The cyclically-adjusted primary balance: A novel approach for the Euro area

Giovanni Carnazza[(*)]

Paolo Liberati[(*)]

Agnese Sacchi[(§)]

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Abstract

This paper presents novel estimates for the cyclically adjusted primary balance for 18 countries of the Euro area to assess the fiscal policy stance pursued by them during the period 1999-2017. We improve the methodology adopted by the European Commission by using quarterly rather than annual frequency data to properly capture the correlations between budgetary policy and the economic cycle. The empirical analysis is carried out considering two sub-periods in order to examine the discretionary fiscal policy before and after the recent economic crisis. We find that even though the budgetary policy of most European countries of our sample can be qualified in principle as countercyclical, this outcome has been weakened by the discretionary policies of many governments especially after the economic crisis started in 2008. Overall, the discretionary fiscal policy has failed its expansionary role in the most severe phases of the crisis reducing the stabilization impact of public policies in the economic system.

Keywords: cyclically-adjusted primary balance, business cycle, fiscal policy, economic crisis.

JEL Classification: H30; H61; H62; E62

[(*)] Roma Tre University, Department of Economics. E-mail: giovanni.carnazza@uniroma3.it
[(*)] Roma Tre University, Department of Economics. E-mail: paolo.liberati@uniroma3.it
[(§)] *Corresponding author*. Sapienza University of Rome, Department of Economics and Law. Via del Castro Laurenziano 9, 00161, Rome, Italy. E-mail: agnese.sacchi@uniroma1.it

1. Introduction

With the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union (TSCG) – or more plainly the Fiscal Stability Treaty – the adoption of a 'balanced budget rule' was required at a constitutional level in all member states of the European Union (EU), with the exception of the Czech Republic and the United Kingdom.[1] Starting from 2013, this new rule was aimed at affecting the budgetary policies of all signatory countries after the recent economic crisis in order to strengthening fiscal discipline (Hauptmeier et al., 2011) and alleviating tensions on the financial markets (Spilimbergo *et al*., 2009).[2]

From a theoretical viewpoint, the new rule allows some flexibility as it defines the balanced budget in structural terms. This means to split the overall actual balance (OB) in two components: the cyclical balance (CB) and the cyclically-adjusted balance (CAB), where the latter is obtained by subtracting CB from the OB and representing the structural component of the public budget (Galì and Perotti, 2003). Put differently, while the overall budget balance is affected by all transitory and permanent changes in output – of both automatic and discretionary nature – the aim of the CAB is to focus on the impact of discretionary changes only. By this way, the automatic response of the public budget induced by aggregate fluctuations through changes in tax bases and public expenditures would instead be embodied in the estimation of the CB (Debrun and Kapoor, 2010).

Thus, the CAB can be interpreted as a better indicator of expansionary or contractionary fiscal policies as it is independent of the economic cycle (Blanchard,

[1] According to the 'balanced budget rule' national budget has to be in balance (or surplus). More precisely, the structural budget balance should not exceed a country-specific Medium-Term budgetary Objective (MTO), which at most can be set to 0.5% of Gross Domestic Product (GDP) for member states with a debt-to-GDP ratio exceeding 60% (or at most 1.0% of GDP for states with debt levels within the 60% threshold).

[2] It is worth noting that this fiscal tightening is part of a broader path started with the Maastricht Treaty.

1990; Chouraqui *et. al*., 1990; Larch and Turrini, 2010). Accordingly, it is more able to capture the sign of discretionary tax policies in both booms and recessions, beyond the impact of automatic stabilizers (Claeys *et al*., 2016).[3] In particular, by calculating the CAB it is possible to verify whether the action of the automatic stabilizers during cyclical fluctuations is either reinforced or weakened by the discretionary action of the policy-makers.

Given the previous theoretical pros, the major cons concern the empirical methodology adopted by the European Commission (EC) for calculating the CAB that might undermine the effective application of countercyclical discretionary policies in the most serious stages of an economic crisis (D'Auria *et al*., 2010; Mourre *et al*., 2013; Mourre *et al*., 2014). For instance, in order to comply with the European budget rules, a country could even be forced to implement a restrictive budgetary policy while experiencing a recessionary phase of the economic cycle (Lendavai, 2011; Fantacone *et al*., 2015).

Two are the crucial points of this vicious circle. The first consists in the estimation of the potential GDP by using a production function, where the potential contribution of labour depends on the unemployment rate consistent with a stable wage inflation, i.e. the NAWRU (Larch and Turrini, 2010), as well as with a non-accelerating inflation rate, i.e. the NAIRU (Heimberger *et al*., 2017). The second crucial point is represented by the decision of estimating the NAWRU through a methodology that does not guarantee its stability, but can imply a strong variability over time with the final effect of establishing a close relationship between the estimated NAWRU and the output cyclical fluctuations.

[3] Given that the CAB can be interpreted either as a measure of fiscal sustainability or as a measure of the impact of the *ex-post* discretionary budgetary changes implemented by governments, our focus will be on the second interpretation.

Faced with these problems, the European Commission has recently revised the method for calculating the CAB (Havik *et al*., 2014) by loosening the aforementioned link between the NAWRU and the actual unemployment rate. However, this adjustment is partial as it applies only to some countries of the Eurozone, while it does not in others for which the detected critical issues remain (Carnazza, 2019). In particular, the EC's method does not allow to include different composition effects on government revenues and expenditures due to unbalanced economic growth, because it focuses on an aggregate mesure of the output gap (Bouthevillain et al., 2001).[4]

Our paper tries to fill this gap by providing new estimates on the CAB. Since we are interested in the fiscal policy attitude of the policy-makers, it has been natural to focus on the evolution of the primary budget balance.[5] Thus, in what follows, the acronym CAB will indicate the cyclically-adjusted primary budget balance. In detail, we use an alternative empirical methodology that is not affected by the dependence among the actual unemployment rate, the NAWRU and the potential GDP (Burnside and Meshcheryakova, 2005a; 2005b). In this perspective, our paper offers a methodological contribution by providing new estimates of the CAB based on Eurostat quarterly data for 18 countries belonging to the Euro area observed over the period 1999-2017.[6] Compared to the annual estimates of the European Commission and other international institutions, the higher frequency of our estimates allows to deepen the relationship between budgetary policy and the economic cycle by investigating more in detail the role of

[4] For a review of output gap modeling techniques that distinguish between univariate and multivariate methods see Álvarez and Gómez-Loscos (2018).
[5] Interest expenditures are excluded from the analysis for the usual reason that they are not under the direct control of the policy-makers, and are not directly taken into consideration in the formulation of economic policies by the governments.
[6] Due to lack of data, it has not been possible to estimate the CAB for Estonia.

discretionary fiscal policies that go beyond the impact of automatic stabilizers (Van den Noord, 2000).

More generally, since the adoption of the Stability and Growth Pact, anchoring a budgetary benchmark for the conduct and implementation of fiscal policy to an annual basis, among an heterogeneous group of countries, was a critical issue for the euro area framework (Artis and Buti, 2000; Orban and Szapáry, 2004; Ferrè, 2012; Fatas and Mihov, 2012), especially during economic downturns. To this purpose, our empirical analysis is also complemented by carrying out CAB estimates for two non-overlapping sub-periods (1999-2007 and 2008-2017)[7] in order to understand the different fiscal attitudes of the countries of the Euro area before and after the recent global economic crisis started in 2008.

The main finding from our CAB estimates is that even though the impact of the automatic stabilizers in most countries of the Eurozone have acted in a countercyclical way, accomplishing the traditional stabilization function, this impact has been severely weakened by the discretionary policies of governments, especially after the economic crisis. The comparison with the pre-crisis period help highlighting the relevance of this finding especially for some countries. This outcome differs from the results obtained by previous studies showing that, for most OECD countries, the impact of the automatic stabilizers in cushioning the cycle is stronger than that of the discretionary changes (Lane, 2003; Wyplosz, 2005; Fatás and Mihov 2009; Egert, 2010), possibly because those studies analyze the fiscal policy stance using annual data and limiting the analysis to years immediately after the recent economic crisis.

[7] The availability of data in some countries is reduced in relation to the first sub-period: Austria (2001-2007); Germany (2002–2007); Ireland (2002–2007); Luxembourg (2002–2007); Malta (2000–2007).

Close to the spirit of our work, there are contributions aimed at estimating the structural budget balance with novel empirical approaches for single case studies (Momigliano and Staderini, 1999 for Italy; Bajo-Rubio *et al*., 2006 for Spain; Pastor and Villagomez, 2007 for Mexico). Compared to them, we provide a more comprehensive analysis taking into account a cross-country perspective, as in Bouthevillain *et al*. (2001), with the additional difference of using quarterly rather annual data, and at the same time avoiding *a priori* assumptions on tax and expenditure laws and information on the income and revenue distributions. The rest of the paper is organized as follows. Section 2 describes the empirical methodology to estimate the cyclically adjusted primary balance for countries of our sample. Section 3 provides and discusses the main results, while some sensitivity checks are included in Section 4. Section 5 briefly concludes and suggests some policy implications.

2. The empirical methodology

2.1 Selecting budgetary items

In order to implement the estimation of the CAB, the national budget of 18 EU member states has been examined taking into account both the trends and the cyclical components of each item of revenues and expenditures using quarterly data from Eurostat.

The first step of the methodology consists in seasonally adjusting data through the TRAMO/SEATS approach (Bee Dagum and Bianconcini, 2016). We use a model-based approach, which conceives the series as the finite part of the realization of a stochastic

process, whose probabilistic structure is described by an ARIMA (Auto Regressive Integrated Moving Average) model.[8]

The second step consists in converting data in real terms by using the GDP deflator (as obtained from the nominal and real seasonally adjusted GDP series). Finally, data have been decomposed into the trend and the cycle components by using the Hodrick-Prescott (HP) filter (Hodrick and Prescott, 1997), with $\lambda = 1{,}600$ according to the existing literature (Pedersen, 2001).[9] The HP decomposition consists in choosing the values y_t^* of a given variable at time t that minimize the following quadratic loss objective function:

$$\sum_{t=1}^{T}(y_t - y_t^*)^2 + \lambda \sum_{t=2}^{T-1}[(y_{t+1}^* - y_t^*) - (y_t^* - y_{t-1}^*)]^2 \qquad (1)$$

This minimization problem leaves a degree of freedom in relation to the choice of the parameter λ. To this regard, the HP filter establishes a trade-off between the adherence

[8] In detail, this seasonal adjustment procedure is a model-based approach which consists of two parts: the first part (TRAMO, Time Series Regression with Arima Noise) preliminarily eliminates the deterministic effects from the time series; it interpolates any missing observations and identifies and estimates the ARIMA model that best fits the data. The second part (SEATS, Signal Extraction in ARIMA Time Series), based on the ARIMA model and the deterministic effects previously identified, carries out the real seasonal adjustment of the historical series. In this context, the identification of the so-called deterministic calendar effects carried out in TRAMO plays an important role, as the identification of the ARIMA model requires the historical series to be purely stochastic. Subsequently, these effects are attributed by SEATS to the seasonal component.

[9] It is worth noting that the use of the HP filter has been subject to some criticism (e.g., Harvey and Jaeger, 1993; Cogley and Nason, 1995; Park, 1996; Guay and St-Amant, 2005). However, Pedersen (2001) has showed how the main critique rests on an inadequate definition of the distortion it may create by showing that the optimal value of the smoothing parameter λ of the HP filter lies in the range 1,000-1,050. In any case, the difference in the distortionary effect of using λ=1,600 is weak and the difference in computed business cycle stylized facts is small. The same Hodrick and Prescott (1997) show how their results do not significantly depend on the value of the smoothing parameter, unless this value tends to infinity. For this reasons, there is agreement for the value of 1,600 for the smoothing parameter when using quarterly data. Robustness checks with different values of the smoothing parameter λ and alternative filters are anyway provided in Section 4. For more details about the procedure for adjusting the band with for the data frequency, see Ravn and Uhlig (2002) and De Jong and Sakarya (2016).

of the trend to the historical series and the regularity of the trend itself. In particular, by setting $\lambda = 0$, the trend that minimizes the previous function collapses to the original series ($y_t = y_t^*$); if $\lambda \to \infty$, the trend tends to a linear form.

The methodology used to estimate the CAB provides for the identification of the items of the public budget whose response can be considered automatic with respect to the fluctuations of the economic cycle (Burnside and Meshcheryakova, 2005a; 2005b). To achieve this outcome, it is necessary to select those items that automatically respond to cyclical fluctuations, disregarding instead those that are mainly affected by the discretionary action of the public decision-maker.

For example, the Value Added Tax (VAT) tends to show a natural automatic procyclical trend determined by the fact that its tax base mostly depends on the performance of the economic activity itself. When consumption falls because of a contractionary period, the tax base of VAT shrinks and the tax revenue from VAT can decrease. On the other hand, some welfare programs, such as unemployment benefits, automatically activate in response to fluctuations of the economic cycle. From a theoretical point of view, it is natural to consider the cyclical movements of these categories of revenues and expenditures as determined by the economic cycle rather than as the cause of the cycle itself.[10]

However, this choice is affected by the shortcoming that even though it is known that there are items in the public budget that are *mostly* affected by automatic responses, the

[10] The presence in the public budget of components that respond automatically in the opposite sense to fluctuations in the economic cycle leads to greater stability of income around its long-term value. This result derives not from a discretionary action of policy-makers but simply from the existence of such components in the public budget, a characteristic of the fiscal policy of industrial economies in the post-World War II period (Burnside e Meshcheryakova, 2005b). In other words, the structure of fiscal policy creates both a stimulus to output when the economy moves into recession and a brake to output when an expansion occurs.

possibility that their movements are at least *partially* determined by discretionary changes cannot be excluded. Thus, the choice has been made to label an item as automatic when it can be assumed that the discretionary component may represent a small part of the total impact. To this purpose, two different types of information have been considered: the first is the quantitative characteristics of the historical series dealt with; the second is a qualitative examination of the economic nature of such series.

To this purpose, the fact that the evolution of a budgetary item is correlated with the cyclical fluctuations of GDP does not necessarily identify a full automatic response to the economic cycle. It may happen, instead, that – depending on the nature of the cycle – a government may implement discretionary policies on certain categories of income or expenditure.

In order to solve this issue, equation (1) has been applied to all items of the public budget and to GDP in order to separate trend and cycle.[11] In symbols, for a generic item Y_t, the application of the HP filter gives $Y_t = Y_t^c + Y_t^*$, where Y_t^c is the cyclical component and Y_t^* is the trend component. Then, the cyclical component Y_t^c of each item of the public budget has been correlated with the cyclical component of GDP in order to select those budgetary items with the highest correlation with the economic cycle, under the assumption that if the correlation is high the cyclical movements of each item are mostly due to the automatic response.

The outcome of the selection process is reported in Table 1, providing information for each country in both sub-periods (1999-2007 and 2008-2017).

[Table 1 about here]

[11] Results are not reported but they are available upon request.

Looking at Table 1, it is worth noting that direct and indirect taxes can be classified as those items for which the statistically significant correlation with the economic cycle is the most frequent, followed by social benefits on the expenditure side. Furthermore, as expected, current budgetary variables are more correlated with the cycle than the items of the capital account, since capital taxes and expenditures are not recurrent and usually not induced by the economic cycle. At a first glance, Table 1 also reveals that the statistical significance of automatic responses is higher in the second sub-period, which includes the economic crisis.

2.2 Calculating the CAB

The outcome of this preliminary analysis has been to select the items of the public budget for which we can assume that most of the correlation with GDP fluctuations is due to the automatic response. Since there is some heterogeneity across countries, country-specific budgetary items have been considered to calculate the CAB, according to the statistical significance of the correlations illustrated in Table 1. This approach allows a more accurate estimation of the CAB, as it takes into account, to some extent, the different reactions of fiscal policy to the economic cycle occurring in different countries.

For each selected budgetary item and for each country, the elasticity of their cyclical components with respect to the cyclical component of GDP has been calculated by using the OLS technique (after transforming the selected series in logarithms). Thus, for a generic budgetary item j, and for any given country k:

$$y_{kjt}^{c} = \theta_{kj} g_{kt}^{c} + \varepsilon_{kjt} \qquad (2)$$

where y^c_{kjt} represents the logarithm of the cyclical component of the item j in the public budget; g^c_{kt} is the logarithm of the cyclical component of GDP; θ_{kj} is the country-specific elasticity of the budget item j, and ε_{kjt} the error term of the model.[12]

The estimated elasticities are finally used to calculate the CAB by clearing the actual public revenues and expenditures of the corresponding cyclical component of the selected items in each country, indicated by j. In symbols:

$$CAB_{kt} = \underbrace{\{R_{kt} - X_{kt}\}}_{Primary\ balance} - \underbrace{\left\{\sum_{j=1}^{n} R_{kjt}[1 - \exp(-\widehat{\theta_{kj}} g^c_{kjt})] - \sum_{j=1}^{n} X_{kjt}[1 - \exp(-\widehat{\theta_{kj}}\, g^c_{kjt})]\right\}}_{Cyclical\ primary\ balance} \qquad (3)$$

where R_{kt} represents actual total revenues in country k, X_{kt} stands for actual total expenditures (excluding interest on public debt), R_{kjt} and X_{kjt} are, respectively, revenue and expenditure items for which elasticities have been estimated according to equation (2). It is worth recalling that these items are, by definition, those whose reaction is mostly automatic, and for which the elasticities capture the size of these automatic responses that are removed from the actual figures to calculate the CAB.

The interpretation of equation (3) is straightforward: if the cyclical component of GDP would be zero, then $g^c_{kt} = 0$, and $y^c_{kjt} = 0$, which implies $\exp\left(-\widehat{\theta_{kj}} g^c_{kjt}\right) = 1$, and no cyclical adjustment is needed. When $g^c_{kt} > 0$ and $\theta_{kj} > 0$, the adjustment would be negative. The intuition is that during a positive cycle, some items of the public budget rise (e.g., income taxes and VAT) because the economy is growing. This means that,

[12] The cyclical component of GDP can be interpreted as the relative deviation of actual GDP from the HP trend. In this sense, the concept is similar to the output gap.

without the positive cycle, that specific item would have not risen in the same way; thus, to neutralise the impact of the cycle the adjustment has to be negative. The opposite holds true in the case of a negative cycle. Furthermore, a specular reasoning can be made for those items for which $\theta_{kj} < 0$ when $g_{kt}^{c} > 0$, as for example for unemployment and other social benefits.

3. Main results and discussion

3.1 Correlations between the cyclical components of CAB and GDP

Figures 1 and 2 provide a direct impact of the correlation between the cyclical component of the primary balance (the continuous line) and the cyclical component of GDP (the dotted line) both expressed as a percentage of the HP trend of the real GDP. In detail, Figure 1 refers to years before the economic crisis started in 2008, while Figure 2 depicts the correlations after the crisis. Both show results by country at a quarterly frequency.

The most straightforward interpretation of both figures is to consider, for each country, the continuous line as the impact of the automatic stabilizers. If the automatic stabilization works, it is expected that when the cyclical component of GDP lies in the negative quadrant, the cyclical component of the primary budget balance lies in the positive quadrant.

With regard to the period after the crisis, i.e. 2008-2017 (Figure 2), this effect is evident in 11 of 18 countries of our sample: Austria, Belgium, Finland, France, Germany, Italy, Latvia, Lithuania, the Netherlands, Slovakia and Slovenia. In the remaining countries, the impact of the automatic stabilizers is either weaker or absent (as in Ireland, Luxembourg, Portugal and Spain). The comparison with the pre-crisis period, i.e. 1999-2007, in Figure 1 confirms these characteristics of the primary balances with some

interesting exceptions: Austria and Italia exhibit a weak impact of the automatic stabilizers, while Portugal and Spain reveal a more countercyclical impact of their fiscal policies.

[Figures 1 & 2 about here]

Put differently, the continuous line in Figure 2 can also be interpreted as the correction that has to be applied to the primary balance to get the CAB. For example, for Austria 2008_Q1 the value is about –2 percent, which means that the actual primary balance is higher than the CAB due to the impact of automatic stabilizers amounting to about 2 percentage points of GDP. The opposite holds when the continuous line lies in the positive quadrant. In this case, the automatic stabilizers have worsened the actual primary balance, which is thus lower than the CAB.

3.2 *The fiscal policy stance*

The relationship between the government budgetary policies and the economic cycle can also be seen by another point of view, which gives a synthetic hint on the fiscal policy stance. To this purpose, Table 2 reports the correlations of both the actual primary balance and the CAB with the economic cycle for each country for each sub-period. In general, a positive correlation means that the balance improves during the expansionary phase of the cycle and worsens during recessions. This features the traditional anticyclical budgetary policy, with an important distinction: the actual primary balance contains both automatic and discretionary fiscal policies, whereas the CAB isolates the impact of discretionary policies only.

[Table 2 about here]

The first result to be noted is that in both sub-periods there is a group of countries for which the impact of the primary budget balance is anticyclical. However, most of the countries for which the correlation of the primary balance with GDP fluctuations is positive in both sub-periods fail to implement anticyclical discretionary policies. This emerges looking at the sporadic statistically significance of the correlation when the CAB is considered.

Additionally, discretionary policies in many countries – especially during the period of economic crisis – seem to have worked in opposition to the automatic stabilizers, thus weakening their impact. This clearly happened in Austria, Belgium, Finland, France, Germany, Italy, Latvia, Lithuania, Luxembourg, the Netherlands and Slovakia. This means that the discretionary intervention of the government in those countries has *de facto* neutralized the automatic stabilizers, reducing the overall impact of the public intervention in the economic system.

When comparing these results with the previous sub-period (i.e. 1999-2007), different outcomes emerge. In particular, for Austria, Finland, Latvia, and Luxembourg the anticyclical impact of the primary budget balance has not been compromised by discretionary actions. In turn, there are countries where both the actual primary budget balance and the CAB are not correlated with the economic cycle in 1999-2007, such as Belgium, Italy, Lithuania and Slovakia.

To some extent, this finding strengthens the previous conclusions about the dynamics of the sub-period following the 2008 crisis, as all the countries above mentioned seem to

have changed significantly their attitude towards the fiscal policy, with the result of weakening the impact of the automatic stabilizers. On the contrary, when comparing the two sub-periods, it is worth noting how France, Germany, and the Netherlands have been consistent in terms of fiscal policy intervention showing the same dynamics without significant differences. In this context, Greece represents an interesting case. In the second sub-period (2008-2017), the government's discretionary action determined the anticyclical impact of the primary budget balance differently from what happened in the first sub-period (1999-2007).

In line with the previous analysis, looking at the second sub-period, there is a group of countries (Cyprus, Ireland, Malta, Portugal and Spain) that have been characterized by an overall neutrality of fiscal policy with respect to the economic cycle. In detail, in the case of Cyprus and Spain this outcome marks a difference with the previous period, where the automatic stabilizers have worked more effectively and the discretionary policies contributed to slightly weaken the countercyclical action of fiscal policy.

To some extent, this outcome – even though with different methodologies – is in line with the conclusions by Debrun and Kapoor (2010). Quite interestingly, their analysis is based over the years 1989-2006, i.e. before the recent economic crisis. Our results not only confirm their conclusion that before 2008 the power of the discretionary policy is weak with respect to the role played by the automatic stabilizers, but also that after the crisis the attitude of the discretionary policy to counteract adverse economic cycles has even weakened in most euro area countries.

4. Sensitivity analysis

In order to strengthen the results achieved with the standard application of the HP filter with a smoothing parameter λ set to 1,600, we repliacate the previous estimates by using different methods of detrendisation.[13]

First, we used the HP filter with five new values of the λ parameter, different from 1,600, based on the contribution provided by Pedersen (2001).[14] Second, as new band-pass filters have been developed over time, such as the Baxter-King filter (Baxter and King, 1999) and the Christiano-Fitzgerald filter (Christiano and Fitzgerald, 2003), we try to apply those techniques in our case.[15] However, it is worth noting that the Baxter-King filter truncates observations from both the beginning and the end of the original sample. Hence, this implies the loss of important information about the response of discretional fiscal policy in the period before and after the 2008 crisis in our case. For this reason, we decide to use only the Christiano-Fitzgerald filter, which does not cause any loss of data. Finally, we apply a polynomial filter of three different orders (linear, quadratic and cubic time trend).[16]

[13] We voluntarly decid to not take into consideration the Beveridge-Nelson approach (Beveridge and Nelson, 1981) as an alternative method of detrendisation. Indeed, as highlighted in Bouthevillain *et al.* (2001), the main problem of that approach is the thoeretical assumption according to which the cyclical component is highly correlated with the first differences of the original series especially in the typical case of a positively autocorrelated original series (Mc Morrow and Roeger, 2001).

[14] In detail, Pedersen (2001) identifies five optimal values for the smoothing parameter when using the HP filter: λ=1,007; λ=1,038; λ=1,041; λ=1,103; λ=1,269.

[15] The band-pass filter by Baxter and King (1999) and that by Christiano and Fitzgerald (2003) are very similar in their design; they only differ in the approximation of the ideal band-pass filter to a filter that can be applied in reality. An approximation of the ideal filter is necessary as the ideal filter requires an infinite-order moving average which implies a data series of infinite length. The most important difference is the amount of output data, resulting from the different assumptions with respect to the simmetry of the weights: Baxter and King assume symmetric weights, while Christiano and Fitzgerald omit this assumption.

[16] Historically, the removal of linear (or log-linear) trends has been a standard method for separating trends and cycles. In any case, it should be kept in mind that recent evidence suggests that many macroeconomic series contain unit root (stochastic trend) components which would not be removed by this procedure (Baxter and King, 1999). For this reason, the results deriving from the use of this kind of filter have to be interpreted in a careful way.

When using the HP filter with different value of the smoothing parameter λ, we get the same results as those previously observed regardless of the five selected value of λ.[17] In relation to the other methods of detrendisation, the soundness of our findings is confirmed. In relation to the period 1999-2007, most of the countries show stable results as reported in Table 3. In particular, no significant differences emerge in the relationships between the primary budget balances and the economic cycle. In any case, a small group of countries show some differences in the estimated correlations of the budget balances with the economic cycle.

[Table 3 about here]

This represents an interesting aspect, especially when we compare the results from the sensitivity analysis between the two sub-periods. Estimates for the period 2008-2017 are reported in Table 4. With the exception of the Netherlands, the sensitivity analysis confirms the direction of the discretionary government's intervention aimed at counteracting the anticyclical effects of the automatic stabilizers in the post-crisis period.

[Table 4 about here]

5. Conclusions

This paper has estimated the cyclically-adjusted primary budget balance (CAB) for 18countries of the Euro area using quarterly budgetary data for the period 1999-2017. CAB has been used in its function of indicator of discretionary changes of fiscal policy

[17] Results are not reported for the sake of space but they are available upon request.

(Blanchard, 1990), obtained by isolating the cyclical component from the actual primary balance.

The methodology here used differs from that based on the EC approach firstly because the latter provides CAB estimates on an annual basis, thus with a reduced frequency to capture significant reactions of fiscal policy to economic fluctuations. Secondly, because it is characterized by some limits and shortcomings that affect the stability of the CAB estimates during the economic cycle. In short, the estimation of CAB provided in this paper gives the opportunity to better characterize the discretionary fiscal policy in two different sub-periods marked off by the recent global economic crisis.

We find that, especially in relation to the period after the crisis (i.e. 2008-2017), the fiscal policy could be defined as countercyclical in most coutries of our sample, but this outcome is severely weakened by discretionary government policies. Once the automatic impact of the economic cycle is removed from the budget balance, the CAB loses its positive correlation with the business cycle. This means that the discretionary fiscal interventions have weakened the automatic countercyclical nature of the budgetary policy. This result highlights to what extent discretionary fiscal policies have failed to provide their expansionary contribution in the most severe phases of the economic crisis in our sample. The comparison with the pre-crisis period also reveals the exceptionality of this phenomenon for some countries, such as Italy, whose actual primary budget balance and CAB have been substantially neutral to the economic cycle.

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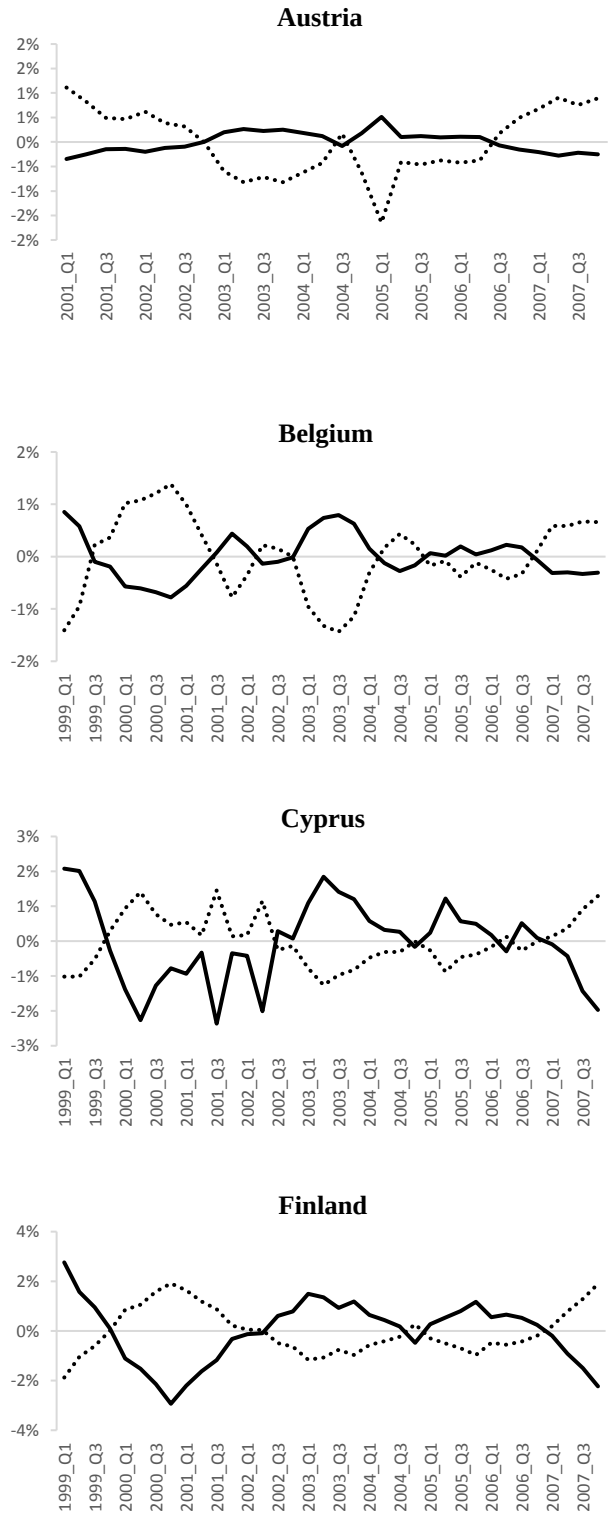
Figures

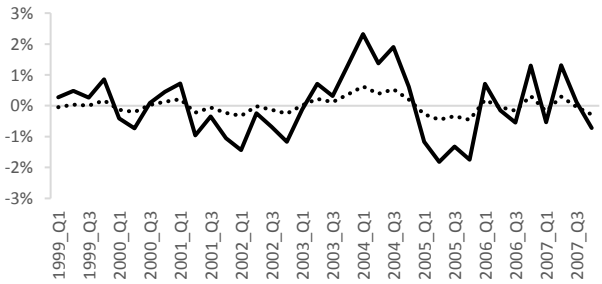
Figure 1 – The cyclical component of GDP and of the primary balance, by country (1999-2007)



France

Germany

Greece



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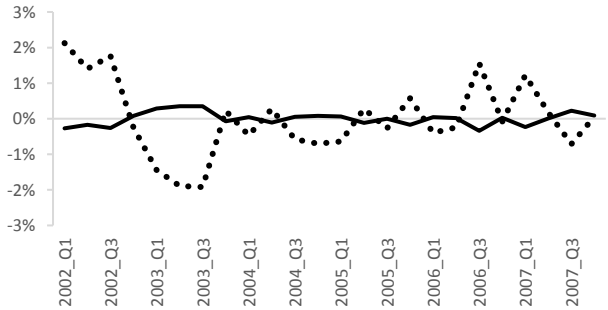

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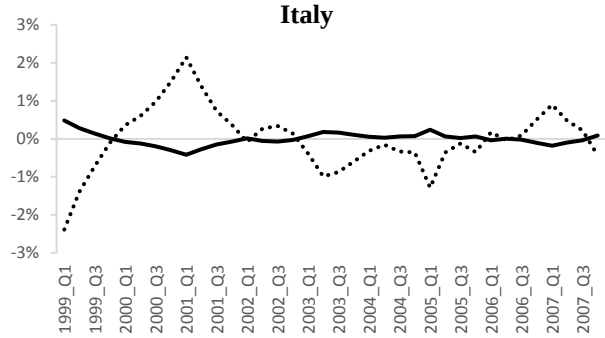

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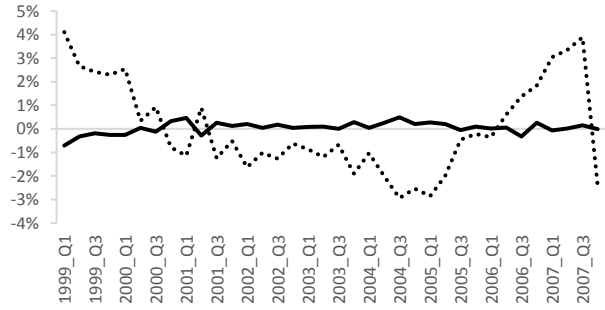

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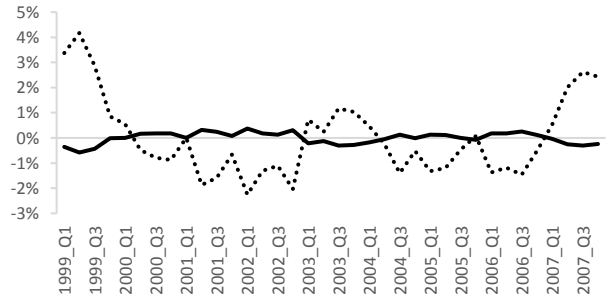

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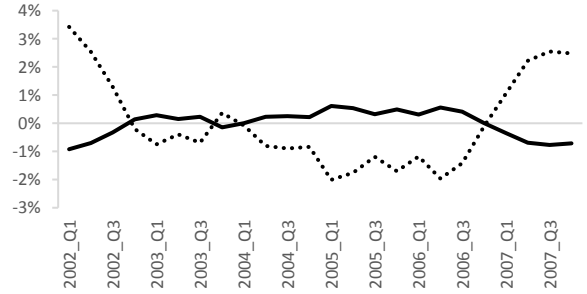

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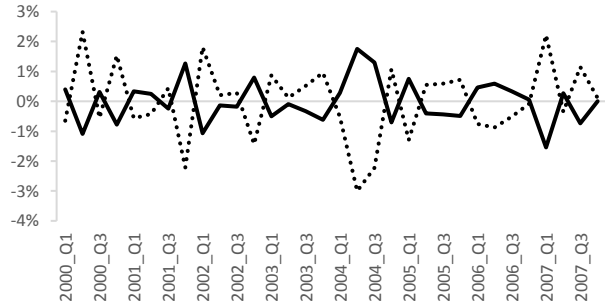

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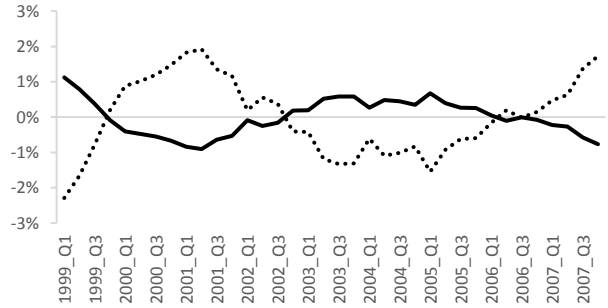

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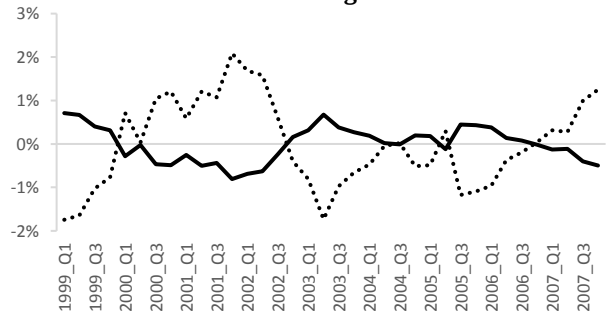

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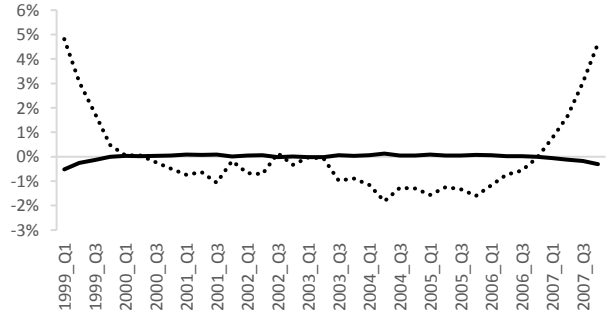
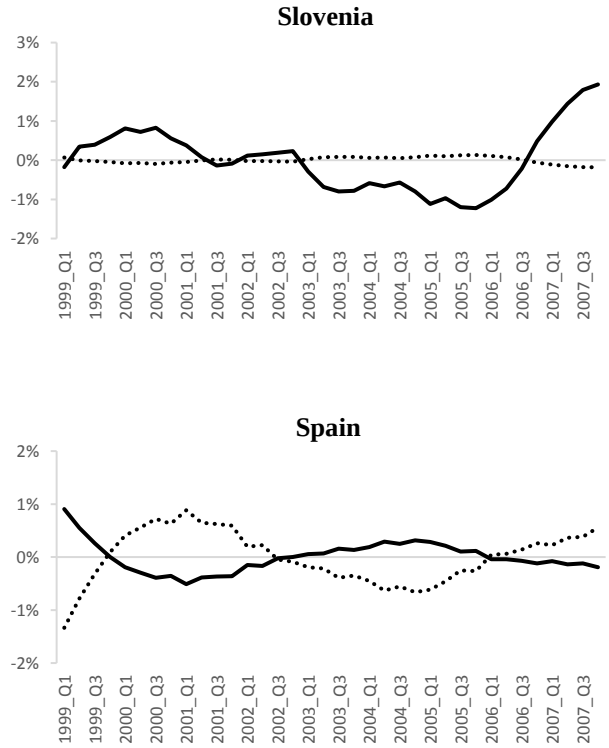
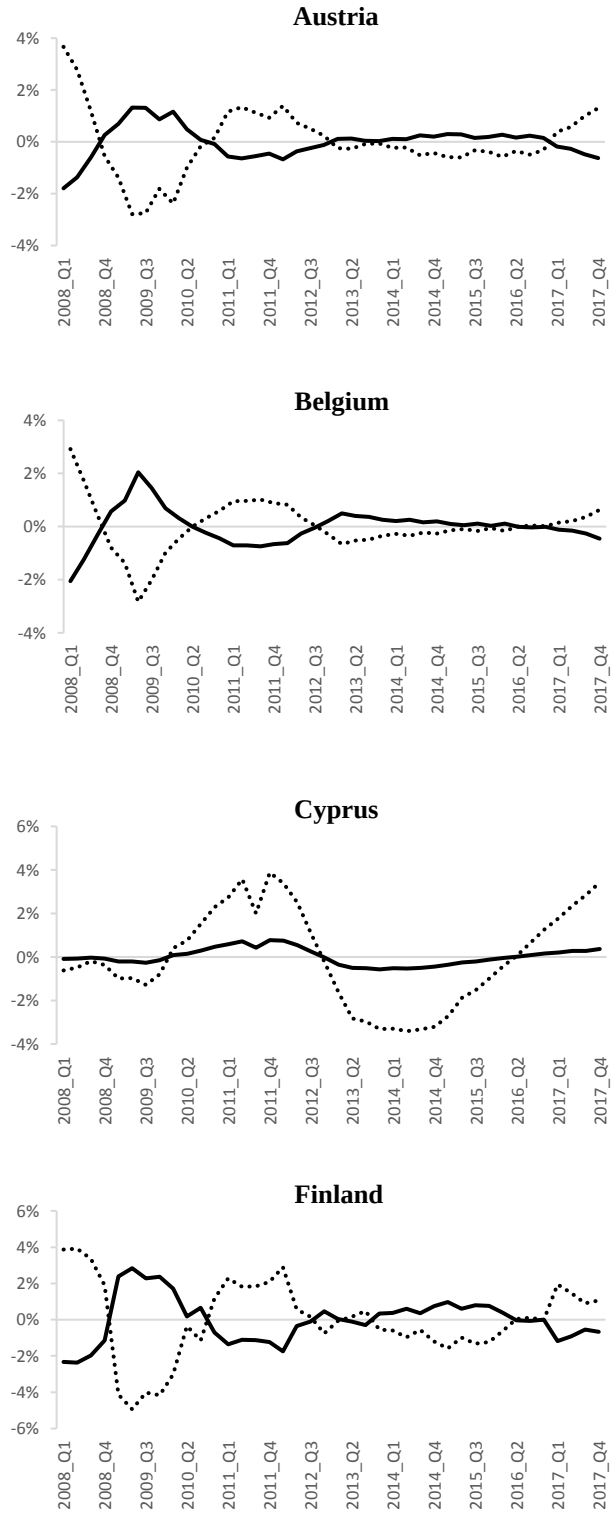




Note: the continuous line represents the difference between the cyclically adjusted primary balance and the primary balance while the dotted line represents the economic cycle. Each series is presented as a percentage of the HP trend of the real GDP.
Note: the availability of data in some countries is reduced in relation to the first sub-period: Austria (2001-2007); Germany (2002–2007); Ireland (2002–2007); Luxembourg (2002–2007); Malta (2000–2007).
Source: authors' elaborations on Eurostat data

Figure 2 – The cyclical component of GDP and of the primary balance, by country (2008-2017)



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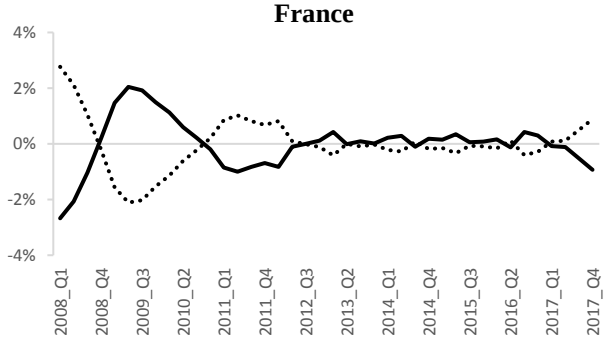

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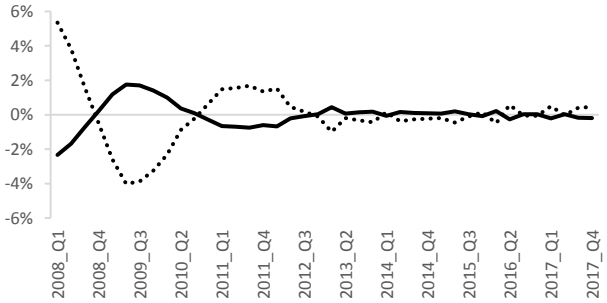

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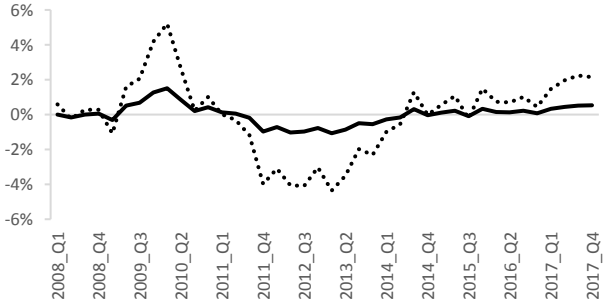

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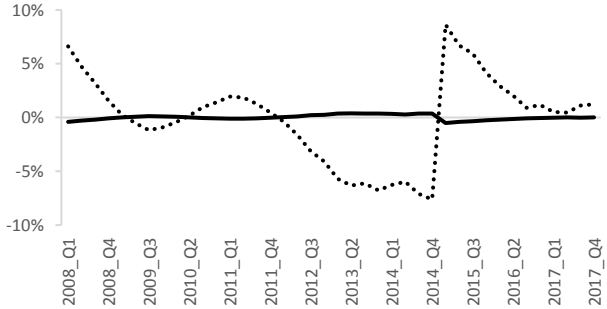

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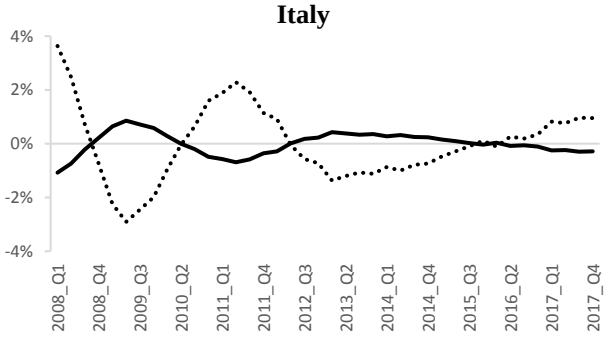

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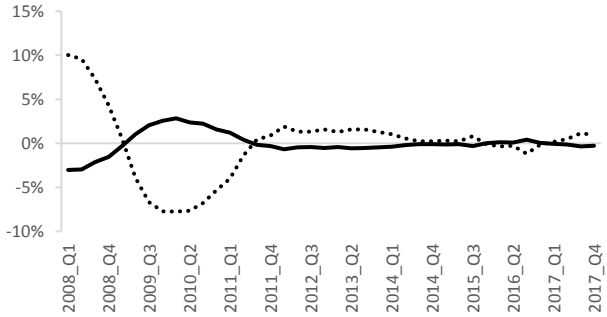

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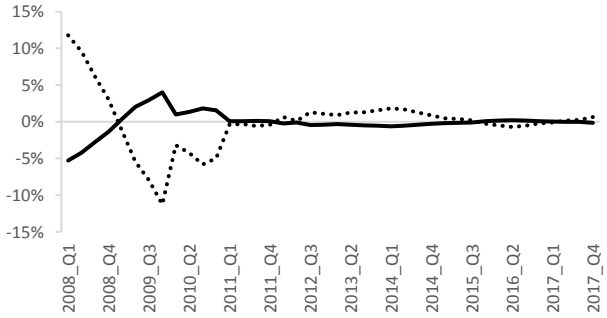

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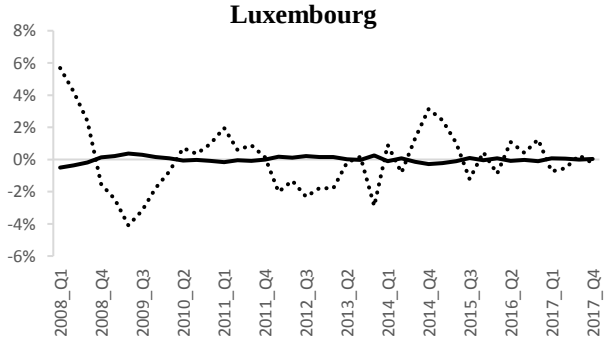

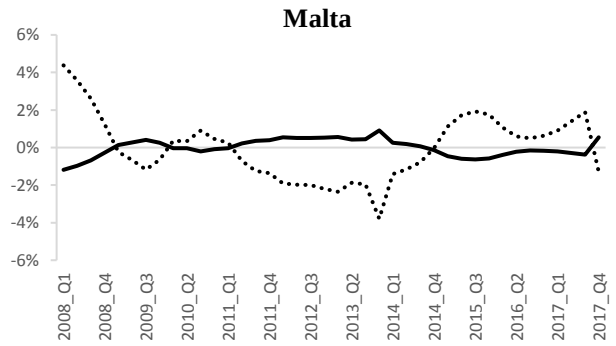
Malta
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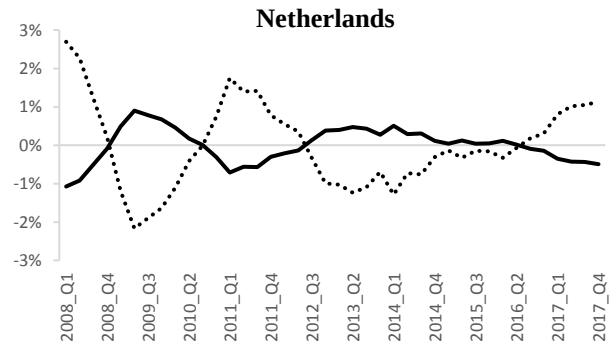
2015_Q3
2016_Q2
2017_Q1
2017_Q4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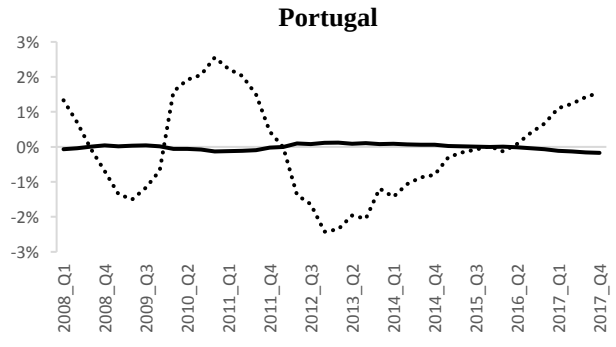
2017_Q1
2017_Q4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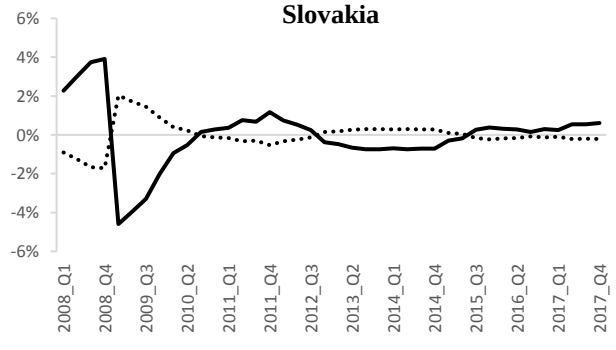
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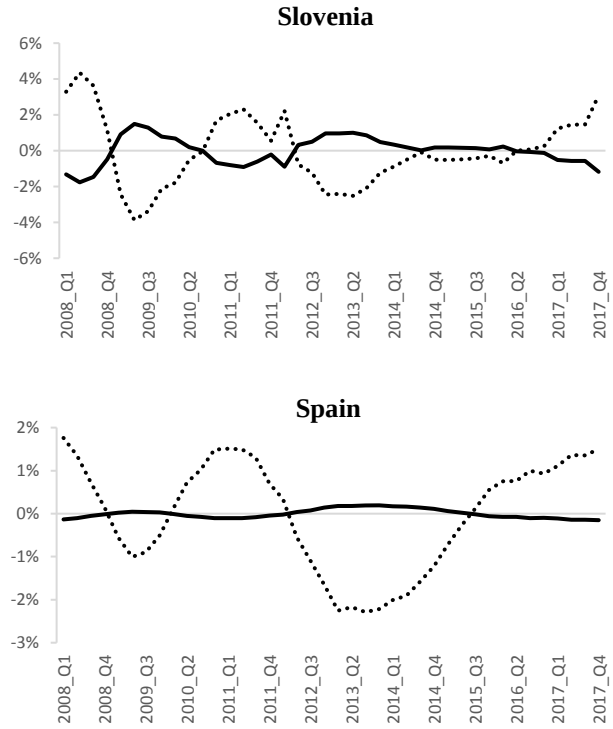
2017_Q4



Note: the continuous line represents the difference between the cyclically adjusted primary balance and the primary balance while the dotted line represents the economic cycle. Each series is presented as a percentage of the HP trend of the real GDP.
Source: authors' elaborations on Eurostat data

Tables

Table 1 – Budgetary items and the economic cycle

1999 - 2007	Direct taxes	Indirect taxes	Net social contributions	Other current taxes	Capital taxes	Compensation of employees	Intermediate consumption	Social benefits	Other current expenditures	Capital expenditures
Austria	x									
Belgium	x	x				x	x	x		
Cyprus	x	x				x		x		
Finland	x	x		x		x	x	x	x	x
France	x			x				x	x	
Germany	x	x					x	x	x	x
Greece	x						x			x
Ireland		x		x						
Italy		x			x					
Latvia	x	x	x			x			x	x
Lithuania		x	x		x			x		x
Luxembourg		x						x	x	
Malta	x		x						x	
Netherlands	x	x		x		x		x	x	
Portugal	x						x	x		
Slovakia	x				x	x				
Slovenia						x		x		x
Spain			x	x		x				

2008 - 2017	Direct taxes	Indirect taxes	Net social contributions	Other current taxes	Capital taxes	Compensation of employees	Intermediate consumption	Social benefits	Other current expenditures	Capital expenditures
Austria	x	x	x			x	x	x		
Belgium	x	x				x	x	x		
Cyprus		x	x			x	x	x		
Finland	x	x	x	x				x		
France	x	x	x	x		x	x	x	x	
Germany	x	x	x					x	x	
Greece			x			x	x	x		
Ireland								x	x	
Italy	x	x	x		x					x
Latvia	x	x	x			x		x		
Lithuania	x	x	x					x		
Luxembourg		x	x			x				
Malta	x	x				x				
Netherlands	x	x					x	x		
Portugal		x	x	x		x	x			
Slovakia	x	x					x			
Slovenia	x	x	x	x			x			
Spain	x	x					x	x		

Source: Authors' elaborations on Eurostat data

Table 2 – Correlations between the primary budget balances and the ecoonomic cycle

	1999 - 2007		2008 – 2017	
	Actual primary budget balance	Cyclically-adjusted primary balance	Actual primary budget balance	Cyclically-adjusted primary balance
Austria	0.51***	0.41**	0.57***	0.13
Belgium	0.24	0.06	0.63***	0.14
Cyprus	0.59***	0.25	0.1	0.16
Finland	0.82***	0.36**	0.66***	0.14
France	0.50***	0.1	0.73***	0.12
Germany	0.43**	0.11	0.51***	0.05
Greece	-0.35**	-0.25	0.26	0.36**
Ireland	-0.01	-0.2	-0.06	-0.08
Italy	0.12	0.03	0.38**	-0.04
Latvia	-0.35**	-0.42**	0.38**	0.01
Lithuania	-0.2	-0.07	0.45***	0.05
Luxembourg	0.65***	0.50**	0.41***	0.29*
Malta	0.29	0.01	0.15	-0.07
Netherlands	0.40**	0.15	0.48***	0.30*
Portugal	0.12	-0.1	-0.15	-0.17
Slovakia	-0.05	-0.09	0.41***	0.13
Slovenia	0.09	0.01	0.25	0.12
Spain	0.33**	-0.06	0.14	0.11

Notes: the correlation with the economic cycle is calculated taking into account the original primary balance and the cyclically adjusted primary balance as a percentage of the HP trend of the real GDP; the economic cycle is expressed in the same way. The significant of the correlation coefficients is indicated by the number of stars. which represent three different levels of significance: 0.01 (***); 0.05 (**); 0.1 (*). The availability of data in some countries is reduced in relation to the first sub-period: Austria (2001-2007); Germany (2002–2007); Ireland (2002–2007); Luxembourg (2002–2007); Malta (2000–2007).
Source: Authors' elaborations on Eurostat data

Table 3 – Sensitivity analysis (1999–2007)

		CF filter	*Order 1 polynomial trend*	*Order 2 polynomial trend*	*Order 3 polynomial trend*
Austria	Primary balance	0,49 (0,0077***)	0,57 (0,0016***)	-0,01 (0,9454)	-0,03 (0,8873)
	Cyclically-adjusted primary balance	0,40 (0,0355)	0,30 (0,1236)	0,00 (0,9849)	-0,01 (0,9515)
Belgium	Primary balance	0,24 (0,1615)	0,30 (0,0735*)	0,20 (0,2329)	0,06 (0,7232)
	Cyclically-adjusted primary balance	0,08 (0,6518)	0,04 (0,8241)	0,01 (0,9429)	-0,10 (0,5730)
Cyprus	Primary balance	0,54 (0,0007***)	0,69 (0,0***)	0,45 (0,0057***)	0,36 (0,0314**)
	Cyclically-adjusted primary balance	0,38 (0,0208)	0,19 (0,2623)	-0,01 (0,9491)	0,31 (0,0619*)
Finland	Primary balance	0,81 (0,0***)	0,78 (0,0***)	0,81 (0,0***)	0,45 (0,0057***)
	Cyclically-adjusted primary balance	0,44 (0,0075***)	0,09 (0,5899)	0,13 (0,4571)	0,11 (0,5127)
France	Primary balance	0,68 (0,0***)	0,56 (0,0004***)	0,48 (0,0031***)	0,43 (0,0087***)
	Cyclically-adjusted primary balance	0,34 (0,0446**)	0,09 (0,5995)	0,11 (0,5199)	-0,03 (0,8547)
Germany	Primary balance	0,50 (0,0136**)	0,44 (0,0316**)	0,08 (0,7019)	0,08 (0,7060)
	Cyclically-adjusted primary balance	0,20 (0,3374)	-0,08 (0,7034)	-0,05 (0,8255)	-0,06 (0,7984)
Greece	Primary balance	-0,37 (0,0282**)	-0,37 (0,0258**)	-0,38 (0,0238**)	-0,35 (0,0351**)
	Cyclically-adjusted primary balance	-0,30 (0,0728*)	-0,27 (0,1048)	-0,26 (0,1216)	-0,29 (0,0808*)
Ireland	Primary balance	0,12 (0,5841)	-0,10 (0,6356)	0,29 (0,1637)	0,16 (0,4466)
	Cyclically-adjusted primary balance	-0,24 (0,249)	-0,26 (0,2288)	0,06 (0,7752)	0,16 (0,4466)
Italy	Primary balance	0,30 (0,0759*)	0,11 (0,5376)	0,17 (0,3189)	0,05 (0,78)
	Cyclically-adjusted primary balance	0,16 (0,3497)	0,02 (0,8894)	-0,11 (0,5410)	-0,03 (0,8542)
Latvia	Primary balance	-0,23 (0,1747)	-0,37 (0,0244**)	-0,14 (0,412)	-0,15 (0,3935)
	Cyclically-adjusted primary balance	-0,21 (0,2115)	-0,46 (0,0044***)	-0,16 (0,3444)	-0,20 (0,2415)

Lithuania	Primary balance	-0,10 (0,5774)	-0,08 (0,6505)	-0,03 (0,8565)	-0,02 (0,9005)
	Cyclically-adjusted primary balance	-0,22 (0,197)	-0,22 (0,2026)	-0,16 (0,3564)	-0,14 (0,4147)
Luxembourg	Primary balance	0,63 (0,001***)	0,70 (0,0001***)	-0,10 (0,6339)	-0,02 (0,9209)
	Cyclically-adjusted primary balance	0,53 (0,0082***)	0,11 (0,6182)	-0,19 (0,3737)	-0,12 (0,5667)
Malta	Primary balance	0,02 (0,9139)	0,34 (0,0548**)	0,21 (0,2447)	0,24 (0,1842)
	Cyclically-adjusted primary balance	-0,05 (0,7728)	0,05 (0,7844)	0,01 (0,9447)	-0,03 (0,8669)
Netherlands	Primary balance	0,53 (0,001***)	0,56 (0,0004***)	0,26 (0,12)	0,47 (0,0042***)
	Cyclically-adjusted primary balance	0,34 (0,0422**)	0,06 (0,7229)	-0,03 (0,8666)	0,05 (0,7804)
Portugal	Primary balance	0,07 (0,6687)	0,13 (0,4627)	0,16 (0,3454)	-0,04 (0,8154)
	Cyclically-adjusted primary balance	0,00 (0,9991)	-0,09 (0,6008)	-0,05 (0,7732)	-0,08 (0,6244)
Slovakia	Primary balance	0,34 (0,0436**)	-0,22 (0,2026)	0,20 (0,2487)	0,38 (0,0242**)
	Cyclically-adjusted primary balance	0,31 (0,0665*)	-0,37 (0,0250**)	0,15 (0,3699)	0,35 (0,0372**)
Slovenia	Primary balance	0,07 (0,6753)	0,16 (0,3501)	-0,11 (0,5277)	0,05 (0,7558)
	Cyclically-adjusted primary balance	-0,02 (0,9104)	-0,23 (0,1857)	-0,15 (0,3787)	0,02 (0,9203)
Spain	Primary balance	0,36 (0,029**)	0,41 (0,0127**)	0,23 (0,1704)	0,58 (0,0002***)
	Cyclically-adjusted primary balance	0,01 (0,972)	0,05 (0,7555)	-0,15 (0,384)	0,07 (0,6908)

Notes: the correlation with the economic cycle is calculated taking into account the original primary balance and the cyclically adjusted primary balance as a percentage of the four different trend of the real GDP; the economic cycle is expressed in the same way. The availability of data in some countries is reduced in relation to the first sub-period: Austria (2001-2007); Germany (2002–2007); Ireland (2002–2007); Luxembourg (2002–2007); Malta (2000–2007).
Source: Authors' elaborations on Eurostat data

Table 4 – Sensitivity analysis (2008–2017)

		CF filter	*Order 1 polynomial trend*	*Order 2 polynomial trend*	*Order 3 polynomial trend*
Austria	Primary balance	0,49 (0,0013***)	0,58 (0,0001***)	0,54 (0,0004***)	0,51 (0,0009***)
	Cyclically-adjusted primary balance	0,08 (0,6164)	0,16 (0,331)	0,06 (0,7179)	0,08 (0,6154)
Belgium	Primary balance	0,34 (0,0336**)	0,74 (0,0***)	0,53 (0,0005***)	0,52 (0,0006***)
	Cyclically-adjusted primary balance	-0,26 (0,109)	0,15 (0,3439)	0,02 (0,9192)	0,13 (0,4083)
Cyprus	Primary balance	0,09 (0,5798)	0,24 (0,1427)	-0,02 (0,9033)	0,15 (0,3501)
	Cyclically-adjusted primary balance	0,15 (0,3706)	0,16 (0,3244)	0,15 (0,3718)	0,13 (0,4219)
Finland	Primary balance	0,49 (0,0012***)	0,80 (0,0***)	0,54 (0,0003***)	0,54 (0,0004***)
	Cyclically-adjusted primary balance	-0,13 (0,4333)	0,06 (0,7331)	-0,01 (0,9369)	-0,02 (0,9193)
France	Primary balance	0,56 (0,0002***)	0,77 (0,0***)	0,69 (0,0***)	0,60 (0,0001***)
	Cyclically-adjusted primary balance	-0,11 (0,5021)	0,05 (0,7483)	0,01 (0,9715)	-0,01 (0,9334)
Germany	Primary balance	0,44 (0,0042***)	0,52 (0,0006***)	0,52 (0,0006***)	0,41 (0,008***)
	Cyclically-adjusted primary balance	-0,01 (0,9704)	0,02 (0,914)	0,01 (0,9312)	-0,03 (0,8529)
Greece	Primary balance	0,18 (0,2727)	0,30 (0,0644*)	0,26 (0,1039)	0,26 (0,1039)
	Cyclically-adjusted primary balance	0,27 (0,0942*)	0,28 (0,0818*)	0,39 (0,0135**)	0,34 (0,0333**)
Ireland	Primary balance	-0,08 (0,6265)	0,00 (0,9958)	-0,17 (0,299)	-0,21 (0,2011)
	Cyclically-adjusted primary balance	-0,10 (0,5338)	-0,09 (0,5632)	-0,19 (0,2515)	-0,22 (0,1803)
Italy	Primary balance	0,39 (0,0119**)	0,25 (0,1203)	0,34 (0,0313**)	0,39 (0,0122**)
	Cyclically-adjusted primary balance	-0,04 (0,8007)	-0,16 (0,3167)	0,05 (0,7468)	-0,04 (0,7922)
Latvia	Primary balance	0,48 (0,0019***)	0,14 (0,3909)	0,45 (0,0038**)	0,43 (0,006***)
	Cyclically-adjusted primary balance	0,10 (0,5482)	-0,03 (0,8614)	0,02 (0,9096)	0,00 (0,9967)

Lithuania	Primary balance	0,35 (0,0264**)	0,42 (0,0068***)	0,45 (0,0038***)	0,23 (0,145)
	Cyclically-adjusted primary balance	0,00 (0,9860)	-0,17 (0,2904)	-0,05 (0,7494)	-0,04 (0,8275)
Luxembourg	Primary balance	0,15 (0,3486)	0,56 (0,0002***)	0,35 (0,0286**)	0,11 (0,484)
	Cyclically-adjusted primary balance	0,06 (0,7346)	0,13 (0,4077)	0,20 (0,2151)	0,08 (0,6424)
Malta	Primary balance	0,27 (0,0901**)	0,21 (0,1929)	0,0 (0,9889)	0,16 (0,3285)
	Cyclically-adjusted primary balance	0,18 (0,2750)	-0,03 (0,8579)	-0,04 (0,829)	0,09 (0,5954)
Netherlands	Primary balance	0,37 (0,0188**)	0,60 (0,0***)	0,25 (0,1181)	0,29 (0,0664*)
	Cyclically-adjusted primary balance	0,09 (0,5878)	0,06 (0,707)	0,10 (0,5208)	0,09 (0,5721)
Portugal	Primary balance	-0,08 (0,6064)	-0,01 (0,9462)	-0,28 (0,0763*)	-0,14 (0,3779)
	Cyclically-adjusted primary balance	-0,11 (0,5042)	-0,15 (0,3522)	-0,24 (0,1303)	-0,17 (0,3025)
Slovakia	Primary balance	0,43 (0,0058***)	0,38 (0,0171**)	0,39 (0,0128**)	0,32 (0,0472**)
	Cyclically-adjusted primary balance	0,09 (0,5652)	-0,07 (0,6876)	0,13 (0,4152)	0,17 (0,2901)
Slovenia	Primary balance	0,11 (0,4959)	0,40 (0,0115**)	0,09 (0,5837)	0,09 (0,5688)
	Cyclically-adjusted primary balance	0,00 (0,9974)	0,16 (0,3161)	0,02 (0,9022)	0,02 (0,9217)
Spain	Primary balance	0,13 (0,4209)	0,25 (0,1262)	-0,20 (0,2218)	0,04 (0,8061)
	Cyclically-adjusted primary balance	0,01 (0,9561)	-0,07 (0,6841)	-0,05 (0,7576)	-0,05 (0,7596)

Notes: the correlation with the economic cycle is calculated taking into account the original primary balance and the cyclically adjusted primary balance as a percentage of the four different trend of the real GDP; the economic cycle is expressed in the same way.
Source: Authors' elaborations on Eurostat data