bank bailouts eroding budget balance during banking crisis. Jalles (2021) found that the European debt crisis of 2011/12 led to a pro-cyclical behaviour of fiscal policy. Afonso and Jalles (2012) found government spending to be stickier than revenues during financial crisis. Afonso, Baxa and Slavík (2018) show that the response of output to fiscal shocks is stronger during periods of high financial stress, which in turn are found to typically increase debt and to deteriorate the fiscal position. This shows us that, during financial crisis, the counter-cyclical power of fiscal policy may be enhanced but debt sustainability concerns may prevent governments from acting on it. However, Afonso, Agnello, Furceri and Sousa (2011) evidence suggest that in recent times,

governments are losing their ability of using automatic stabilizers to smooth the economy due to a reduction on revenues responsiveness to output.

3. METHODOLOGY

3.1. Measuring Cyclicality

To measure cyclicality of fiscal police, I will follow Jalles (2018 and 2021) and Furceri and Jalles (2018) who follow Lane's (2003) approach but introduce the possibility for cyclicality coefficients to change over time, *t*. That is, I regress a fiscal variable on the change on economic activity, to get the cyclicality coefficient for country *i* on year *t* (that is, $\beta_{i,t}$):

$$(1) \qquad Fiscal_{i,t} = \alpha_{i,t} + \beta_{i,t} * \Delta y_{i,t} + \varepsilon_{i,t}$$

where $Fiscal_{i,t}$ is the fiscal variable of interest, either Overall (or general) Budget Balance (OBB) or Cyclically Adjusted Primary Balance (CAPB), both in GDP ratios. I focus on both those fiscal variables, rather than only on CAPB, with a similar purpose of Bénétrix and Lane (2013) that is to assess the differences on how the automatic (reflected on the overall budget balance) and discretionary components (the true fiscal stance, net of the cycle, given by the CAPB) react to the business cycle.

As a proxy for economic activity ($\Delta y_{i,t}$) I use real GDP growth – this is the proxy used by Furceri and Jalles (2018). Jalles (2021) used the same proxy and mentioned that using output gap, obtained via a HP filter, yields similar results.

Due to our specification of fiscal variables in ratios-to-GDP, higher values of β are a sign of higher counter-cyclicality (Jalles, 2018 and Bénétrix & Lane, 2013) – meaning that when GDP falls starkly, $Fiscal_{i,t}$ follows the fall, indicating that, for instance, CAPB fell even harder than GDP, that is on the denominator of our $Fiscal_{i,t}$ variable. According to Bénétrix and Lane (2013), this specification can result in some ambiguity since if government balance does not react to changes in GDP, implying a coefficient of zero, we may be induced to believe this is an a-cyclical behaviour while it is, in truth, pro-cyclical. For the balance-to-GDP ratio to be constant over the cycle, it means, for instance, that revenue increases during booms are being absorbed by increasing spending. However, as those authors, I will consider that if balance-to-GDP ratio remains constant over the cycle, ($\beta_{i,t}$=0) we have a-cyclical behaviour.

According to the methodology of Furceri and Jalles (2018), I assume β to change "slowly and unsystematically over time", which translates into:

(2) $\beta_{i,t} = \beta_{i,t-1} + v_{i,t}$, where $v_{i,t} \sim N(0; {\sigma_i}^2)$.

Equations (1) and (2) are jointly estimated using the Varying-Coefficient model proposed by Schlicht (2003). According to the literature already mentioned, this method to get time-varying coefficients has multiple advantages, namely the reduction of reverse causality. As Furceri and Jalles (2018) mention, "it reduces reverse causality problems when fiscal counter-cyclicality is used as explanatory variable as the degree of fiscal counter cyclicality depends on the past." As regarding the application of the said method, I use the software *VC - A Program for Estimating Time-Varying Coefficients*, provided by Schilicht (2021) which executes his method and returns the values for $\beta_{i,t}$.

3.2. Explaining Cyclicality

After estimating the cyclicality coefficients, in a second step I proceed to estimate their explaining factors. I follow Jalles (2021), who in turn follows Aghion and Marinescu (2008). Thus, we estimate:

(3) $\hat{\beta}_{i,t} = \delta_i + \gamma_t + \boldsymbol{\theta X_{i,t-1}} + \varepsilon_{i,t}$

where $\hat{\beta}_{i,t}$ is the cyclicality coefficient estimate for country *i*, in year *t,* δ_i and γ_t are country and time fixed effects, respectively, to account for country unobserved heterogeneity and global shocks. Lastly, $\boldsymbol{X_{i,t-1}}$ is a vector of macroeconomic, financial, and institutional variables, all introduced with one lag to avoid reverse causality issues (Jalles, 2021).

The macroeconomic variables considered are real GDP per capita, an indicator of economic development used by Lane (2003). Government size is also usually found to have explanatory power regarding fiscal cyclicality (Afonso & Jalles, 2013; Fatás & Mihov, 2013; Furceri & Jalles, 2018 and Jalles, 2021). I measure it as government expenditure-to-GDP ratio, as per the literature (Debrun, Pisani-Ferry & Sapir, 2008, Furceri & Jalles 2018 and Jalles, 2018).

Lane (2003) shows that trade openness leads to greater pro-cyclicality in spending and less pro-cyclicality in primary surplus. The rational is that more open economies are more prone to import external shocks (Rodrik, 1998) which may force the government to

be more fiscally active. I will measure trade openness as the sum of imports and exports over GDP. Besides trade openness, the literature suggests that capital account openness can also have an impact on fiscal cyclicality. According to Aghion and Marinescu (2008) foreign capital usually flees the economy during recessions, thus making it more difficult for authorities to raise money to conduct counter-cyclical fiscal policy. The opposite is true during expansions. This dynamic can impinge on the ability of very open countries to conduct counter-cyclical fiscal policy. To capture this effect, I follow the literature and use the Chinn-Ito index of capital account openness. Still according to Aghion and Marinescu (2008), higher credit-to-GDP ratio enhances the ability of governments to raise money during downturns, affecting its ability to conduct counter-cyclical fiscal policy. According to Benétrix and Lane (2013) I also include debt-to-GDP ratios, that were found to have explanatory power on cyclicality of fiscal policy.

To assess if fiscal policy reacts differently to output conditions, I introduce a dummy variable that assumes the value of 1 in year *t* if output growth was negative in that year. That is, I test if fiscal policy in year *t* reacts in a statistically different way to falls in GDP in that same year, *t*. Because of possible implementation lags, I also test with a dummy that assumes value 1 in year *t* if output growth in the previous, *t-1*, year was negative. This methodology is inspired on Afonso and Jalles (2013) who although found counter-cyclicality of total expenditure coefficients both during good and bad times, results suggest a stronger effect during bad times, at least in OECD countries. This effect was led by social security and welfare spending components and thus it is now interesting to see if they also have explanatory power in explaining the fiscal stance, i.e., the discretionary part of the budget balance, measured by CAPB.

Regarding institutional features, I follow Furceri and Jalles (2018) and introduce an executive constraints indicator, taken from Polity5 data set (Center for Systemic Risk, 2018). Also, mimicking the approach from Bénétrix and Lane (2013) regarding the effects of the Maastricht Treaty and the European Monetary Union (EMU) on fiscal policy, I will use a dummy variable to see if the changes on the SGP that entered into force after the 2005 reform had an impact on authorities' behaviour. Thus, I specify a dummy variable for the years after that reform entered into force, i.e., from 2006 onwards.

4. RESULTS

4.1. Measuring Cyclicality

4.1.1. CAPB Cyclicality

Regarding the time-varying measures of cyclicality estimated using equations (1) and (2) for the CAPB, our estimates yielded a mean cyclicality of 0.19 over the period in analysis, which means that an increase in output growth of 1 percentage points (p.p.) raises, on average, the CAPB (as a ratio to GDP) by 0.19 p.p.. Being positive, the mean cyclicality coefficient indicates that fiscal policy in our sample, measured by the CAPB, was on average counter-cyclical from 1995 to 2020. That is, for instance, GDP growth led to an improvement on the CAPB as a ratio to GDP, meaning that the budget balance, in absolute value, was growing faster than GDP itself. However, Figure 1 shows us that even though, on average, CAPB has been always counter-cyclical during our sample years, this counter-cyclicality peaked around 1997 and then fell, up until 2012, after which it recovered. This pattern goes accordingly to the results of Bénétrix and Lane (2013), who describe an increase in counter-cyclicality after 1992 due to the Maastricht Treaty and a subsequent deterioration after those countries' Euro Area membership

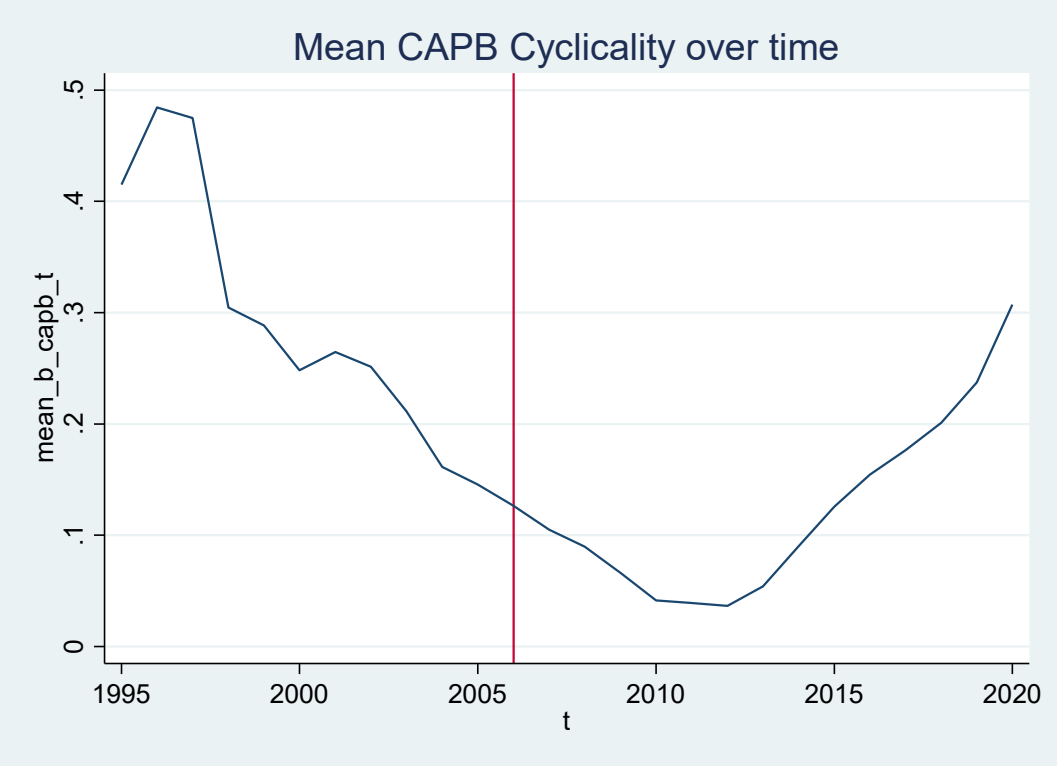

Figure 1 – Sample mean of the CAPB time-varying coefficients, over time.

The red vertical line indicates 2006, the year when the 2005 SGP reform came into force.

became effective. The lowest point of counter-cyclicality being in 2012 is also supported by Jalles (2021) who finds that "The (EU) debt crisis in 2011/12 led to some pro-cyclical correction".

Figure 2 shows us the pattern of the CAPB cyclicality over time for the 19 EA countries. The red vertical line still indicates the year of 2006 and the dashed line indicates the average cyclicality coefficient for that country, over the sample period. The average coefficient was negative for six of the 19 countries, i.e., close to one third of the sample presented an average pro-cyclical fiscal policy, measured by CAPB. Those were Estonia, France, Greece, Lithuania, Portugal and Slovakia. Also, 15 out of the 19 countries presented improvements in counter-cyclicality from 1995 to 2020, as observed by the increase in the cyclicality coefficient over time, which is a pattern that goes accordingly to Furceri and Jalles (2018) results for advanced countries, on a 1984-2014 time sample. The exceptions of this trend were Belgium, Estonia, Ireland and Italy.

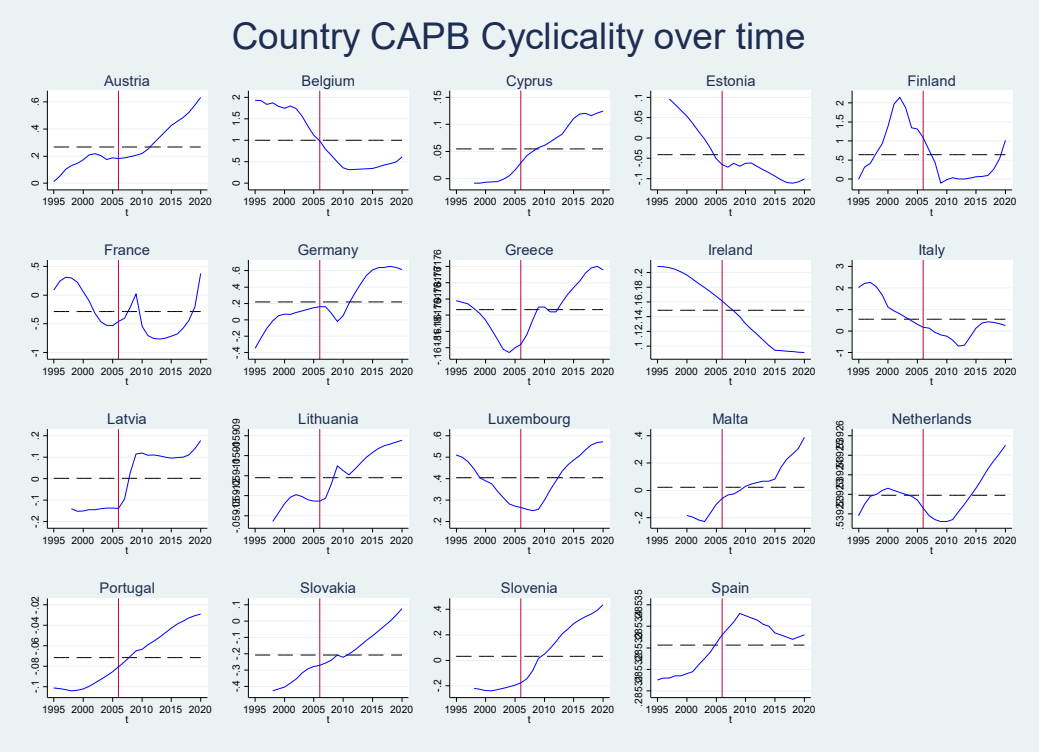

Figure 2– Time-varying CAPB cyclicality for the EA countries, over time.

The dashed line indicates the average cyclicality coefficient for that country over the sample period and the red vertical line indicates 2006, the year when the SGP reform came into force.

4.1.2. OBB Cyclicality

On what concerns the cyclicality of the OBB, the average cyclicality coefficient for our country and time sample was -0.21, which means the average fiscal policy, measured by the OBB, was pro-cyclical from 1995 to 2020 – in this case, when GDP grew, the OBB as a ratio do GDP decreased, meaning revenues' growth, in absolute terms, were not keeping up with GDP growth. By each increase of 1 p.p. of GDP growth, the OBB-to-GDP ratio is reduced by 0.21 p.p.. This average pro-cyclicality may seem unexpected and to contradict previous findings about advanced economies, namely those of Gavin and Perotti (1997), Fatás and Mihov (2012) and Furceri and Jalles (2018) referred before. However, it is corroborated by Bénétrix and Lane (2013) findings about the behaviour of EA countries after their euro membership became effective and by Jalles (2021) who report evidence of pro-cyclical adjustment during the European debt crisis. What is striking is that, according to our results, those pro-cyclical behaviours were strong enough to affect the OBB cyclicality, hence overrunning automatic stabilizers, that usually make OBB being counter-cyclical. These results also seem to highlight the "deterioration of the capacity of fiscal authorities to use automatic stabilizers to counteract the negative effects of the crisis" described by Afonso et al. (2011), which is, according to the same authors, result of a "reduction of the responsiveness of government revenues to the economic cycle (…) compared to responsiveness of government spending". In previous work of Afonso et al. (2010), it had already been found a higher persistence than responsiveness of fiscal policy, indicating a higher difficulty for temporary fiscal measures, mainly due to a reduction of revenue responsiveness to economic activity. Thus, one can speculate that the OBB pro-cyclicality here identified is stemming from the revenue side of the balance, rather than the expenditure side.

Nevertheless, looking at the evolution of the mean OBB cyclicality coefficient over time (Figure 3), we find that it has improved and has become counter-cyclical since 2017. Notice that the behaviour from 2010 to 2017 fits Jalles (2021) argument about the forced pro-cyclical adjustment during the European debt crisis.

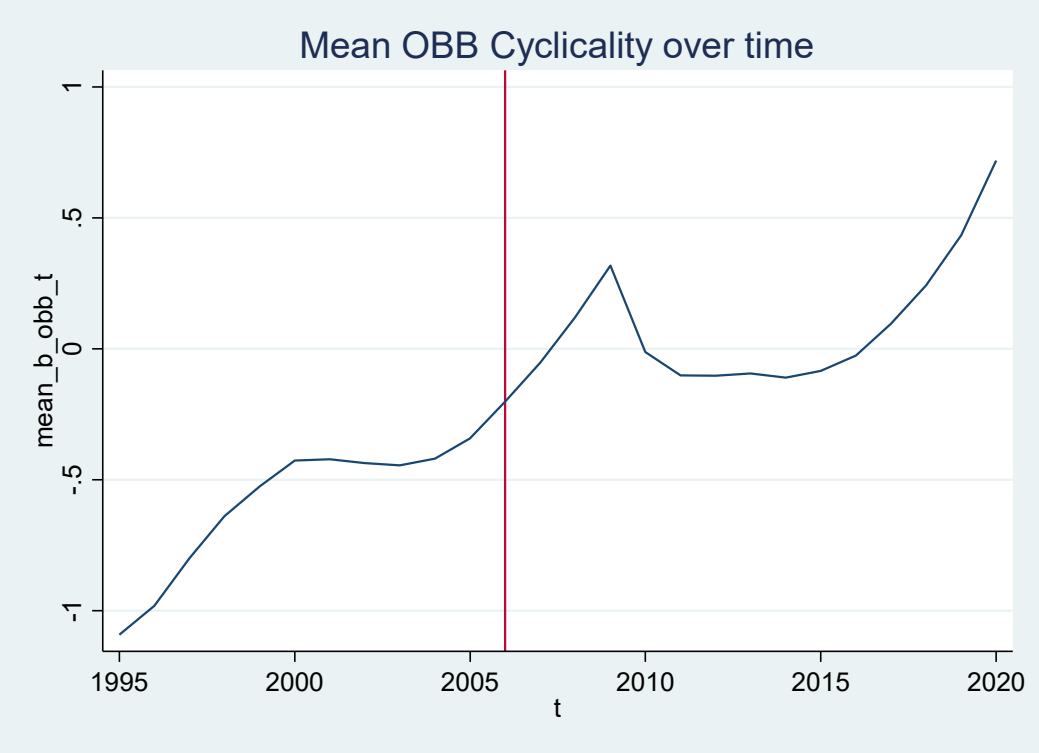

Figure 3 - Sample mean of the OBB time-varying coefficients, over time.

The red vertical line indicates 2006, the year when the 2005 SGP reform came into force.

Looking once more to the individual behaviour of the 19 EA countries on Figure 4, we find, as expected, some heterogeneity. Seven of the 19 countries have positive mean coefficients for this period, indicating a counter-cyclical OBB, on average. They were Estonia, Finland, Ireland, Latvia, Luxembourg, the Netherlands and Spain. Notwithstanding, Ireland and Luxembourg were the only countries from the whole sample where counter-cyclicality of the OBB decreased from 1995 to 2020.

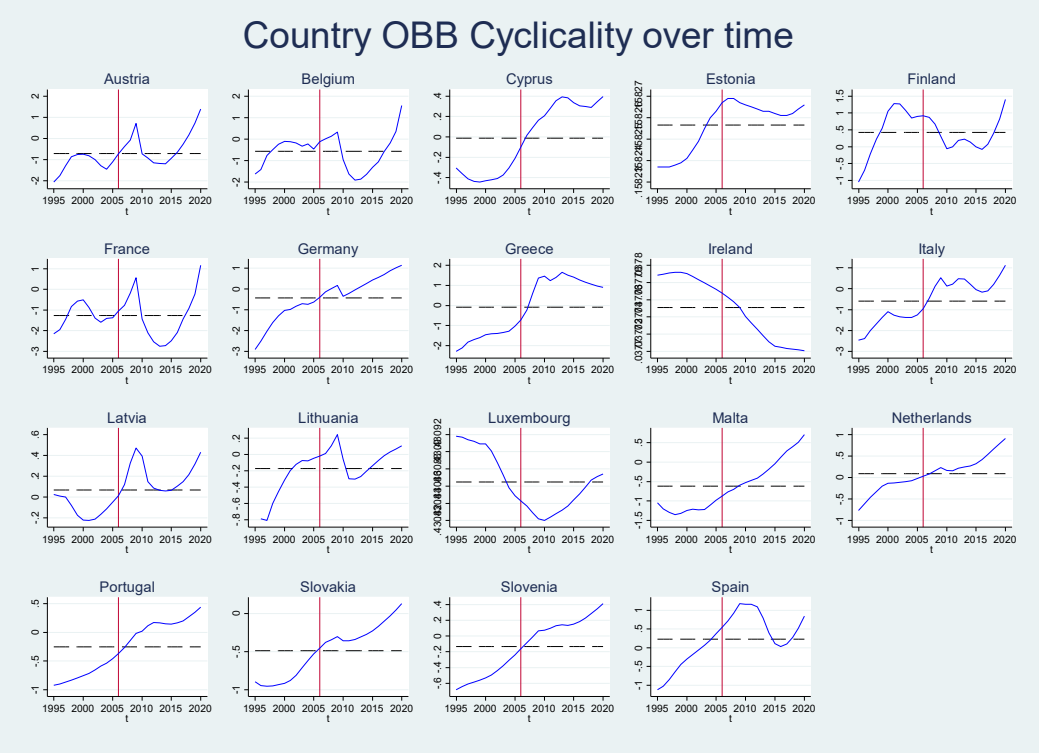

Figure 4 - Time-varying OBB cyclicality for the EA countries, over time.

The dashed line indicates the average cyclicality coefficient for that country over the sample period and the red vertical line indicates 2006, the year when the SGP reform came into force.

4.2. Explaining Cyclicality

In this subsection I present the OLS estimations for equation (3), with country fixed effects. Our baseline specification, which is identified in the tables as specification (1), is as follows:

$$(4) \quad \hat{\beta}_{i,t} = \delta_i + \alpha_1 Government\ Size_{i,t-1} + \alpha_2 Trade\ Openness_{i,t-1} + \alpha_3 KA\ Openness_{i,t-1} + \alpha_4 Credit - to - GDP_{i,t-1} + \alpha_5 Debt - to - GDP_{i,t-1} + \alpha_6 D\_Growth\ t_i + \alpha_7 D\_SGP + \varepsilon_{i,t},$$

where $\hat{\beta}_{i,t}$ is the cyclicality coefficient estimate for country i, in year t (either regarding CAPB or OBB) δ_i are country fixed effects, to account for country unobserved heterogeneity. I estimated the regressions with country fixed effects, with time fixed effects in an isolated manner and, finally, with both types of fixed effects. The latter two types can be found in the Appendix. The results presented in this section are those with country fixed effects. D_Growth and D_SGP are dummy variables, the former assuming the value of 1 in year t if output growth of one country was negative in that year and the

latter assuming the value 1 from 2006 onwards to capture any impact from the SGP reform.

4.2.1. CAPB Cyclicality

Regarding how to explain cyclicality, I first test each of the selected variables described above (plus the alternative dummy variable D_Growth t-1, which assumes the value of 1 in year *t* if output growth was negative in *t-1*), in an isolated manner, one regressor at a time. The results of each regression can be found on the Appendix. The regressions were estimated with country fixed effects, with time fixed effects and, lastly, with both types of fixed effects. Country fixed effects proved to be always statistically significant in the standalone regressions, either with or without time fixed effects. Regarding time fixed effects, they only proved to be significant (at least at a 5% significance level) on two standalone regressions. Once we conjugate both fixed effects, the presence of time fixed effects cannot be rejected in all but two standalone regressions, indicating the presence of cross time differences in the other eight. The overall results of our estimate with country fixed effects are as following: from the seven variables selected, only the size of the public sector and financial development had stand-alone statistically significant explanatory power regarding the CAPB cyclicality coefficients. From the three dummies tested we find that both the SGP dummy and the dummy regarding output conditions in the year *t-1*, by themselves, have explanatory power over cyclicality at a 1% significance level and that the dummy regarding output conditions in *t* cannot also be ignored at a 10% level. Nevertheless, all three have a negative sign, indicating more pro-cyclicality, which was not expected.

After regressing all seven variables with the three dummies, it was found that the Polity 5 variable, used to identify constraints on the executive, had to be omitted for this sample of countries and years, since there was no variation of this indicator across the sample, violating assumptions of no collinearity needed for this regression analysis. Real GDP per capita was also initially considered as an explanatory variable but since it proved to be statistically insignificant in most of the regressions and its absence did not change the results obtained, this variable was also omitted. Therefore, although those two variables are included in the standalone regressions, they are not in the baseline specification and its variations.

In Table I it can be found the OLS estimates of equation (3). The six specifications differ as follows:

1) Baseline specification; using the dummy variables D_Growth t and D_SGP;
2) using the dummy variables D_Growth t-1 and D_ SGP;
3) using only a dummy variable D_SGP;
4) same as (1) but without the SGP dummy variable;
5) same as (2) but without the SGP dummy variable;
6) without dummy variables.

Table I - Determinants of CAPB cyclicality – regressions with country fixed effects.

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.021***	-.019***	-.021***	-.02***	-.018***	-.02***
	(.005)	(.006)	(.005)	(.006)	(.006)	(.006)
Trade Open.	0	0	0	-.002	-.003*	-.002*
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
KA Open.	.047	.048	.052	.004	.004	.008
	(.044)	(.045)	(.045)	(.046)	(.046)	(.046)
Credit-to-GDP	.002*	.001	.001	0	0	-.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Debt-to-GDP	.004***	.004***	.004***	.002**	.003**	.003**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
D_Growth t	-.09**			-.1**		
	(.043)			(.045)		
D_SGP	-.249***	-.252***	-.254***			
	(.049)	(.049)	(.049)			
D_Growth t-1		-.069			-.076	
		(.046)			(.048)	
Observations	291	291	291	291	291	291
R-squared	.172	.166	.159	.091	.083	.074

Notes: Panel estimates with country fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

I took the same approach as before and estimated the six specifications with country fixed effects, with time fixed effects and with both. The country fixed effects proved to be relevant regardless of whether conjugated with time fixed effects or not. However, regarding time fixed effects, one only rules out the null hypothesis of them being zero on those specifications where the SGP dummy is not included (i.e., specifications 4 to 6), regardless of conjugated with country fixed effects or not. Thus, the results for the estimations with only time fixed effects and its conjugation with country fixed effects are

presented in the Appendix and below are the results for the estimations with only country fixed effects, that proved to be more relevant.

Starting with government size, this variable is associated with more pro-cyclical fiscal policy. By each increase in 1 p.p. on government expenditure to GDP ratio, we expect a decrease in the cyclicality coefficient of around 0.02, which in turn tells us that, once GDP growth increases 1 p.p., CAPB (in GDP ratio) will increase less 0.02 p.p., on average, ceteris paribus. This indicates that bigger governments will lose their ability to conduct counter-cyclical fiscal policy, which can be explained by the evidence that government expenditure is mainly a-cyclical (Afonso and Jalles, 2013) and that there has been losing ability of governments to capture revenues during upturns (Afonso et al., 2011). Thus, bigger governments will have a bigger a-cyclical component on their balances, which combined with less reactive revenues leads to less counter-cyclical fiscal policy.

Trade openness is statistically significant in the two last specifications, suggesting that more open countries experience a more procyclical discretionary fiscal policy. This contradicts Lane's (2003) expectations that trade openness leads to less pro-cyclicality in primary surplus. However, in the present work it is the CAPB that is used and not primary surplus. Also, if more open economies are indeed more exposed to external shocks and that forces government to be more fiscally active (Rodrik, 1998), this may prove that, once we account for the business cycle, those measures seem to fail their aim to stabilize activity for any of the various reasons enumerated before. Accordingly, where trade openness is 10 p.p. higher, when GDP growth increases 1.p.p., the CAPB will increase less 0.02 p.p. than where it is not, ceteris paribus.

On the other hand, financial development, measured as credit-to-GDP ratio, is statistically significant in the baseline specification and its coefficient implies that the higher this ratio is, the more counter-cyclical fiscal policy also is. This result supports Aghion and Marinescu (2008), who say that a higher credit-to-GDP ratio enhances the ability of governments to raise money during downturns, making it easier to implement counter-cyclical fiscal policy during troubled times.

The only other variable with explanatory power over cyclicality of the CAPB is the debt-to-GDP ratio. This variable seems to indicate that countries with higher debt have

more counter-cyclical fiscal policy, which is a result that was also found by Bénétrix and Lane (2013). According to them, this can be seen as "greater focus on debt sustainability" from those countries. So, one may think that countries that have a higher debt are somehow forced to implement counter-cyclical fiscal policy to curb it, namely during expansions. This indicates the prevalence of a Ricardian fiscal regime, a result previously found by Afonso (2008) and Afonso and Jalles (2019) for EA countries. Those results suggest that governments improve their balances in reaction to higher debt levels, to reduce them, with the latter work finding stronger emphasis for this behaviour after 2007, i.e., after the global financial crisis. On top of that, a finding that the compliance with a Ricardian regime may improve counter-cyclicality was pointed by Afonso (2008), who indicates that revenues rise with increases in the output gap. It is also mentioned by the same author that the reaction of primary balances to debt levels is higher the higher the debt level of that country. All in all, our results are supported by these previous findings: more indebted countries perform a stronger adjustment toward the Ricardian regime, namely during upturns, which promotes counter-cyclicality of fiscal policy. A ten-percentage point increase in debt-to-GDP ratio leads to a higher cyclicality coefficient of about 0.04, in the baseline specification. This means that, once GDP grows 1 p.p. more, CAPB increases more 0.04 p.p. than if debt ratio was 10 p.p. lower, on average, ceteris paribus.

Regarding the SGP dummy, it is statistically significant and seems to indicate a more pro-cyclical fiscal policy after 2006. This interpretation can be two-fold: it can mean that the SGP reform was unable to promote counter-cyclicality of fiscal policy or, even if it was, it was not enough to cancel the debt-crisis effect that forced pro-cyclical adjustment in European economies, after 2011. The dummies created to tell us if there is a change in fiscal policy during downturns tell us that, while there seems to be no effect on cyclicality when GDP growth is negative in the year before, the same does not happen regarding recessions registered on that same year. That dummy (D_Growth t) has a negative sign, providing evidence that when GDP growth is negative in year *t*, fiscal policy gets more pro-cyclical in that same year. In other words, keeping all other variables constant, in years of negative output growth, the cyclicality coefficient is reduced, on average, by 0.09. That means that when GDP growth is – 1%, CAPB change is 0.09 p.p. smaller, in absolute value, than when GDP growth is +1%. In other words, when GDP falls, CAPB

gets stickier and does not react as much to GDP fluctuations as when GDP grows. This result can also be explained by the strong effect of the sovereign debt crisis, that led to financing constraints of some eurozone governments.

4.2.2. OBB Cyclicality

Proceeding as above and starting with the one at a time estimations, we find now that country and time fixed effects are significantly different from zero both either isolated and as well as conjugated with each other. All the estimations can be found in the Appendix but the results accounting for country fixed effects alone (to be comparable to those of the CAPB) are as follows: it was found that more variables have isolated explanatory power regarding OBB than for CAPB. Real GDP per capita, trade openness, capital account (KA) openness, credit-to-GDP level and debt-to-GDP ratio all boost counter-cyclicality of OBB. As for the dummies, only the one regarding economic growth in year t-1 did not prove to be statistically significant, with the other two having a positive impact in counter-cyclicality (for CAPB, the results were the opposite, with those dummies indicating higher pro-cyclicality, but with a much smaller coefficient, in absolute value).

Regarding our baseline specification, along with its variations, with specifications 1) to 6) having the same meaning as before, the results for the OLS estimates with country fixed effects are presented on Table II. The results for the estimations with time fixed effects and the conjugation of both can be found in the Appendix. With OBB, country fixed effects also appear to be significant either alone or conjugated with time fixed effects. The latter were significant by themselves in all specifications but number 3, while once conjugated with country fixed effects, we can reject the null hypothesis of these being zero in all specifications.

As for the results on Table II, one finds that, as it was the case with CAPB, government size seems to promote pro-cyclicality of OBB. Trade openness is again statistically significant, at least in those specifications without the SGP dummy but, contrary to the findings with the CAPB, now it has a positive coefficient, meaning that it promotes counter-cyclicality of the OBB. Financial development is again statistically significant and, still having a positive sign, it supports once more the idea that countries with higher credit-to-GDP have a more counter-cyclical fiscal policy, which Aghion and

Marinescu (2008) argue to be due to being easier for governments to raise liquidity during downturns. Debt-to-GDP ratio is also statistically significant and has the same interpretation as for the CAPB, indicating that more indebted countries tend to have more counter-cyclical fiscal policy – another evidence pointing to a Ricardian behaviour of more indebted countries.

Table II - Determinants of OBB cyclicality – regressions with country fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.043***	-.049***	-.043***	-.044***	-.05***	-.045***
	(.011)	(.011)	(.011)	(.011)	(.012)	(.011)
Trade Open.	.002	.003	.003	.005*	.007**	.006**
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
KA Open.	.032	.028	.016	.087	.084	.072
	(.091)	(.092)	(.092)	(.091)	(.092)	(.092)
Credit-to-GDP	.005**	.006***	.007***	.007***	.009***	.009***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
Debt-to-GDP	.006***	.005**	.005**	.008***	.006***	.007***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
D_Growth t	.284***			.298***		
	(.089)			(.091)		
D_SGP	.315***	.324***	.33***			
	(.1)	(.101)	(.102)			
D_Growth t-1		.191**			.2**	
		(.095)			(.097)	
Observations	291	291	291	291	291	291
R-squared	.221	.203	.191	.192	.172	.159

Notes: Panel estimates with country fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.

*** p<.01, ** p<.05, * p<.1

Regarding the SGP dummy variable, that is always statistically significant, it indicates a more counter-cyclical OBB after the SGP reform. Namely, it indicates that for an increase in GDP growth of 1 p.p. after 2006, OBB rose more 0.32 p.p. than before. This evidence may show that, even if the SGP did not improve the counter-cyclicality of CAPB, it may have done so for OBB, with countries being more surgical on their use of the cyclical component of their fiscal policy. However, the financial and sovereign debt crises may be impinging in these results, since the OBB considers debt payments, which ballooned as output decreased in many European countries during those years. The output growth dummies also suggest a statistically significant more counter-cyclical OBB in recession years and in the years immediately after recessions. This is not surprising and captures the automatic stabilizers behaviour that is expected during those times.

4.2.3 The Global Financial Crisis

Given the concerns raised by the possible influence of GFC on the results above, I proceeded to estimate the baseline specification once more, this time adding a dummy variable (D_GFC) assuming the value of 1 for the years between 2008 to 2012. In Table III, those new specification are on the right, and adding the GFC dummy does not alter the interpretation of our previous results with country fixed effects. The dummy is not statistically significant neither for the CAPB nor the OBB cyclicality, meaning there is no evidence of a change in the cyclicality of fiscal policy during this period.

Table III – Effects of the GFC on the cyclicality of fiscal policy

Dependent Variable:	CAPB	OBB	CAPB	OBB
Gov. Size	-.021***	-.043***	-.02***	-.041***
	(.005)	(.011)	(.006)	(.011)
Trade Open.	0	.002	0	.002
	(.001)	(.003)	(.001)	(.003)
KA Open.	.047	.032	.048	.034
	(.044)	(.091)	(.044)	(.091)
Credit-to-GDP	.002*	.005**	.002*	.005**
	(.001)	(.002)	(.001)	(.002)
Debt-to-GDP	.004***	.006***	.003***	.006**
	(.001)	(.002)	(.001)	(.002)
D_Growth t	-.09**	.284***	-.082*	.296***
	(.043)	(.089)	(.046)	(.094)
D_SGP	-.249***	.315***	-.244***	.323***
	(.049)	(.1)	(.05)	(.102)
D_GFC			-.023	-.033
			(.041)	(.083)
Observations	291	291	291	291
R-squared	.172	.221	.174	.221

Notes: Panel estimates with country fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.

*** p<.01, ** p<.05, * p<.1

5. CONCLUSIONS

Euro Area countries presented, on average, a counter-cyclical discretionary fiscal policy during the years considered, as expected for developed countries. Nevertheless, the average counter-cyclicality of EA fiscal policy is still recovering from its fall that occurred in the early 2000's. Looking at individual countries, six out of the 19 members showed an average pro-cyclical fiscal policy and 15 presented improvements (i.e., towards a more counter-cyclical fiscal policy) during the period of analysis.

As regarding what variables may affect the cyclical behaviour of discretionary fiscal policy, the results suggest that higher debt-to-GDP seems to promote counter-cyclicality. These results support the existence of a Ricardian behaviour of fiscal policy in those countries closer to their intertemporal budget constraint, which prevents them from engaging in a more pro-cyclical behaviour than others. Government size seems to harm counter-cyclicality, as well as trade openness. In the baseline specification, financial development also has a positive impact on counter-cyclicality. The results suggest a more pro-cyclical fiscal policy after the SGP reform of 2006, a result that is maintained even once we isolate the years of the Global Financial Crisis. Finally, the answer for the research question of how Eurozone countries' fiscal stance change during recessions is that, according to our data for this time sample, the fiscal stance became more pro-cyclical in those years, meaning that during recessions, on average, countries implemented more contractionary fiscal policy. In other words, when GDP falls, CAPB gets stickier and does not react as much to GDP fluctuations as when GDP grows.

The results regarding the cyclicality of the OBB suggest, notwithstanding the improving trend towards counter-cyclicality, an average pro-cyclical behaviour of EA countries' OBB. Individually, only seven out of the 19 members had an average counter-cyclical behaviour of OBB but 16 showed signs of improvement.

Regarding on what variables affect this behaviour, the conclusions did not differ much from the results with the CAPB – unexpectedly, since the CAPB is, by definition, a part of the OBB. A bigger government leads to more pro-cyclicality and more debt-to-GDP has the opposite result. The degree of financial development and trade openness also promote counter-cyclicality. One difference is that the OBB became more counter-cyclical after the SGP reform. Lastly, one also concludes that, although it was not the case

with discretionary fiscal policy, the overall fiscal policy, that is, with automatic stabilisers, became more counter-cyclical immediately during and after recessions. Hence, one can say that, even though discretionary fiscal policy may have become more contractionary during recessions in this period, that was offset by automatic stabilizers, since the OBB, which encompasses both dimensions, became more counter-cyclical during those times, indicating a more expansionary fiscal policy in the economy during those years.

Further research on fiscal policy in the context of the European Monetary Union could look closer to institutional features of member countries, namely the existence of fiscal rules at a national level and how they can affect the cyclicality of fiscal policy. Another possible path could be to assess if there were changes in the ability of fiscal policy to smooth the business cycle in different periods of time (before and after the SGP, for instance).

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List of countries.

Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, Spain.

Table A 1 – Variables, definitions and sources

Variable	Definition	Source
CAPB	Net lending, excluding interests of general gov. adjusted for the cyclical component, percentage of GDP.	AMECO
OBB	Overall Budget Balance. Net lending, percentage of GDP.	AMECO
Real GDP growth	Annual percentage change of real GDP.	IMF World Economic Outlook
Real GDP per capita	Gross domestic product per capita, constant prices, national currency.	IMF World Economic Outlook
Government Size	Government total expenditure, percentage of GDP.	AMECO
Trade Openness	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	World Bank
KA openness	Chinn Ito Index for capital account openness. Index measuring the restrictions on cross-border financial transactions.	Chinn Ito Index of Financial Openness
Credit to GDP	Domestic credit to private sector, percentage of GDP	World Bank
Deb-to-GDP	Gross public debt, percentage of GDP	AMECO
Executive Constraints	XCONS - institutionalized constraints on the decision-making powers of chief executives.	Polity 5
SGP dummy	Takes value 1 after 2005.	
Growth dummy (in t)	Takes value 1 when Real GDP growth in t is negative.	
Growth dummy (in t-1)	Takes value 1 when Real GDP growth in t-1 is negative.	

Table A 2 – Time-varying CAPB cyclicality coefficients per country and mean coefficients per year and per country.

	Mean	Austria	Belgium	Cyprus	Estonia	Finland	France	Germany	Greece	Ireland	Italy
1995	.415	.013	1.935			-.005	.09	-.35	-.162	.208	2.018
1996	.484	.054	1.926			.318	.245	-.222	-.162	.208	2.221
1997	.475	.103	1.836		.096	.413	.315	-.103	-.162	.206	2.267
1998	.304	.131	1.876	-.009	.083	.694	.303	-.012	-.162	.204	2.051
1999	.288	.148	1.79	-.009	.068	.931	.22	.048	-.162	.201	1.682
2000	.248	.172	1.748	-.007	.054	1.384	.058	.071	-.162	.196	1.121
2001	.265	.208	1.798	-.006	.036	1.968	-.093	.065	-.162	.191	.938
2002	.251	.218	1.736	-.005	.017	2.146	-.318	.088	-.162	.185	.8
2003	.211	.204	1.562	-.002	-.002	1.878	-.465	.107	-.162	.18	.637
2004	.161	.175	1.328	.005	-.025	1.344	-.527	.127	-.162	.174	.467
2005	.145	.186	1.124	.016	-.05	1.313	-.531	.146	-.162	.168	.31
2006	.127	.183	.989	.029	-.066	1.083	-.456	.162	-.162	.161	.175
2007	.105	.187	.793	.042	-.072	.747	-.402	.159	-.162	.154	.128
2008	.090	.196	.65	.05	-.062	.443	-.205	.082	-.162	.148	-.064
2009	.066	.206	.491	.057	-.069	-.11	.024	-.021	-.162	.14	-.176
2010	.042	.221	.36	.061	-.062	-.015	-.542	.05	-.162	.13	-.235
2011	.039	.251	.318	.068	-.062	.034	-.705	.199	-.162	.123	-.426
2012	.037	.297	.32	.075	-.07	.004	-.755	.327	-.162	.115	-.697
2013	.054	.34	.333	.082	-.078	.003	-.764	.442	-.162	.108	-.66
2014	.090	.384	.339	.097	-.085	.029	-.748	.543	-.162	.101	-.264
2015	.126	.426	.349	.111	-.094	.059	-.717	.608	-.162	.094	.131
2016	.154	.455	.383	.119	-.102	.067	-.676	.637	-.162	.094	.363
2017	.176	.484	.429	.121	-.11	.098	-.577	.641	-.162	.093	.429
2018	.201	.523	.455	.116	-.111	.259	-.44	.651	-.162	.092	.406
2019	.237	.577	.495	.121	-.108	.54	-.204	.639	-.162	.092	.338
2020	.307	.633	.611	.124	-.101	1.015	.382	.614	-.162	.091	.244
Mean	.185	.268	.999	.055	-.041	.64	-.288	.219	-.162	.148	.546

Table A 3 – continuation of A2

	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Portugal	Slovakia	Slovenia	Spain
1995			.511		.539	-.101			.285
1996			.501		.539	-.102			.285
1997			.479		.539	-.103			.285
1998	-.139	-.059	.446		.539	-.104	-.427	-.219	.285
1999	-.152	-.059	.404		.539	-.104	-.415	-.226	.285
2000	-.151	-.059	.39	-.182	.539	-.102	-.403	-.236	.285
2001	-.144	-.059	.376	-.194	.539	-.1	-.381	-.238	.285
2002	-.144	-.059	.342	-.215	.539	-.096	-.354	-.228	.285
2003	-.14	-.059	.312	-.228	.539	-.093	-.317	-.219	.285
2004	-.136	-.059	.282	-.165	.539	-.09	-.291	-.207	.285
2005	-.136	-.059	.272	-.102	.539	-.085	-.278	-.193	.285
2006	-.138	-.059	.266	-.059	.539	-.081	-.27	-.177	.285
2007	-.095	-.059	.257	-.032	.539	-.076	-.256	-.144	.285
2008	.029	-.059	.251	-.026	.539	-.07	-.238	-.082	.285
2009	.114	-.059	.257	0	.539	-.065	-.207	.015	.285
2010	.119	-.059	.301	.031	.539	-.063	-.221	.05	.285
2011	.109	-.059	.349	.047	.539	-.059	-.2	.094	.285
2012	.111	-.059	.39	.059	.539	-.055	-.175	.147	.285
2013	.107	-.059	.434	.067	.539	-.051	-.146	.207	.285
2014	.101	-.059	.465	.068	.539	-.047	-.118	.245	.285
2015	.095	-.059	.486	.084	.539	-.043	-.09	.286	.285
2016	.099	-.059	.508	.165	.539	-.039	-.061	.317	.285
2017	.1	-.059	.534	.229	.539	-.036	-.029	.341	.285
2018	.111	-.059	.557	.267	.539	-.033	.001	.362	.285
2019	.14	-.059	.568	.307	.539	-.03	.037	.392	.285
2020	.178	-.059	.572	.388	.539	-.029	.077	.433	.285
Mean	.002	-.059	.404	.024	.539	-.071	-.207	.031	.285

Table A 4 – Time-varying OBB cyclicality coefficients per country and mean coefficients per year and per country.

	Mean	Austria	Belgium	Cyprus	Estonia	Finland	France	Germany	Greece	Ireland	Italy
1995	-1.092	-2.067	-1.628	-.305	.158	-1.05	-2.154	-2.91	-2.284	.038	-2.473
1996	-.981	-1.754	-1.409	-.362	.158	-.696	-1.947	-2.502	-2.105	.038	-2.382
1997	-.799	-1.284	-.756	-.411	.158	-.212	-1.457	-2.026	-1.82	.038	-1.998
1998	-.639	-.86	-.497	-.436	.158	.225	-.831	-1.621	-1.698	.038	-1.683
1999	-.525	-.754	-.236	-.444	.158	.548	-.57	-1.287	-1.599	.038	-1.371
2000	-.426	-.741	-.098	-.43	.158	1.049	-.504	-1.028	-1.453	.038	-1.1
2001	-.421	-.817	-.11	-.422	.158	1.284	-.885	-.986	-1.415	.038	-1.265
2002	-.435	-.999	-.177	-.409	.158	1.273	-1.392	-.822	-1.398	.038	-1.343
2003	-.444	-1.293	-.322	-.373	.158	1.077	-1.585	-.703	-1.343	.038	-1.373
2004	-.418	-1.46	-.224	-.305	.158	.852	-1.404	-.741	-1.288	.038	-1.383
2005	-.342	-1.109	-.462	-.21	.158	.901	-1.381	-.624	-1.034	.038	-1.252
2006	-.201	-.729	-.12	-.1	.158	.921	-1.051	-.398	-.722	.038	-.961
2007	-.0525	-.387	.018	.015	.158	.87	-.772	-.134	-.232	.038	-.454
2008	.122	-.073	.136	.091	.158	.672	-.186	.017	.598	.038	.114
2009	.318	.708	.325	.162	.158	.308	.566	.174	1.376	.038	.521
2010	-.012	-.728	-.951	.208	.158	-.059	-1.443	-.35	1.466	.038	.13
2011	-.101	-.921	-1.628	.279	.158	-.007	-2.099	-.209	1.247	.038	.223
2012	-.103	-1.16	-1.902	.356	.158	.185	-2.535	-.049	1.395	.038	.486
2013	-.094	-1.182	-1.856	.395	.158	.222	-2.754	.109	1.654	.038	.469
2014	-.109	-1.204	-1.643	.384	.158	.143	-2.721	.269	1.503	.038	.214
2015	-.084	-.935	-1.313	.336	.158	-.004	-2.485	.428	1.409	.038	-.041
2016	-.025	-.652	-1.053	.305	.158	-.082	-2.087	.558	1.279	.038	-.164
2017	.096	-.28	-.587	.3	.158	.072	-1.442	.691	1.158	.038	-.103
2018	.243	.16	-.179	.29	.158	.396	-.922	.88	1.056	.038	.201
2019	.434	.724	.361	.345	.158	.823	-.223	1.023	.973	.038	.643
2020	.720	1.386	1.56	.397	.158	1.403	1.16	1.137	.902	.038	1.12
Mean	-.205	-.708	-.567	-.013	.158	.427	-1.273	-.427	-.091	.038	-.586

Table A 5 – continuation of A4

	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Portugal	Slovakia	Slovenia	Spain
1995	.024		.431	-1.043	-.77	-.922	-.896	-.681	-1.121
1996	.009	-.787	.431	-1.201	-.611	-.902	-.946	-.642	-1.027
1997	-.001	-.81	.431	-1.288	-.463	-.866	-.956	-.61	-.846
1998	-.079	-.602	.431	-1.35	-.329	-.833	-.95	-.585	-.642
1999	-.175	-.456	.431	-1.315	-.202	-.793	-.933	-.559	-.451
2000	-.223	-.313	.431	-1.239	-.13	-.755	-.918	-.531	-.305
2001	-.226	-.194	.431	-1.205	-.123	-.714	-.878	-.493	-.178
2002	-.212	-.12	.431	-1.228	-.111	-.653	-.812	-.438	-.059
2003	-.167	-.075	.431	-1.215	-.095	-.587	-.71	-.378	.064
2004	-.114	-.077	.431	-1.099	-.075	-.536	-.616	-.309	.205
2005	-.049	-.047	.431	-.981	-.025	-.459	-.531	-.236	.37
2006	.013	-.02	.431	-.874	.03	-.369	-.454	-.161	.542
2007	.12	.014	.431	-.762	.086	-.263	-.38	-.083	.719
2008	.325	.106	.431	-.697	.156	-.141	-.344	-.011	.921
2009	.471	.245	.431	-.597	.228	-.015	-.303	.068	1.175
2010	.393	-.057	.431	-.524	.164	.023	-.359	.076	1.158
2011	.148	-.297	.431	-.47	.161	.116	-.357	.098	1.161
2012	.085	-.303	.431	-.41	.218	.173	-.339	.13	1.091
2013	.063	-.269	.431	-.306	.244	.167	-.308	.145	.789
2014	.058	-.202	.431	-.181	.267	.148	-.274	.134	.401
2015	.064	-.138	.431	-.046	.321	.147	-.228	.153	.107
2016	.105	-.073	.431	.124	.421	.168	-.169	.184	.035
2017	.148	-.013	.431	.283	.538	.203	-.101	.23	.101
2018	.214	.033	.431	.396	.662	.274	-.03	.286	.27
2019	.316	.07	.431	.511	.79	.353	.046	.346	.518
2020	.432	.106	.431	.706	.913	.438	.13	.41	.848
Mean	.067	-.171	.431	-.616	.087	-.254	-.485	-.133	.225

Table A 6 – Determinants of CAPB cyclicality – standalone regressions with country and time fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	.00001**									
	(0)									
Gov. Size		-.005								
		(.003)								
Trade Open.			.003***							
			(.001)							
KA Open.				.119***						
				(.03)						
Credit-to-GDP					.001					
					(.001)					
Debt-to-GDP						.004***				
						(.001)				
Executive Const.							.387			
							(.354)			
D_Growth t								-.072		
								(.062)		
D_Growth t-1									-.096	
									(.062)	
D_SGP										.002
										(.122)
Observations	471	463	472	428	328	462	433	472	472	472
R-squared	.103	.101	.118	.122	.165	.114	.094	.092	.094	.089

Notes: Panel estimates with country and time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 7 - Determinants of CAPB cyclicality – standalone regressions with country fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	0									
	(0)									
Gov. Size		-.008**								
		(.003)								
Trade Open.			0							
			(.001)							
KA Open.				.036						
				(.028)						
Credit-to-GDP					-.002**					
					(.001)					
Debt-to-GDP						.001				
						(.001)				
Executive Const.							.217			
							(.351)			
D_Growth t								-.077*		
								(.042)		
D_Growth t-1									-.123***	
									(.044)	
D_SGP										-.132***
										(.031)
Observations	471	463	472	428	328	462	433	472	472	472
R-squared	.003	.015	.001	.004	.018	.004	.001	.007	.017	.039

Notes: Panel estimates with country fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 8 Determinants of CAPB cyclicality – standalone regressions with time fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	.00001***									
	(0)									
Gov. Size		.009***								
		(.003)								
Trade Open.			.001**							
			(0)							
KA Open.				.17***						
				(.028)						
Credit-to-GDP					0					
					(.001)					
Debt-to-GDP						.002***				
						(.001)				
Executive Const.							.774			
							(.487)			
D_Growth t								-.124		
								(.085)		
D_Growth t-1									-.153*	
									(.083)	
D_SGP										-.108
										(.17)
Observations	471	463	472	428	328	462	433	472	472	472
R-squared	.186	.085	.076	.142	.084	.092	.068	.067	.07	.063

Notes: Panel estimates with time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 9 - Determinants of CAPB cyclicality – with country and time fixed effects

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.016***	-.015**	-.016**	-.016***	-.015**	-.016**
	(.006)	(.006)	(.006)	(.006)	(.006)	(.006)
Trade Open.	.001	.001	.001	.001	.001	.001
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
KA Open.	.07	.069	.073	.07	.069	.073
	(.046)	(.046)	(.046)	(.046)	(.046)	(.046)
Credit-to-GDP	.002**	.002**	.002*	.002**	.002**	.002*
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Debt-to-GDP	.004***	.004***	.004***	.004***	.004***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
D_Growth t	-.092			-.092		
	(.06)			(.06)		
D_SGP	-.34***	-.343***	-.344***			
	(.103)	(.103)	(.103)			
D_Growth t-1		-.073			-.073	
		(.06)			(.06)	
Observations	291	291	291	291	291	291
R-squared	.219	.216	.211	.219	.216	.211

Notes: Panel estimates with country and time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 10 - Determinants of CAPB cyclicality – regressions with time fixed effects

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.016***	-.015**	-.016**	-.016***	-.015**	-.016**
	(.006)	(.006)	(.006)	(.006)	(.006)	(.006)
Trade Open.	.001	.001	.001	.001	.001	.001
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
KA Open.	.07	.069	.073	.07	.069	.073
	(.046)	(.046)	(.046)	(.046)	(.046)	(.046)
Credit-to-GDP	.002**	.002**	.002*	.002**	.002**	.002*
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Debt-to-GDP	.004***	.004***	.004***	.004***	.004***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
D_Growth t	-.092			-.092		
	(.06)			(.06)		
D_SGP	-.34***	-.343***	-.344***			
	(.103)	(.103)	(.103)			
D_Growth t-1		-.073			-.073	
		(.06)			(.06)	
Observations	291	291	291	291	291	291
R-squared	.219	.216	.211	.219	.216	.211

Notes: Panel estimates with time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 11 - Determinants of OBB cyclicality – standalone regressions with country and time fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	.00006***									
	(0)									
Gov. Size		-.006								
		(.005)								
Trade Open.			-.004***							
			(.001)							
KA Open.				.102**						
				(.043)						
Credit-to-GDP					.006***					
					(.002)					
Debt-to-GDP						.007***				
						(.002)				
Executive Const.							-.267			
							(.296)			
D_Growth t								.481***		
								(.097)		
D_Growth t-1									.433***	
									(.096)	
D_SGP										1.811***
										(.175)
Observations	487	478	492	440	328	477	449	493	493	493
R-squared	.456	.394	.411	.411	.313	.406	.352	.426	.42	.394

Notes: Panel estimates with country and time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 12 - Determinants of OBB cyclicality – standalone regressions with country fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	.00004***									
	(0)									
Gov. Size		-.007								
		(.006)								
Trade Open.			.008***							
			(.001)							
KA Open.				.332***						
				(.045)						
Credit-to-GDP					.004***					
					(.002)					
Debt-to-GDP						.011***				
						(.002)				
Executive Const.							.508			
							(.346)			
D_Growth t								.658***		
								(.077)		
D_Growth t-1									.095	
									(.084)	
D_SGP										.667***
										(.052)
Observations	487	478	492	440	328	477	449	493	493	493
R-squared	.09	.003	.09	.114	.027	.089	.005	.133	.003	.256

Notes: Panel estimates with country fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 13 - Determinants of OBB cyclicality – standalone regressions with time fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	0									
	(0)									
Gov. Size		-.019***								
		(.004)								
Trade Open.			.001**							
			(0)							
KA Open.				.067*						
				(.037)						
Credit-to-GDP					.004***					
					(.001)					
Debt-to-GDP						-.004***				
						(.001)				
Executive Const.							.083			
							(.356)			
D_Growth t								.633***		
								(.119)		
D_Growth t-1									.617***	
									(.118)	
D_SGP										1.811***
										(.223)
Observations	487	478	492	440	328	477	449	493	493	493
R-squared	.272	.318	.292	.294	.204	.295	.232	.319	.318	.278

Notes: Panel estimates with time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 14 - Determinants of OBB cyclicality – with country and time fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.026**	-.032***	-.028**	-.026**	-.032***	-.028**
	(.012)	(.012)	(.012)	(.012)	(.012)	(.012)
Trade Open.	.004	.003	.002	.004	.003	.002
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
KA Open.	-.007	-.004	-.023	-.007	-.004	-.023
	(.09)	(.091)	(.092)	(.09)	(.091)	(.092)
Credit-to-GDP	.006***	.006***	.008***	.006***	.006***	.008***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
Debt-to-GDP	.006**	.005**	.006**	.006**	.005**	.006**
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
D_Growth t	.409***			.409***		
	(.117)			(.117)		
D_SGP	.742***	.755***	.76***			
	(.202)	(.204)	(.206)			
D_Growth t-1		.335***			.335***	
		(.119)			(.119)	
Observations	291	291	291	291	291	291
R-squared	.324	.313	.291	.324	.313	.291

Notes: Panel estimates with country and time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1

Table A 15 - Determinants of OBB cyclicality – regressions with time fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
Gov. Size	-.039***	-.042***	-.039***	-.039***	-.042***	-.039***
	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)
Trade Open.	-.002**	-.002***	-.003***	-.002**	-.002***	-.003***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
KA Open.	.001	.017	-.013	.001	.017	-.013
	(.074)	(.074)	(.078)	(.074)	(.074)	(.078)
Credit-to-GDP	.002*	.002	.003***	.002*	.002	.003***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Debt-to-GDP	.001	0	.001	.001	0	.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
D_Growth t	.782***			.782***		
	(.141)			(.141)		
D_SGP	1.053***	.989***	1.021***			
	(.234)	(.233)	(.246)			
D_Growth t-1		.787***			.787***	
		(.14)			(.14)	
Observations	291	291	291	291	291	291
R-squared	.328	.331	.251	.328	.331	.251

Notes: Panel estimates with time fixed effects; estimation by OLS; standard errors are in parentheses; constants omitted; all variables inserted with one lag, except the dummies.
*** p<.01, ** p<.05, * p<.1