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Breuer, Christian

Chemnitz University of Technology, Department of Economics, Junior Professorship for European Economics

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Christian Breuer

Chemnitz University of Technology
Department of Economics
Junior Professorship for European Economics
christian.breuer@wirtschaft.tu-chemnitz.de

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Abstract

Empirical studies on the effects of fiscal policy using the *conventional* or *data-based approach* and the *Blanchard-method* of cyclical adjustment or the *Blanchard Fiscal Impulse* (BFI) discovered that fiscal consolidations can be expansionary, particularly in the case of spending-cuts. In this paper, it is stated this finding is affected by reverse causality, i.e. increasing GDP causally decreases expenditure-GDP-ratios if the cyclical adjustment strategy fails to correct for cyclical effects. It is also illustrated that the BFI as used in the literature does not appropriately control for cyclical effects in the case of expenditure-GDP-ratios and the resulting BFI is endogenously correlated with the economic cycle. This might explain why previous studies based on the BFI pointed to counter-intuitive findings when examining cuts in government expenditure. Replicating one prominent example of literature on expansionary austerity and comparing both the results based on the BFI and the results based on standard cyclical adjustment strategies, only the BFI-based results show expansionary effects of fiscal consolidations, while these effects disappear after applying standard methods of cyclical adjustment.

Keywords: fiscal policy; fiscal adjustment, cyclical adjustment; reverse causality
JEL Classifications: E 62, E 63, H 50

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1. Introduction

One of the lively debated issues in today's macroeconomic research is the question of the effects of fiscal policy. Since the European fiscal crisis, this debate gained political relevance because policy-makers around the world have been in search of an efficient way to reduce government debt levels. The idea of an "expansionary fiscal contraction" seemed to be one possible solution for the challenges of the time.

Macroeconomic textbooks in the Keynesian tradition however suggest that fiscal expansions increase, while fiscal consolidations contract aggregate demand. A reduction of government deficit levels would thus decrease economic growth in the short run. On the other hand, a substantial amount of research on the macroeconomic effects of fiscal consolidations challenges this conventional wisdom and finds that fiscal adjustments may have expansionary economic effects ('expansionary austerity hypothesis'). This view was first expressed by Giavazzi and Pagano (1990) who discussed the expansionary effect of cases of fiscal adjustment in Ireland and Denmark during the 1980s. Alesina and Perotti (1995)[2] found first evidence for the expansionary austerity hypothesis in a large panel of OECD countries. They also pioneered the data-based approach and the application of the "Blanchard-method" for cyclical adjustment of budget data. In the aftermath, a number of papers built on the approach used in A&P (1995) to investigate the effects of fiscal policy.[3] According to this stream of literature, fiscal consolidations are likely to be expansionary if the adjustment mainly takes place on the expenditure side, while tax increases are more likely to be contractionary (Alesina and Ardagna, 1998, 2010, and 2013).[4]

To measure discretionary changes in fiscal policy, this approach investigates changes in the cyclically-adjusted primary balance (hereafter: *conventional* or *data-based approach*) and applies a cyclical adjustment strategy based on the so-called "*Blanchard method*" (hereafter: *A&P approach*).[5]

[2] Hereafter A&P.
[3] See for instance Alesina and Perotti (1997), Alesina and Ardagna (1998, 2010, and 2013), and Ardagna (2004 and 2009).
[4] Hereafter A&A (1998, 2010, and 2013).
[5] The cyclical adjustment strategy is motivated by Blanchard (1990) and described by Alesina and Perotti (1995).

Critique of this approach is not new. In a comment on A&P, Kollintzas (1995) criticised that the cyclical adjustment strategy used in A&P (1995) might not capture the cyclical effects of the government budget balance so that the resulting "*Blanchard Fiscal Impulse*" (BFI) might not be an appropriate measure of a discretionary change in fiscal policy. Moreover, Giavazzi (1995) suggests that the results in A&P are influenced by accompanying monetary policies, in form of exchange rate devaluations, for example in the case of Ireland 1987.[6]

At the beginning of the European fiscal crisis, there was a renewed interest in the effects of fiscal consolidations and potential expansionary effects. Against this background, A&A (2010 and 2013) provided new evidence on expansionary effects of fiscal consolidations in a panel of OECD countries. These studies have been frequently debated in recent literature.[7] Leigh et al. (2010) and Guajardo et al. (2014) analysed historical records of fiscal adjustments and contrasted the *conventional approach* with the *historical approach*. Their results did not share the expansionary austerity view.

Guajardo et al. (2014) illustrate that the fiscal indicator as used in A&A (2010) is correlated with GDP forecast revisions. The authors state that estimates based on the conventional approach appear to be biased towards overestimating expansionary effects, since the conventional approach entails one-offs operations in the budget balance. They also criticise that the cyclical adjustment strategy used in A&P (1995) and A&A (2010) neglects the effects of budgetary effects of changes in asset price. Jayadev and Konczal (2010) and Jordà and Taylor (2016) illustrate that the successful cases of fiscal adjustments in the AAP literature are in most instances associated with an economic upswing, an analysis that questions the exogeneity of the fiscal indicator used in the *data-based* approach. In this line, De-Cos and Moral-Benito (2013) illustrate that fiscal adjustment episodes as identified by AAP are not exogenous to economic growth and treat fiscal consolidations as weakly exogenous or predetermined, which points to the question of potential feedback effects and reverse causality. Moreover, De-Cos and Moral-Benito (2016) illustrate that the cases of fiscal adjustments identified by the *narrative approach* are not exogenous to GDP, as well.

[6] The same critique holds for the episodes examined in Giavazzi and Pagano (1990).

[7] Refer to Blyth (2013) and Stiglitz (2016) for a comprehensive discussion and critique of the relevance of expansionary fiscal consolidations in the European fiscal crisis.

To account for potential endogeneity in the study of A&A (2010), Holden and Midthjell (2013) and Yang et al. (2015) applied alternative measures of discretionary change and illustrate that the expansionary effect of fiscal adjustments disappears after applying alternative strategies of adjusting the budgetary data, rather than adjusting with the Blanchard method.

Since the Blanchard method used in A&P (1995) has been criticised for the (non-) recognition of fluctuations in asset prices and their effect on the budget balance (Guajardo et al., 2014), Yang et al. (2015) developed an indicator of fiscal impulse which controls for asset price fluctuations and discovered that the results are more in-line with the narrative approach when the changes in the fiscal stance is measured with this alternative strategy. In this line, Holden and Midthjell (2013) discussed potential reverse causality in the study of A&A (2010) and illustrate that the tax multiplier is not greater, compared to the expenditure multiplier, if the CAPB is estimated with a modified strategy, rather than the strategy used by A&A. However, Holden and Midtjell (2013) and Yang et al. (2015) established a new strategy to adjust for cyclical effects rather than applying standard methods of cyclical adjustments. Moreover, no previous study discusses why and how the *Blanchard method* in A&P fails to adjust for cyclical effects, with the exception of neglecting changes in asset prices (Yang et al., 2015).

This paper builds on previous critical analyses on expansionary austerity and illustrates that studies in the tradition of A&P using the BFI as an indicator of fiscal impulse are biased towards expansionary austerity if the cyclical adjustment strategy fails to correct the budget balance for cyclical effects. This cyclical adjustment problem in the method proposed by A&P and applied in A&A (1998, 2010, and 2013) is particularly pronounced in the case of government expenditure. This explains why the resulting multiplier in the literature based on the A&P method is biased towards expansionary results, particularly in the case of government expenditure.

Different from previous critical studies, in this study a new fiscal indicator or a new strategy of fiscal adjustment is not developed. It is not only that the data-based approach in general does not take into account countercyclical policy response or that the CAPB does not correct for changes in asset prices, as argued by previous critical studies. Beyond that, section 2 of this paper illustrates that the strategy applied by A&P is in conflict with standard assumptions made in the literature on cyclical adjustment.

Different from the assumptions proposed in the literature, the A&P method implicitly assumes an elasticity of government expenditure with respect to GDP of 1, while it is common in the literature so far to assume inelastic government expenditure (other than transfers). Section 3 summarizes the theoretical discussion and proposes testable hypotheses. The following empirical parts test these hypotheses based on the dataset used in A&A (2010) and contrast the A&P strategy with a CAPB based on a standard cyclical adjustment strategy.[8]

Section 4 provides evidence for the hypothesis that the A&P fiscal indicator as used in A&A (2010) is not exogenous to economic growth and systematically correlated with the output gap, while the same is not true for the CAPB if standard assumptions are used on cyclically adjustment. As predicted in section 2, this systematic correlation appears to be particularly pronounced for the expenditure-GDP-ratio (computed by the strategy proposed in A&P), while the revenue side of the budget remains unrelated to the economic cycle, both for the A&P measure and the OECD measure.

Section 5 analyzes large changes of the output gap, rather than large changes in the CAPB and illustrates that episodes with large changes in the output gap are very likely to be picked as an episode of large discretionary change if the A&P method, rather than the CAPB is used, as computed by the OECD.

Replicating some of the results in A&A (2010), in section 6, the estimated effects are compared based on the CAPB computed with the strategy of A&P with the CAPB computed with the OECD method (Girouard and André, 2005). In line with the hypotheses formulated in section 3, it is shown that the results based on the Blanchard measure provide evidence for expansionary effects of fiscal contractions in the case of expenditure cuts, while the estimated effect is contractionary after using standard measures to correct for cyclical effects. Section 7 computes dynamic effects of fiscal policy based on both strategies to compute the CAPB. It is shown that there is a qualitative difference in the estimated multiplier if standard methods are used to compute the CAPB, rather than the method proposed by A&P. Section 8 concludes.

[8] In the following empirical part of the paper I use the same data and definitions as A&A (2010), precisely the OECD Economic Outlook, No. 84, as applied in A&A (2010) and in de Coz and Moral-Benito (2013). As a standard cyclical adjustment strategy I obtain cyclically-adjusted data from the same source, based on the method proposed in Girouard and André (2005).

2. Cyclical adjustment and reverse causality

2.1. Cyclical adjustment and the data-based approach

To analyse the effects of changes in fiscal policy on GDP, the conventional (data-based) approach applies regressions of GDP growth rates Δy_t in year t on changes in the cyclically-adjusted primary budget balances (as a ratio to GDP) $\Delta capb_t$:

$$\Delta y_t = \alpha + \beta\, \Delta capb_t + \varepsilon_t \tag{1}$$

The idea of this approach is quite straightforward: coefficient β captures the effect of a change in fiscal policy (measured as a percentage point of GDP) on GDP growth rates, i.e, the fiscal multiplier. This approach provides unbiased estimates of the fiscal multiplier if $CAPB_t$ is assumed to be uncorrelated to GDP growth. Since the cyclical adjustment strategy aims at controlling for the automatic feedback effects of GDP on the budget balance, the most obvious reason why the budget balance responds to GDP is controlled for. Because the c. a. budget balance is influenced by a number of factors (that might be correlated with the economic cycle – beyond automatic stabilizers), the question of reverse causation has often been discussed in the literature. Perotti (2013) distinguishes between two potential pitfalls of empirical papers on the effects of fiscal policy using the conventional approach, the "countercyclical response problem", and the "imperfect cyclical adjustment problem".

While cyclical adjustment strategies usually aim at capturing the automatic response of the budget balance to a change in the economic cycle, the cyclically-adjusted budget balance can still be influenced by economic factors that are correlated with GDP growth but might not be captured by the cyclical adjustment strategy. For example, it is possible that counter-cyclical policy responses might contribute to the positive relationship between the budget balance and economic growth ("counter-cyclical response problem"). According to Perotti (2013), another potential pitfall might be the "incomplete cyclical adjustment problem", e.g. that standard cyclical adjustment

strategies do not account for changes in asset prices, while asset price fluctuations might be related to economic growth. In this context, a number of articles discuss the influence of asset prices on the budget.[9] According to this, under the assumption of no "imperfect cyclical adjustment problem" due to asset price changes and no "counter-cyclical response problem", it can be assumed that the estimated coefficient β is an unbiased assessment of the multiplier if the c.a. strategy correctly adjusts the budget balance for cyclical effects.

2.2. The Blanchard method

Typical cyclical adjustment strategies (as for instances applied in the OECD economic outlook) aims at controlling for automatic feedback from changes in the economic cycle to the budget balance:

$$\Delta CAPB_t = PB - \alpha \ \Delta Gap_t + u_t \tag{2}$$

Here, *Gap* represents the output gap (as a percentage of potential GDP), where potential GDP is to be measured with a production function or filtering methods, what is a potential source of measurement error. Since a number of authors have been skeptical regarding the reliability of estimations of potential output and thus the output gap, Blanchard (1990) suggests estimations of potential GDP and the gap using the unemployment rate as a natural indicator of the economic cycle[10]:

$$\Delta CAPB_t = PB - \alpha \ \Delta UR_t + u_t \tag{3}$$

A&P (1995) pioneered data-based analyses and the so-called "Blanchard method" to adjust the budget balance for cyclical effects. They refer to the so computed change in the fiscal stance as the "Blanchard fiscal impulse" (equation 3).

[9] See Morris and Schuknecht (2007) and Yang et al. (2015) on how asset price fluctuations might influence the budget balance and the estimated fiscal multiplier.

[10] According to Blanchard (1990) an estimation of the level of potential GDP is not necessary anyway, since we are interested in changes in the fiscal policy rather than levels which might be estimated with the help of changes in the unemployment rate.

The basic question in this article is whether and how the cyclically adjustment strategy proposed in A&P is in line with the assumptions made in the literature on cyclical adjustment and whether there are potential pitfalls at the spending- or revenue side. Fedelino et al. (2009) is referred to as a benchmark study on cyclical adjustment, even though there are other pioneering discussions of cyclical adjustment strategies, for example Girouard and André (2005). According to Fedelino et al. (2009), the CAB consists of cyclically-adjusted revenues net of cyclically-adjusted expenditure, both adjusted with their respective elasticities[11]:

$$CAPB_t = R\left(\frac{Y^P}{Y}\right)^{\varepsilon_R} - G\left(\frac{Y^P}{Y}\right)^{\varepsilon_G} \tag{4}$$

One baseline assumption in the literature on cyclical adjustment, the following assumptions are made: unit-elastic revenues (responding to the tax base with an elasticity of 1), $\varepsilon_R = 1$, and inelastic government expenditure ($\varepsilon_G = 0$). If so, equation (4) can be simplified:

$$CAPB_t = R\left(\frac{Y^P}{Y}\right) - G \tag{5}$$

To adjust the budget balance for cyclical effects, it appears to be reasonable to adjust revenues but not expenditure. However, since some expenditure items - as in the case of unemployment benefits - are affected by the economic cycles, the assumption of inelastic expenditure is critical. It is necessary to take into account elastic transfer payments (because unemployment benefits increase in an economic downturn). In this line, Alesina and Perotti (1995) assume that social transfers to households, as well as revenues (and only transfers and revenues) respond to cyclical effects. Accordingly, A&P apply the cyclical adjustment procedure to taxes and transfers, whereas expenditures other than transfers remain unadjusted.

[11] Note that the CAB in this illustration is not calculated as a ratio to GDP.

According to A&P[12], it is necessary to adjust revenues with the unemployment rate rather than with estimations of potential output or the output gap. According to A&P and equivalent to equation (3), the BFI gives the following:

$$\Delta CAPB_t = \Delta R - \alpha_R \Delta UR_t - (\Delta Tr_t - \alpha_{Tr} \Delta UR_t) - \Delta G \quad (6)$$

Rather than computing estimates of potential GDP and output elasticities, here it is only necessary to compute estimates of the elasticities of transfers and tax revenues with respect to GDP (α_R and α_{Tr}).

To do so, for each country, A&P regresses social transfers as a share of GDP[13] on two time trends (one for the full period and one for the period after 1975 to control for a potential structural break)[14] and on the unemployment rate:

$$Tr_t = a_0 + a_1 \cdot trend_1 + a_2 \cdot trend_{75} + b \cdot UR_t + e_t \quad (7)$$

Thus, A&P estimates what the transfers would be in period t if unemployment rates were the same as in the previous year:

$$Tr_t(UR_{t-1}) = \hat{a}_0 + \hat{a}_1 \cdot trend_1 + \hat{a}_2 \cdot trend_{75} + \hat{b} \cdot UR_{t-1} + \hat{e}_t \quad (8)$$

Here $\hat{a}_0$, $\hat{a}_1$, $\hat{a}_2$, and $\hat{b}$ represent estimated coefficients (and $\hat{e}$ is the residual) of equation (7). The difference between unemployment-adjusted transfers $Tr_t(UR_{t-1})$ according to equation (8) and previous' years' transfers Tr_{t-1} is seen as a measure of the change in cyclically-adjusted transfers (equivalent to equation 6).

$$\Delta CATr_t = \Delta Tr_t - \hat{b} \cdot \Delta UR_t \quad (9)$$

[12] This definition remains relatively similar to the follow up papers, as e. g. in A&A (1998, 2010, 2013).
[13] Note that in the definition of the Blanchard method in A&P the fiscal variables are expressed as ratios to GDP.
[14] In more recent studies, the second trend is neglected (see A&A, 2010 and 2013).

The estimated elasticity of transfers with respect to unemployment $\hat{b}$ is similar to coefficient α_{Tr} in equation (6). The same procedure is applied for revenues to achieve unemployment-adjusted revenues ($R_t(UR_{t-1})$). With the construction of $Tr_t(UR_{t-1})$ and $R_t(UR_{t-1})$, A&P estimates the primary deficit that would have prevailed in period *t* if unemployment were to be the same rate as in year *t-1*. According to equation (6), the BFI (changes in cyclically-adjusted primary balance) is the difference between the unemployment adjusted measure of the primary balance and the previous year's primary balance.

2.3. Scaling and the incomplete cyclical adjustment problem

The definition of the BFI, as defined above, however, is in conflict with standard methods to compute cyclically-adjusted budget balances, for example, the OECD approach (Girouard, André, 2005) or as described in Fedelino et al. (2009). The reason for this is that the Blanchard method - according to A&P - does not adjust only revenue and expenditure, but revenue and expenditure as a ratio of GDP. To use the variables in data-based analyses (as explained above), it is helpful to scale the variables and express the CAPB as a ratio of potential GDP (as a natural reference series). In doing so, following Fedelino et al. (2009), equation (4) and (5) will have to be modified into:

(10)

$$capb_t = \frac{CAPB_t}{Y_t^p} = \frac{R}{Y}\left(\frac{Y^P}{Y}\right)^{\varepsilon_R - 1} - \frac{G}{Y}\left(\frac{Y^P}{Y}\right)^{\varepsilon_G - 1} = \frac{R}{Y}(1+gap)^{-(-\varepsilon_R - 1)} - \frac{G}{Y}(1+gap)^{-(\varepsilon_G - 1)}$$

Note that *gap* here represents the output gap as a ratio of potential GDP.

Again, assuming unit-elastic revenues ε_R = 1 and inelastic government expenditure ε_G = 0, equation (10) can be simplified:

(11) $$capb_t = \frac{R}{Y} - \frac{G}{Y}(1+gap)$$

The result is different from the CAPB without scaling in equation (5). Using revenues and expenditures as a ratio of GDP, standard assumptions would suggest adjusting expenditure (as a ratio of GDP), rather than revenue (as a ratio of GDP).[15] It will not be reasonable to adjust revenues if the variables are expressed as ratios of GDP, since (if the elasticity will be one) revenues are expected to have the same growth rates as GDP. After scaling however, there is need to adjust expenditures.

2.4. Incomplete cyclical adjustment and reverse causality

Using equation (10) and (1) to measure the effect of fiscal policy on growth gives:

$$\Delta Y_t = \alpha + \beta\, \Delta\left(\frac{R_t}{Y_t}(1+gap_t)^{-(-\varepsilon_R-1)} - \frac{G_t}{Y_t}(1+gap_t)^{-(\varepsilon_G-1)} \right) + u_t \tag{12}$$

If $\varepsilon_R = 1$ and $\varepsilon_G = 0$

$$\Delta Y_t = \alpha + \beta \left(\Delta\left(\frac{R_t}{Y_t} \right) - \Delta\left(\frac{G_t}{Y_t}(1+gap_t) \right) \right) + u_t \tag{13}$$

Accordingly, government expenditure as a ratio of GDP needs to be corrected for cyclical effects, however, following A&P and correcting only taxes and transfers as a ratio of GDP, the estimated CAPB (as a ratio of GDP) includes cyclical effects (in the denominator) and consists of (adjusted) revenues as a ratio of GDP, (CAR_t), net of (adjusted) transfers as a ratio of GDP ($CATr_t$), net of the ratio of (unadjusted) government expenditure (other than transfers) to GDP (E_t / Y_t):

$$\Delta Y_t = \alpha + \beta\, \Delta\left(CAR_t - CATr_t - \frac{E_t}{Y_t} \right) + u_t \tag{14}$$

[15] In this line A&P note that using the primary deficit as a share of GDP "is not a bad approximation as long as expenditures and revenues are close to being unit elastic to GDP". Indeed, following their methodology, implicitly they assume expenditure to be unit-elastic, what is in conflict with standard assumptions on cyclical adjustment, in the case of expenditures.

Under the assumption that government spending (other than transfers) does not respond to cyclical effects, by approximation, the expenditure-to-GDP ratio behaves inversely proportional to the output gap:

$$\Delta Y_t = \alpha + \beta\, \Delta\left(CAR_t - CATr_t - e_t(1 - Gap_t)\right) + u_t \tag{15}$$

Where e_t is the structural ratio of expenditure (other than transfers) to potential output. It is now obvious that the ratio of government expenditure other than transfers can be influenced by two separate factors, discretionary policy changes that influence the structural expenditure ratio (Δe_t) and cyclical effects (ΔGap_t). Assuming no policy changes ($\Delta CAR = 0$, $\Delta CATr = 0$, as well as $\Delta e = 0$), and under the assumption that output growth is a sum of (constant) potential output growth *c* and changes in the output gap ($\Delta Y = c + \Delta Gap_t$), equation (15) can be simplified to:

$$c + \Delta Gap_t = \alpha + \beta\, e_t \Delta Gap_t + u_t \tag{16}$$

It is now obvious that an increase in the output gap (ΔGap) influences both sides of equation (16), even without any discretionary policy change. The BFI, however, might interpret an economic upswing (increase in the output gap) as a discretionary reduction in government spending.

3. Hypotheses

This section explores how erroneous assumptions on the elasticities ε_R and ε_G would influence estimates of parameter β in *data-based* analyses on fiscal policy. Basically, ignoring other critique (countercyclical response problem and changes in asset prices), regressions of equation (12) provide unbiased estimates of parameter β if the elasticities ε_R and ε_G are estimated correctly. If the method applied however does not correctly adjust for cyclical effects, Table 1 shows how this would affect the correlation of the CAPB-ratio to the output gap, and the consequences for the estimated multiplier in conventional analyses of fiscal policy (equation 12).

To summarize, following the standard assumptions, that $\varepsilon_R = 1$ and $\varepsilon_G = 0$ or $\varepsilon_G < 0$[16], a flawed estimate of the fiscal multiplier is particularly pronounced in the case of expenditures. However, if $\varepsilon_R > 1$, an imperfect cyclical adjustment problem will not only decrease the estimated multiplier in the case of government expenditure but also decrease the estimated multiplier in the case of taxes. In this case, the consequence of finding evidence for expansionary austerity will be particularly likely.

From the above analysis, the following testable hypotheses are obtained:

1.) The BFI is correlated with changes in the output gap, while other fiscal indicators based on standard assumptions are not (or less) correlated.
2.) This correlation is particularly pronounced in the case of changes in expenditure (per GDP) and less pronounced in the case of changes in revenue (per GDP).
3.) The resulting estimated fiscal multiplier (using equation 1) is small (or even negative) if the BFI is used as fiscal impulse, compared to results based on standard assumptions on automatic stabilization (the CAPB as used in the OECD Economic Outlook based on Girouard and André, 2005).
4.) Differences in estimations of the fiscal multiplier are particularly pronounced in the case of changes in expenditures (per GDP) and less pronounced in the case of changes in revenues (per GDP).

[16] Refer to Girouard and Andre (2005).

4. Endogeneity of fiscal indicators

This section analyzes the cyclical behavior of the BFI (as estimated by A&A, 2010) and compares it to the behavior of the *CAPB*, as calculated by the OECD. Since section 2 has shown that the BFI suffers from imperfect cyclical adjustment, hypothesis (1) shows that the BFI entails a (positive) cyclical pattern. Figure 1 a) compares changes in the *CAPB* (estimated according to A&P), and b) according to the definitions of the OECD against changes in the output gap, since an imperfect c.a. problem will result in a cyclical behavior of $\Delta CAPB$.[17]

Figure 1 (c and d) depicts the cyclical behavior of cyclically adjusted government revenues (adjusted with the A&P method and the OECD method), and Figure 1 (e and f) shows the comparable behavior of expenditures. Figure 1 a) and 1 e) shows that the fiscal indicators measured according to A&P are biased if there is no adjustment for cyclical effects (hypothesis 1). While this pattern seem not to be pronounced for revenues (1 c), it is particularly pronounced in the case of government expenditure (hypothesis 2).

We quantitatively explore the cyclical pattern of the fiscal indicators ΔF_{it} in our panel dataset (with country i and year t) with regressions of the following form[18]

$$\Delta F_{it} = \mu_i + \lambda_t + \gamma\, \Delta Gap_{it} + u_{it} \tag{17}$$

Table 2 shows the estimated coefficients γ. For comparison, Table 2 includes the unadjusted primary balance as another reference. As expected, it is shown that the unadjusted primary balance entails a cyclical pattern (imperfect cyclical adjustment). This pattern seems to be lower but persistent in the A&P measure, while the CAPB from the OECD appears to be uncorrelated to changes in the economic cycle. Looking at government revenue, the unadjusted revenues are negatively correlated to the output

[17] The data used in this paper is from the same source as used in A&A (2010), obtained from the OECD Economic Outlook no. 84. The c.a. procedure of the OECD is described in Girouard and André (2005).

[18] Guajardo et al. (2014) analyze fiscal cyclicality in a comparable framework to show that the CAPB (as used in A&A) obtain a cyclical pattern, while the narrative measure of fiscal activity does not. Different from Guajardo et al. (2014) I do not use narrative measures of fiscal policy as a reference, but CAPB based on standard definitions, as provided by the OECD, and use the change in the output gap as cyclical indicator rather than GDP growth rate revisions.

gap, pointing to a short-run elasticity of < 0. However, after cyclical adjustment the cyclicality of revenues disappears, both in the BFI- as well as in the OECD-measure.
However, as proposed by hypothesis 2, the indicators of government expenditures (as a ratio of GDP) are negatively associated with the economic cycle, which is strongly pronounced in the case of unadjusted indicators. Adjusting the expenditure ratio with the *Blanchard-method*, this counter-cyclical pattern remains at a slightly lower level. Thus, the *Blanchard method* does not sufficiently control for cyclical effects in government expenditure, as suspected in equation (15).[19]

5. Large recessions and expansions

A&A (2010) identify episodes of large changes in fiscal policy. According to their definition, an episode of a large fiscal stimulus is an episode when the BFI (primary deficit, c.a. with the Blanchard method) increases by more than 1.5 pp. of GDP in the same year, while an episode of a large fiscal adjustment is an episode when the BFI (primary deficit, c.a. with the Blanchard method) decreases by more than 1.5 pp. of GDP. Following the hypotheses above, it is conceivable that the selection of these episodes is endogenous to economic growth. In particular, the identification as an episode of large fiscal stimulus will be influenced by negative changes in the output gap, while positive changes in the output gap will increase the likelihood of identifying this episode as a large fiscal consolidation.
Table 3 shows the 40 largest cases of economic recessions (negative changes in the output gap) in OECD history (in the dataset of A&A, 2010). While this selection focuses on episodes during the oil price crises of 1975 and 1981, some of these episodes are selected as large episodes of fiscal expansion, according to A&A (2010). To test whether this selection is based on the cyclical adjustment strategy of A&P, the BFI in these episodes is compared with the CAPB (c.a. with OECD method) and it was discovered that the CAPB, as estimated with the OECD method, also identifies a few large recessions as episodes of discretionary fiscal stimulus, however several of the episodes identified by A&A (2010) are not large expansionary episodes if the CAPB is

[19] The results are very much in line if we use GDP growth as alternative cyclical indicator, rather than the output gap.

used. For instance, Canada in 1982 and 1991, as well as Belgium and France in 1975 did not increase the CAPB by more than 1.5. percent; while A&A (2010) treat these years as episodes of large fiscal expansions because the BFI increases by more than 1.5 percent. This selection points to the two problems highlighted by Perotti (2013), the countercyclical response problem (a), as well as the incomplete cyclical adjustment problem (b).

First, the countercyclical response problem appears if fiscal policy behaves countercyclical and increases deficits as a consequence of an economic recession. Table 3 depicts that this problem appears in both cases, whether we rely on the BFI or the CAPB. Governments tend to increase the CAPB in periods of economic slack as a countercyclical policy response, whether the cyclical adjustment strategy is the *Blanchard method* or the OECD method. This countercyclical response problem might be one reason for the critique of the data-based approach. However, the CAPB (OECD method) selects substantially fewer recessions as episodes of fiscal stimuli, compared to the BFI. This, secondly, points to an incomplete cyclical adjustment problem (b) for the BFI (hypothesis 1). Since this article focuses on the question of how to correct for cyclical effects and whether an incomplete cyclical adjustment influences the results of the fiscal multiplier, there is no elaboration on the countercyclical response problem in more detail, rather focus is on the incomplete cyclical adjustment problem.

While the BFI selects 15 of the 40 largest recessions as episodes of fiscal stimulus, the CAPB only selects 9. It is thus more likely that the BFI interprets an economic downturn as an episode of fiscal expansionism. The imperfect cyclical adjustment problem (b) in the BFI thus might multiply the countercyclical response problem (a).

Table 4 shows a similar picture for the case of economic upturns and fiscal consolidations. The results are less striking as in the case of fiscal stimuli in times of recessions. While the BFI selects 9 of the 40 largest economic upturns as episodes of fiscal consolidation, the CAPB only selects 4. For instance, United Kingdom in 1988 and New Zealand in 1993 and 1994 shows up as a case of large fiscal consolidation, while the CAPB-based approach does not show an increase in the CAPB of more than 1.5 percentage points. It seems that the countercyclical response problem is less distinctive in the case of responding to economic upturns, however, the number of cases in which the BFI selects a large episode of economic expansion as period of fiscal

consolidation significantly increases (more than doubled), so that the effect of the imperfect cyclical adjustment (in A&P) should not be underrated. Figure 4 shows the correlation between changes in the economic cycle (output gap) and the CAPB (based on the Blanchard method) in the 40 largest episodes of economic upswings and downturns. It shows a clear negative relationship, suggesting that the BFI-based CAPB tends to be clearly more expansionary in economic recessions, compared to the large episodes of economic upswings (when the BFI-based CAPB seems to be more contractionary). From this picture, it is reasonable to assume a positive correlation between fiscal adjustments and GDP (either through a countercyclical response problem or expansionary austerity).

Figure 5 depicts the same variables, but now the CAPB is calculated with standard assumptions on cyclical adjustment by the OECD. The clear negative relationship decreases substantially. While the positive relationship is particularly pronounced in the case of economic downturns, it is less significant in the case of economic upswings, pointing to a small remaining countercyclical response problem in times of recessions (probably as a reaction to the oil price crises in 1975 and 1981), while there is little support for a large countercyclical response problem in the case of upswing episodes.

In summary, the CAPB based on the BFI appears to be highly correlated with changes in the economic cycle, while the CAPB based on conventional methods is not. This suggests that the BFI as proposed by A&P and applied by A&A (2010) suffers from an incomplete cyclical adjustment problem, as suggested by hypothesis (1). It is shown that the incomplete cyclical adjustment problem increases the likelihood of selecting an economic recession as a fiscal expansion and an economic upswing as an episode of fiscal consolidation.

6. Replication and sensitivity analysis

This section reproduces the evidence shown in A&A (2010) based on the BFI and shows the sensitivity of the results if CAPB is used as a fiscal indicator, cyclically-adjusted with standard methods as used by the OECD, rather than the BFI.

As discussed in the previous section, A&A (2010) examines episodes of large changes in the fiscal stance, if the BFI/CAPB increases/decreases by more than 1.5 percentage

points. The selected episodes by this definition, for the BFI as well as the CAPB, are shown in the appendix.[20] Table 5 and 6 shows the results of a replication of A&A (2010), both with the BFI and the CAPB.[21] A&A (2010) analyzes whether changes in the BFI have an effect on GDP in episodes of large changes in the fiscal stance with regressions of the following form:

$$\Delta y_{it} = \alpha + \sum_{j=1}^{2} \alpha_j \Delta y_{it-j} + \beta\ \Delta capb_{it} + \gamma X + u_{it} \tag{18}$$

where only cases of either large fiscal expansions or large fiscal consolidations are taken into account. Table 5 shows the results for the analysis of large episodes of fiscal expansions. While column (1) and (2) are perfect replications of the results in A&A, column (3) and (4) show the same results, with the only difference that the CAPB is used as provided by the OECD (from the OECD Economic outlook no. 84, as in A&A, 2010), rather than calculated with the Blanchard method. While the BFI selects 72 episodes, the number of episodes selected by the CAPB (OECD) decreases substantially (65). It is shown that the positive effect of fiscal consolidations decreases after using the CAPB of the OECD, however, the effect is not statistically significant in both regressions (column 1 and 3). Column (2) and (4) distinguish between the effect of current expenditure investment and revenue. The results based on the BFI and presented in A&A show a clear negative relationship between expenditure and growth in episodes of fiscal stimuli. This relationship has been widely interpreted as evidence for a negative multiplier in the case of expenditure cuts (A&A, 2010). However, using the OECD measure of the CAPB, the result decreases substantially and loses statistical significance (column 4).

Table 6 illustrates the results for fiscal adjustments. As in the case of fiscal stimuli (Table 5), the number of observations decreases from 88 to 76, after using the CAPB (by the OECD). Similar to the evidence in Table 5, the effect of fiscal consolidation based on the BFI is positive in column 1, suggesting evidence for expansionary

[20] Note that the selected episodes selected in the case of the BFI are similar to the episodes examined in A&A (2010).

[21] Since the data is the same data as used by A&A, the results for the Blanchard method are perfect replications of the results in A&A.

austerity, however, the result is not statistically significant. The results based on the CAPB (OECD), however, shows that fiscal consolidations appear to be negatively associated with GDP growth, suggesting a typical Keynesian effect, even though the effect is not statistically significant (column 3). Column 2 and 4 distinguish between the effects of expenditure- and revenue- based fiscal consolidations. It turns out that the effect of revenues increases slightly, while the effect of expenditure cuts do not change substantially, however, the positive effect of expenditure cuts on GDP loses statistical significance if the cyclical adjustment is based on the OECD method. Comparing the results based on the BFI-based with the results based on the OECD-based CAPB in Tables 5 and 6, the results based on the BFI provide evidence for non-Keynesian effects, while the results based on the CAPB (hypothesis 3) do not support this view. Further, the negative multiplier for results based on the BFI seems to be more pronounced in the case of expenditure cuts, compared to increases in revenues (hypothesis 4). However, as discussed in section 4, there might be a countercyclical response problem. Further, the evidence presented in Tables 5 and 6 is based on a limited number of observations so that it might be interesting to additionally analyze and compare the evidence based on the full sample and not rely only on the selective evidence for cases of large changes in fiscal policy.

Table 7 replicates and compares another result of A&A (2010), that fiscal consolidations are positively associated with GDP, if the sample is not restricted to large episodes of discretionary change. Regressions of the following form are estimated:

$$\Delta y_{it} = \sum_{j=1}^{2} \alpha_j \Delta y_{it-j} + \beta_k \Delta cab_{it-k} + \lambda_i + \mu_t + u_t \tag{19}$$

Here the sample is not restricted to large cases of fiscal stimuli and adjustments, and includes country- and time fixed effects. Again, columns (1) and (2) present the replication of the A&A results, while columns (3) and (4) show the results based on the CAPB (OECD). Comparing columns (1) and (3), the statistically significant positive effect of fiscal consolidation on GDP disappears after appropriately controlling for cyclical effects. Further, the negative multiplier for expenditures (column 2) decreases substantially if CAPB based measure rather than the BFI (column 4) is used. This latter finding is consistent with our hypothesis (4).

7. Dynamic responses

Section 4 has shown that both the BFI-based as well as the CAPB-based analysis might be influenced by a countercyclical response problem in episodes of large recessions, due to countercyclical policy in times of crisis. It will thus be interesting, whether the results hold after excluding large episodes of fiscal expansions and analyze and compare episodes of large increases in the CAPB, based on both methods. To show that the estimated effect of fiscal adjustments on GDP is influenced by the strategy of how to adjust for cyclical effects, the method proposed by Leigh et al. (2010) and used in Alesina and Ardagna (2013) is applied:

$$\Delta Y_{it} = \sum_{j=1}^{2} \alpha_j \Delta y_{it-j} + \sum_{k=0}^{2} \beta_k \Delta cab_{it-k}^{FA} + \lambda_i + \mu_t + u_t \quad (20)$$

Again, Δy_{it} represents real GDP growth in country *i* at time *t* and Δcab_{it}^{FA} denotes the estimated change in the cyclically adjusted primary balance (as a percentage of GDP) in periods of large fiscal adjustments (Δcab_{it-k} > 1.5 p.p. of GDP) and zero otherwise.[22] I distinguish between two strategies to adjust for cyclical effects, the BFI method as proposed by Alesina and Perotti (1995), and the conventional (OECD) method, as proposed by Girouard and André (2005).[23] λ_i and μ_t represent cross-section and time fixed effects, respectively.

Table 8 shows the results of this augmented specification. Since A&A (2010) did not compute dynamic responses of fiscal policy, this table is not a replication of A&A (2010), however, since the sample and data is similar to their study it might be a comparable analysis to A&A (2013) which computed dynamic responses of changes in fiscal policy based on the BFI in a similar framework.

[22] In an augmented specification I include changes in cyclically-adjusted current revenues and changes in cyclically-adjusted current primary spending in periods of large fiscal adjustments, rather than changes in the CAB during the same year.

[23] The data and sample in this study again is the same as in A&A (2010), while the results for the OECD-measure use data based on the OECD Economic Outlook No. 84 (same source as used in A&A, 2010).

Column (1) shows that there is a positive association between fiscal adjustments and GDP growth, however, the result is not statistically significant. This non-Keynesian effect changes its sign in column (3), after using the c.a. strategy of the OECD however the result is not statistically significant at conventional levels. Furthermore, column (2) shows a strong non-Keynesian effect of expenditure cuts on GDP if the BFI is used, but the result turns opposite after using the OECD measure. This clearly supports hypothesis 3 and 4 which states that the BFI-based results are biased towards expansionary effects and that this bias is particularly pronounced for expenditure cuts. Column (4) additionally suggests that the (negative) effects of BFI-based measures are underestimated in the case of revenue-based consolidations, however, the effect changes after a lag of one year.

Figure 4 depicts the dynamic effects of changes in fiscal policy based on the results of equation (20), where there is a distinguishment between the estimated effect of large changes in the CAPB as calculated by the method proposed by A&P (1995) and large changes in the CAPB as provided by the OECD. Dynamic response functions are computed with the delta method to show whether the estimated dynamic response of GDP to a one-percentage point fiscal consolidation varies with the measure of fiscal policy.

A comparison of the results show that the estimated contractionary effect of fiscal adjustments based on the CAPB (OECD approach) is more pronounced, as compared to the results based on the A&P approach. While the response of the BFI-based consolidation shows some evidence for potential expansionary effects of fiscal adjustment, the results based on the CAPB (OECD approach) are relatively contractionary, in line with hypothesis (3).

Figure 5 shows the estimated effect of a one percent point increase in current revenues. In line with hypothesis 4, the estimated effects of both approaches are relatively similar and contractionary, what is not surprising, given that the elasticity of revenues is usually assumed to be approximately one, so that the revenue-GDP-ratio does not necessarily need to be adjusted for automatic cyclical effects.

Figure 6 shows the same results for expenditure-cuts. The estimated effect of a one percent point reduction in primary expenditures is very different in both approaches, depending on the method applied to adjust the data for cyclical effects. The A&P

approach finds expansionary effects of fiscal adjustments at the spending side. The (negative) impact multiplier is estimated to be -0.3 and turns out to be -0.4 after two years.[24] If the data provided by the OECD is used, the result is the opposite. The impact multiplier is 0.1 (positive), suggesting that a reduction in government spending has a negative impact on GDP if adjustment is made for cyclical effects with the OECD-method. This observation is in line with hypothesis (4), where a negative correlation is expected between GDP growth and the expenditure-GDP ratio, if we fail to correct for cyclical effects in the expenditure-GDP ratio.[25]

Since the data-based approach has been criticized for not controlling for one-off operations, as another strategy to improve the data-based approach, an alternative CAPB of the OECD which excludes one-off operations, the so-called underlying balance, was used.[26] As a test for robustness, all regressions are estimated using this indicator alternatively. After using the underlying balance and controlling for the noise through one-off operations in the budget balance, a large share of the results turn out to be more pronounced and statistically significant, compared to the CAPB-based ones. Nevertheless, since the intention of this paper is the illustration of the incomplete cyclical adjustment problem in the literature following the method proposed by A&P (1995), at this point there is no extensive discussion on the advantages and disadvantages of using this alternative indicator. Nevertheless, as a test for robustness the dynamic response of GDP to large fiscal contractions (computed with the underlying balance rather than the CAPB) is shown in the appendix of this paper.

[24] These results are very much in line with the results in Alesina and Ardagna (2013), who found that a one percent point reduction in government spending increases GDP by 0.15 percent in the same year and by 0.46 percent after two years.

[25] Alesina and Ardagna (2010) state that their results are not affected by the method applied to adjust for cyclical effects, and that the results remain robust, even without controlling for cyclical effects. Indeed, the estimated effects of fiscal consolidations based on the A&P approach are almost identical to those estimated with unadjusted data. To address this question, I compute the results based on unadjusted data, compared to the results based on the CAPB. The results based on this measure are shown in the appendix.

[26] Refer to Joumard et al. (2008) for a discussion on how one-off operations influence the budget balance and the definition of the underlying primary balance.

8. Conclusion

A large share of empirical literature on fiscal policy pioneered by Alesina and Perotti (1995) examines changes in cyclically-adjusted budget balances (CAPB) and finds a positive relationship between CAPB (computed with the A&P-method) and GDP (non-Keynesian effects or expansionary austerity). This counter-intuitive relationship has been found to be particularly pronounced in the case of government spending (wage- and non-wage consumption expenditure). This stream of literature highlights that adjustments at the spending side are likely to be successful (in reducing government debt) or expansionary, while this is not the case for revenue-based consolidations (A&A, 1998, 2010 and 2013).

A number of authors have criticized these findings and pointed to potential conflicts with endogeneity. For instance, Jayadev and Konczal (2010) and De Cos and Moral-Benito (2013) found that the evidence on expansionary austerity in A&A (2010) is mainly based on successful adjustments in an economic upswing.

Guajardo et al. (2014) contrasted the data-based evidence in A&A (2010) with new evidence based on narrative measures of fiscal consolidations. They show that the data-based fiscal consolidations are not exogenous to economic growth.

Nevertheless, the discussion so far has not identified why the CAPB as proposed by A&P is endogenous to growth. Some studies highlight the presence of a countercyclical response problem (de Coz and Moral-Benito, 2013, and Guajardo et al., 2014), while others discuss the failure of the BFI to address the fiscal effects of changes in asset prices (Guajardo et al., 2014 and Yang et al., 2015). However, both hypotheses do not explain why the CAPB computed with standard methods is not (or less) endogenous to growth, a finding that is shown in this paper. The reverse causality argument can be seen as an answer to this puzzle.

The reverse causality argument proposed in this article focuses on the incomplete cyclical adjustment problem in the approach of A&P (1995) to adjust for cyclical effects in budgetary data with the help of the "*Blanchard method*" or the *Blanchard fiscal impulse* (BFI), which is relevant in a large number of subsequent studies based on the same approach, as for instance A&A (1998, 2010 and 2013), as well as Ardagna (2002

and 2009). It is shown that the cyclical adjustment strategy pioneered by A&P (1995) and used in a number of following studies is prone to an *imperfect cyclical adjustment problem* (following the definition of Perotti, 2013).

The critique of the A&P approach proposed in this paper is that A&P implicitly assume an elasticity of government expenditure (other than transfers) with respect to GDP of one (or close to one). Conversely, standard cyclical adjustment procedures assume an elasticity of zero for expenditures other than transfers (Girouard and André, 2005). The theoretical discussion in this paper shows that this imperfect cyclical adjustment problem influences the estimated multiplier in conventional (data-based) analyses of fiscal policy so that the results are endogenously biased towards expansionary austerity. This paper highlights that this result is affected by reverse causality, i.e. increasing GDP decreases expenditure-GDP-ratios, if the method applied fails to adjust for cyclical effects. It is shown theoretically and empirically that the cyclical adjustment strategy proposed by A&P does not appropriately control for cyclical effects.

The empirical discussion in this paper examines the data used in one of the prominent studies in the literature on expansionary austerity, A&A (2010), which is based on the method proposed by A&P. Further, the data and results of A&A (2010) are contrasted with cyclically-adjusted data, as provided by the OECD and respective results.

It is shown that the CAPB based on the A&P method is positively correlated with changes in the economic cycle, while the CAPB based on conventional methods is not.

Investigating large changes in the output gap, it is shown that the strategy proposed by A&P increases the likelihood that a large episode of economic downturn is selected as an episode of a large fiscal stimulus by the method applied in A&A (2010), so that a large share of cases of fiscal stimuli as examined by A&A (2010) are affected by cyclical increases in deficits, rather than structural stimuli. In this line, the cyclical adjustment strategy proposed by A&P increases the likelihood that an episode of large economic upswing is selected as an episode of fiscal consolidation, since the cyclically adjustment procedure fails to disentangle the endogenous cyclical increase in the budget balance and the exogenous discretionary change in the fiscal stance. The imperfect cyclical adjustment problem particularly affects the expenditure-GDP-ratio, so that an increase in GDP is associated with decreases in the expenditure-GDP-ratio, while the

(non-) adjustment of revenues in the approach of A&P does not affect the results in a systematic pattern.

Replicating the results presented in A&A (2010), and comparing the results based on the Blanchard-method with the results based on an alternative CAPB-based measure (where the CAPB is cyclically-adjusted with standard assumptions based on the method proposed by Girouard and André, 2005), it is shown that the expansionary effect of fiscal consolidations disappears after controlling for cyclical effects with the help of standard methods, rather than the method proposed by A&P.

The reverse causality argument proposed in this paper might contribute to systemizing a number of controversies in the recent literature. For example, it explains why the evidence on expansionary austerity is particularly based on cases where output operates above potential (Jayadev and Konczal, 2010; Jordà and Taylor, 2015; de Cos and Moral-Benito, 2013). It also explains why the literature based on the A&P approach suggests that cuts in government expenditure are associated with macroeconomic expansions, while increasing revenues (as a ratio to GDP) are contractive. While the latter finding is in line with the theoretical literature, the finding of expansionary effects in case of expenditure cuts has been seen as a counter-intuitive finding and has been frequently cited. It is shown that this finding reflects cyclical increases in the budget resulting from economic upswing, rather than an economic upswing resulting from a discretionary cut in government expenditures.

This article might also contribute to the literature in a more general way. A number of contributions have been critical regarding data-based analyses of fiscal policy in the recent past (Guajardo et al, 2014). However, in this article it is shown that it is not the data-based approach in general, rather than a specific method of how to adjust the budget for cyclical effects, which biases the results. In line with Yang et al. (2015), this article shows that the data-based approach is applicable if the cyclical position of the budget is correctly taken into account. If the incomplete cyclical adjustment problem is addressed, for example, by using the CAPB as published by the OECD, it would thus be possible to improve the data-based approach.

References

Alesina, A. and S. Ardagna (1998), "Tales of Fiscal Adjustment", *Economic Policy* 13, 489-585.

Alesina, A. and S. Ardagna (2010), "Large Changes in Fiscal Policy: Taxes vs. Spending", in: Brown, J. R. (ed.), *Tax Policy and the Economy* 24, Chicago: University of Chicago Press, 35-68.

Alesina, A. and S. Ardagna (2013), "The Design of Fiscal Adjustments", in: Brown, J. R. (ed.), *Tax Policy and the Economy* 27, Chicago: University of Chicago Press, 19-67.

Alesina, A. and R. Perotti (1995), "Fiscal Expansions and Adjustments in OECD Countries", *Economic Policy* 10, 205-248.

Alesina, A. and R. Perotti (1997), "Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects", *NBER Working Paper* 5730.

Ardagna, A. (2004), "Fiscal stabilizations: When do they work and why", *European Economic Review*, 48, 1047-1074.

Ardagna, A. (2009), "Financial markets' behavior around episodes of large changes in the fiscal stance", *European Economic Review*, 53, 37-55.

Blanchard, O. (1990), "Suggestions for a new set of fiscal indicators", *OECD Economics Department Working Paper* No. 79.

De Cos, P. H. and Moral-Benito, E. (2013), "Fiscal Consolidations and Economic Growth", *Fiscal Studies*, 34, 491-515.

De Coz, P. H. and Moral-Benito, E. (2016), "On the predictability of narrative fiscal adjustments", *Economics Letters*, 143, 69-72.

Fedelino, A., Ivanova, A., Horton, M. (2009), " Computing Cyclically Adjusted Balances and Automatic Stabilizers", International Monetary Fund, Technical Notes and Manuals, 09/05.

Giavazzi, F. and M. Pagano (1990), "Can Severe Fiscal Contractions be Expansionay? Tales of Two Small European Countries", *NBER Macroeconomics Annual*, 1990.

Giavazzi, F. (1995), "Comment on Fiscal Expansions and Adjustments in OECD Countries", Economic Policy, 1995, 240-241.

Girouard, N and C. André (2005), "Measuring cyclically-adjusted budget balances for OECD countries", *OECD Economics Department Working Paper* 434.

Guajardo, J., D. Leigh, and A. Pescatori (2014), "Expansionary Austerity? International Evidence", *Journal of the European Economic Association,* 12, 949-968.

Holden, S., Midthjell, N. L. (2013), „Successful Fiscal Adjustments – Does the Choice of Fiscal Instruments Matter?", CESifo Working paper Series 4456.

Jayadev, A. and M. Konczal (2010), "The Boom Not the Slump: The Right Time for Austerity", New York: Roosevelt Institute.

Jordà, Ò. and Taylor, A. (2015), "The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy", *Economic Journal,* 2016, 126, 219-255.

Joumard, I., M. Minegishi, C. Andre, C. Nicq, and R. Price (2008), "Accounting for one-off operations when assessing underlying fiscal positions", *OECD Economics Department Working Papers*, 642.

Kollintzas, T. (1995), "Comment on Fiscal Expansions and Adjustments in OECD Countries", Economic Policy, 1995, 241-243.

Leigh, D., P. Devries, C. Freedman, J. Guajardo, Laxton, D. and A. Pescatori (2010), "Will It Hurt? Macroeconomic Effects of Fiscal Policy Consolidation", in: *IMF World Economic Outlook October 2010*, 93-124.

Morris, R., and L. Schuknecht (2007), "Structural balances and revenue windfalls: the role of asset prices revisited", *European Central Bank Working Paper*, 737.

Perotti, R. (2013), "The "Austerity Myth": Gain Without Pain?", NBER Chapters, in: *Fiscal Policy after the Financial Crisis*, NBER.

Yang, W., Fidrmuc, J., Ghosh, S. (2015), "Macroeconomic effects of fiscal adjustments: A tale of two approaches", Journal of International Money and Finance, 57, 31-60.

Table 1: Consequences of imperfect cyclical adjustment under different assumptions on revenue- and spending elasticities

If	Relation to gap	Effect on the estimated multiplier
$\varepsilon_R > 1$	R/Y (+)	Underestimation of the (negative) revenue multiplier
$\varepsilon_R < 1$	R/Y (-)	Overestimation of the (negative) revenue multiplier
$\varepsilon_G > 1$	G/Y (+)	Overestimation of the (positive) expenditure multiplier
$\varepsilon_G < 1$	G/Y (-)	Underestimation of the (positive) expenditure multiplier

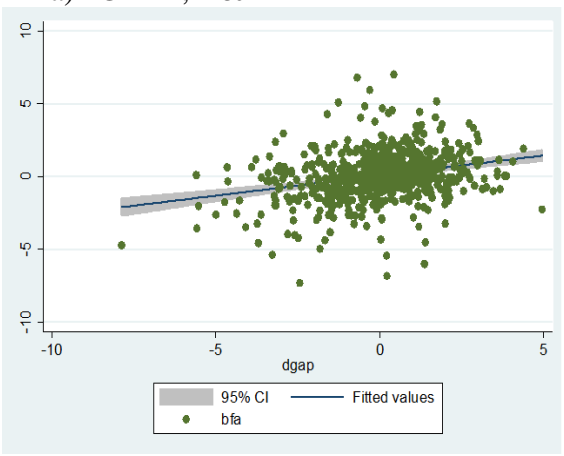
Table 2: Fiscal policy and changes in the output gap

Equation estimated: $\Delta F_{it} = \mu_i + \lambda_t + \gamma \Delta Gap_{it} + \varepsilon_{it}$				
Measure of ΔF	β	s.e.	R-squared	*Obs*
ΔPB	0.350***	0.061	0.298	669
ΔCAPB(AA)	0.188***	0.059	0.228	668
ΔCAPB(OECD)	0.019	0.052	0.160	653
Current revenues	β	s.e.	R-squared	Obs
ΔR	-0.107*	0.060	0.179	669
ΔCAR(AA)	-0.063	0.046	0.122	668
ΔCAR(OECD)	-0.006	0.055	0.168	653
Current expenditures	β	s.e.	R-squared	Obs
ΔE	-0.441***	0.064	0.567	669
ΔCAE(AA)	-0.222***	0.047	0.331	668
ΔCAE(OECD)	0.005	0.050	0.333	669

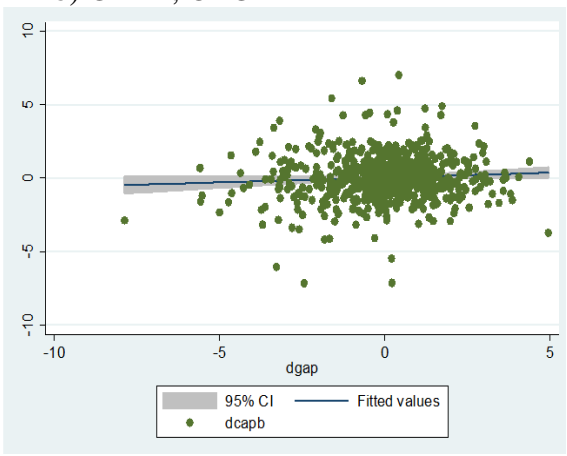
Notes: The table reports point estimates and heteroscedasticity-robust standard errors. All specifications contain full set of country and time fixed effects (not reported in the table).
*** Significant at 1%, ** significant at 5%, * significant at 10%.

Figure 1: Indicators of fiscal policy (A&P and OECD) vs. output gap

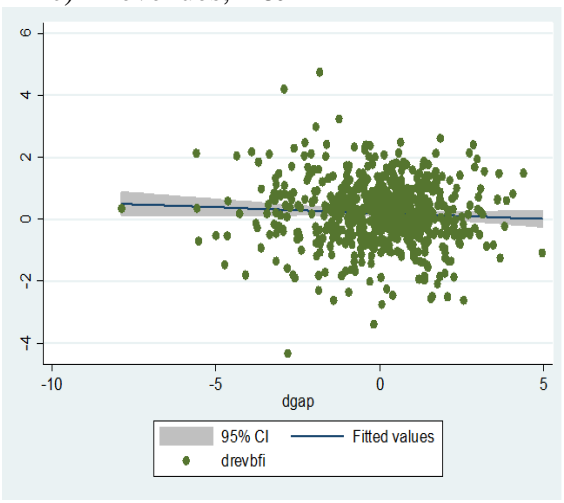
a) CAPB, A&P



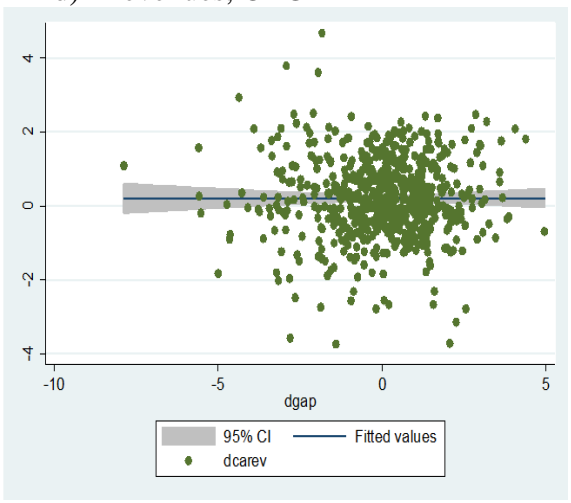
b) CAPB, OECD



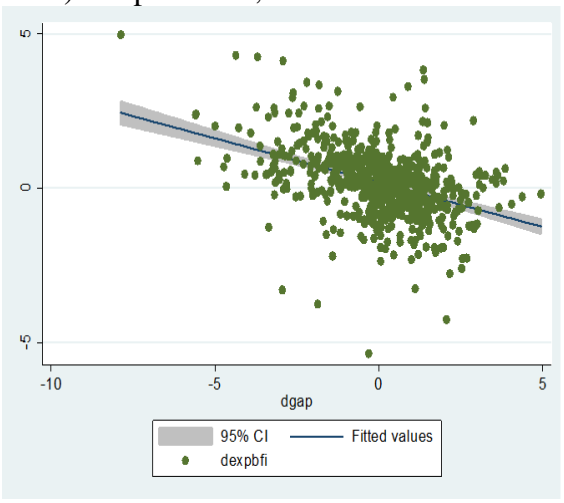
c) Revenues, A&P



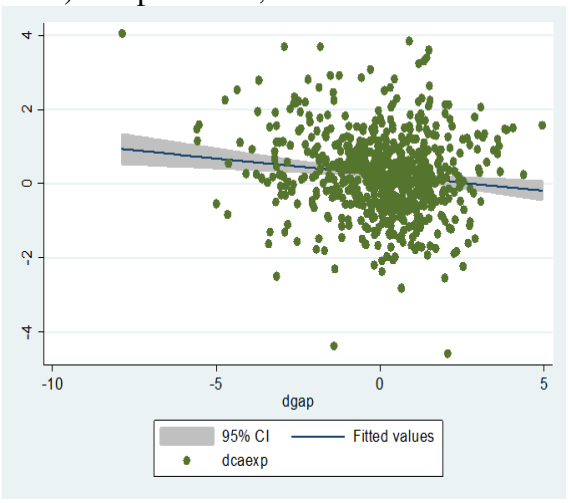
d) Revenues, OECD



e) Expenditure, A&P

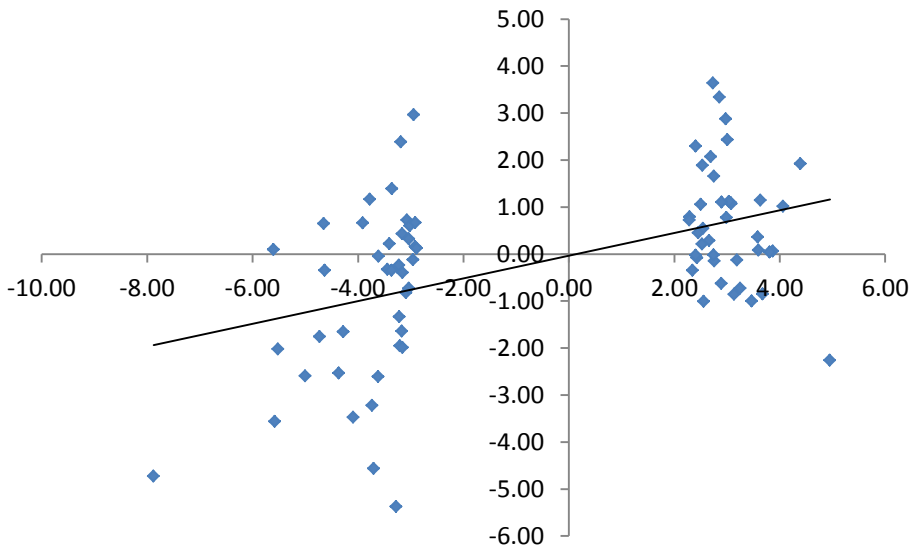


f) Expenditure, OECD



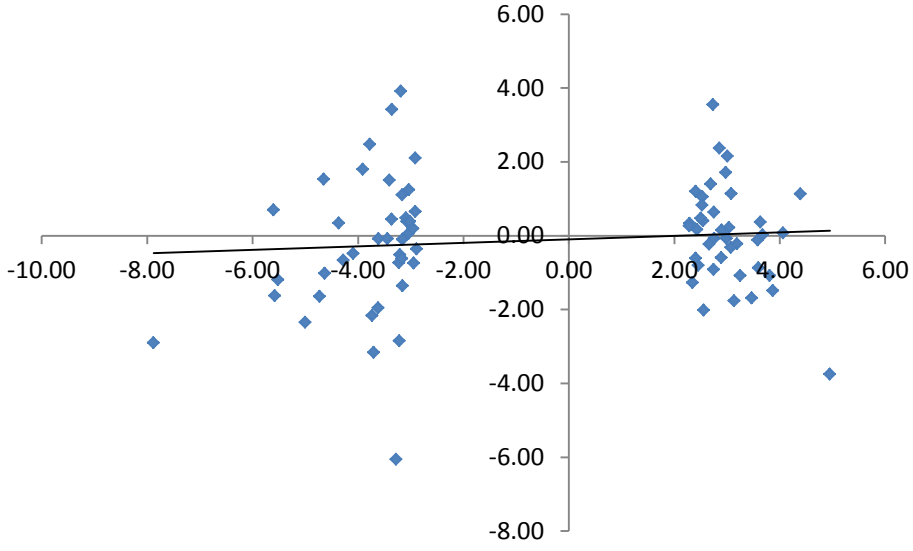
Source: Alesina and Ardagna (2010), OECD Economic Outlook No. 84.

Figure 2: ΔCAPB (A&P) vs. ΔGap in largest episodes of up- and downswing



Source: A&A (2010), OECD Economic Outlook, No. 84, own calculations.

Figure 3: ΔCAPB (OECD) vs. ΔGap in largest episodes of up- and downswing



Source: OECD Economic Outlook, No. 84, own calculations.

Table 3: 40 largest cases of economic downturns

Country	Year	BFI	DCAPB	DGAP	BFI>1.5	CAPB<-1.5
Finland	1991	4.73	-2.90	-7.88	1	1
Japan	1974	-0.09	0.69	-5.60		
Italy	1975	3.56	-1.63	-5.58	1	1
Canada	1982	2.02	-1.20	-5.52	1	
Portugal	1993	2.59	-2.34	-5.00	1	1
Finland	1992	1.75	-1.64	-4.73	1	1
Portugal	1984	-0.65	1.53	-4.65		
United States	1982	0.34	-1.02	-4.63		
Belgium	1975	2.53	0.34	-4.37	1	
Canada	1991	1.65	-0.67	-4.28	1	
Spain	1993	3.47	-0.48	-4.09	1	
United Kingdom	1980	-0.66	1.79	-3.91		
Greece	1987	-1.17	2.47	-3.78		
Austria	1975	3.22	-2.16	-3.73	1	1
Sweden	1977	4.56	-3.16	-3.71	1	1
Australia	1991	2.61	-1.96	-3.62	1	1
United States	1974	0.05	-0.09	-3.61		
Switzerland	1991	0.32	-0.09	-3.44		
Ireland	1986	-0.22	1.50	-3.40		
Austria	1978	0.35	0.44	-3.36		
Ireland	1983	-1.39	3.42	-3.36		
Japan	1998	5.38	-6.06	-3.28	1	1
United States	1980	0.24	-0.74	-3.23		
United States	1975	1.34	-2.85	-3.22		1
France	1975	1.96	-0.52	-3.20	1	
Portugal	1983	-2.39	3.91	-3.19		
United Kingdom	1991	1.64	-0.62	-3.17	1	
New Zealand	1991	-0.43	1.10	-3.16		
Australia	1982	0.39	-0.10	-3.16		
Denmark	1981	1.99	-1.36	-3.16	1	
United Kingdom	1981	0.82	0.47	-3.09		
Sweden	1993	-0.72	0.38	-3.07		
Ireland	1991	0.73	0.06	-3.04		
Austria	1981	-0.32	1.24	-3.03		
United States	1991	-0.60	0.39	-3.02		
Australia	1983	0.12	0.19	-2.96		
Norway	1989	-2.97	-0.74	-2.94		
United Kingdom	1974	-0.16	0.65	-2.91		
Belgium	1993	-0.67	2.10	-2.91		
Norway	1988	-0.12	-0.36	-2.89		

Table 4: 40 largest cases of economic upswings

Country	Year	BFI	DCAPB	DGAP	BFI<-1.5	DCAPB>1.5
United Kingdom	1973	2.26	-3.75	4.95		
Portugal	1988	-1.92	1.12	4.39	1	
Denmark	1976	-1.01	0.07	4.06		
Ireland	1990	-0.06	-1.49	3.87		
Greece	1978	-0.04	-1.09	3.81		
United States	1984	0.85	0.02	3.67		
Norway	1985	-1.15	0.37	3.63		
Portugal	1989	-0.08	-0.88	3.59		
Japan	1973	-0.36	-0.12	3.59		
Finland	1979	1.00	-1.69	3.47		
Portugal	1987	0.73	-1.09	3.25		
Australia	1984	0.13	-0.22	3.19		
Japan	1972	0.86	-1.77	3.13		
Finland	1997	-1.07	1.14	3.08		
Belgium	1973	-1.09	-0.32	3.07		
Finland	1989	-1.12	0.21	3.04		
Italy	1976	-2.43	2.15	3.01	1	1
Canada	1984	-0.77	-0.07	2.99		
Spain	1987	-2.88	1.71	2.98	1	1
Ireland	1997	-1.10	0.15	2.90		
Denmark	1994	0.62	-0.60	2.89		
Finland	1988	-3.34	2.37	2.85	1	1
Japan	1988	0.15	-0.07	2.76		
United Kingdom	1988	-1.66	0.63	2.75	1	
Belgium	1976	0.02	-0.92	2.74		
Denmark	1986	-3.64	3.55	2.73	1	1
New Zealand	1994	-2.07	1.40	2.69	1	
Austria	1979	-0.29	-0.23	2.66		
Greece	1988	1.01	-2.02	2.56		
United States	1973	-0.55	0.40	2.55		
New Zealand	1993	-1.89	1.05	2.53	1	
Netherlands	1976	-0.21	0.83	2.53		
Canada	1973	-1.06	0.47	2.50		
Belgium	1988	-0.45	-0.81	2.45		
United States	1978	0.08	0.17	2.43		
Italy	1979	0.03	-0.61	2.41		
Sweden	1984	-2.30	1.20	2.41	1	
Ireland	1999	0.35	-1.27	2.34		
Canada	1999	-0.79	0.33	2.29		
Canada	1988	-0.72	0.26	2.28		

Table 5: Fiscal Stimulus and Growth

	(1)	(2)	(3)	(4)
	Blanchard method Replication of A&A		CAPB-based (OECD)	
GDP growth (t-1)	0.468***	0.484***	0.528***	0.540***
	(0.147)	(0.133)	(0.165)	(0.164)
GDP growth (t-2)	-0.162	-0.081	-0.219	-0.225
	(0.139)	(0.134)	(0.149)	(0.154)
G7 growth (t-1)	0.364*	0.272	0.308	0.303
	(0.202)	(0.185)	(0.232)	(0.234)
Debt (t-1)	-0.004	-0.007	-0.008	-0.014
	(0.008)	(0.008)	(0.011)	(0.012)
Expenditure		-0.751***		-0.214
		(0.262)		(0.366)
Investment		-0.255		0.331
		(0.185)		(0.642)
Revenues		-0.177		-0.364
		(0.285)		(0.318)
Consolidation	0.283		0.113	
	(0.187)		(0.228)	
Constant	0.008	0.012	0.012	0.012
	(0.009)	(0.009)	(0.012)	(0.012)
Observations	72	72	65	65
R-squared	0.282	0.428	0.285	0.330

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

Table 6: Fiscal Adjustments and Growth

VARIABLE	(1) Blanchard method Replication of A&A	(2)	(3) CAPB-based (OECD)	(4)
GDP growth (t-1)	0.296***	0.288***	-0.004	0.008
	(0.099)	(0.092)	(0.137)	(0.130)
GDP growth (t-2)	-0.001	0.082	0.069	0.042
	(0.088)	(0.084)	(0.115)	(0.109)
G7 growth (t-1)	0.116	0.038	0.210	-0.128
	(0.151)	(0.142)	(0.204)	(0.221)
Debt (t-1)	-0.011*	-0.007	-0.012*	-0.016**
	(0.006)	(0.006)	(0.007)	(0.007)
Expenditure		-0.434**		-0.441
		(0.170)		(0.267)
Investment		0.082		-0.534
		(0.136)		(0.335)
Revenues		-0.216		-0.369
		(0.199)		(0.229)
Consolidation	0.044		-0.081	
	(0.134)		(0.173)	
Constant	0.026***	0.024***	0.030***	0.041***
	(0.007)	(0.007)	(0.007)	(0.008)
Observations	88	88	76	76
R-squared	0.218	0.348	0.073	0.198

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

Table 7: Fiscal Policy and GDP Growth

	(1)	(2)	(3)	(4)
	Blanchard method Replication of A&A		CAPB-based (OECD)	
GDP growth (t-1)	0.352***	0.367***	0.351***	0.345***
	(0.042)	(0.040)	(0.043)	(0.043)
GDP growth (t-2)	-0.038	0.016	-0.045	-0.039
	(0.042)	(0.040)	(0.043)	(0.043)
Debt (t-1)	-0.004	-0.005	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)
Expenditure		-0.508***		-0.176**
		(0.061)		(0.082)
Investment		-0.070		-0.086
		(0.060)		(0.168)
Revenue		-0.121**		-0.094
		(0.061)		(0.066)
Consolidation	0.154***		0.028	
	(0.039)		(0.042)	
Observations	569	569	566	566
R-squared	0.500	0.562	0.482	0.491
Countries	21	21	21	21
R-squared within	0.500	0.562	0.482	0.491
R-squared between	0.872	0.802	0.886	0.846
R-squared overall	0.504	0.571	0.488	0.500

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

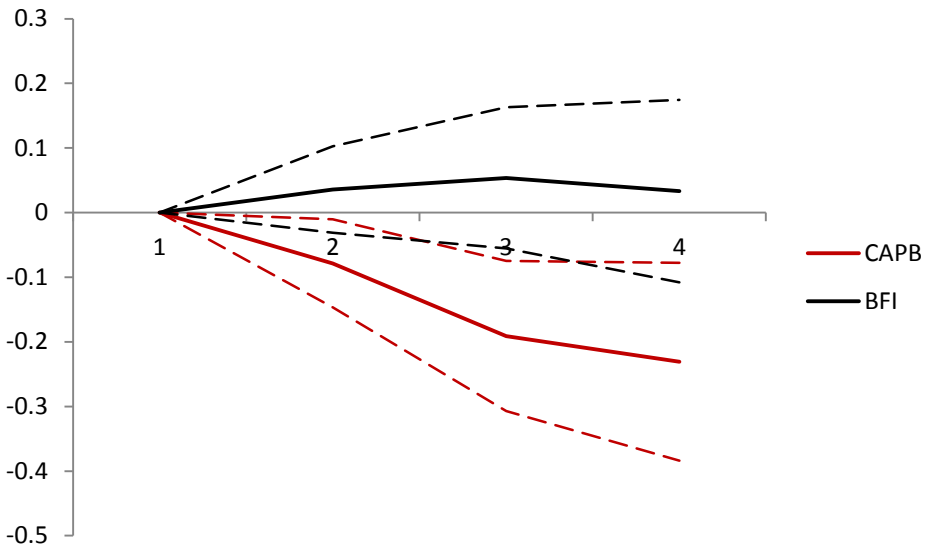
Table 8: Dynamic response of GDP to fiscal consolidation

	(1)	(2)	(3)	(4)
	Blanchard method		CAPB-based (OECD)	
GDP growth (t-1)	0.319***	0.325***	0.391***	0.394***
	(0.040)	(0.040)	(0.042)	(0.042)
GDP growth (t-2)	-0.019	-0.014	-0.029	-0.018
	(0.040)	(0.040)	(0.041)	(0.041)
Revenues		-0.101		-0.140
		(0.133)		(0.125)
Revenues (t-1)		-0.049		-0.314**
		(0.134)		(0.125)
Revenues (t-2)		0.092		-0.014
		(0.133)		(0.126)
Expenditure		-0.286**		0.123
		(0.132)		(0.193)
Expenditure (t-1)		-0.034		-0.115
		(0.133)		(0.193)
Expenditure (t-2)		0.086		-0.062
		(0.131)		(0.188)
Consolidation	0.036		-0.078	
	(0.067)		(0.068)	
Consolidation (t-1)	0.007		-0.082	
	(0.067)		(0.068)	
Consolidation (t-2)	-0.025		0.002	
	(0.068)		(0.069)	
Observations	662	662	611	611
R-squared	0.395	0.401	0.447	0.452
Countries	21	21	21	21
R-squared within	0.395	0.401	0.447	0.452
R-squared between	0.921	0.928	0.954	0.941
R-squared overall	0.407	0.417	0.468	0.475

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

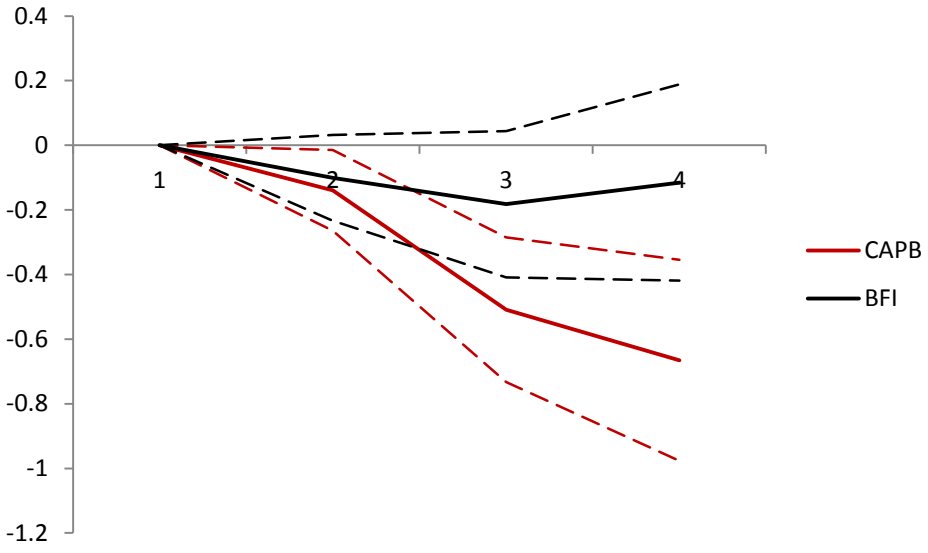
Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

Figure 4: Effects of a 1 percent of GDP fiscal consolidation



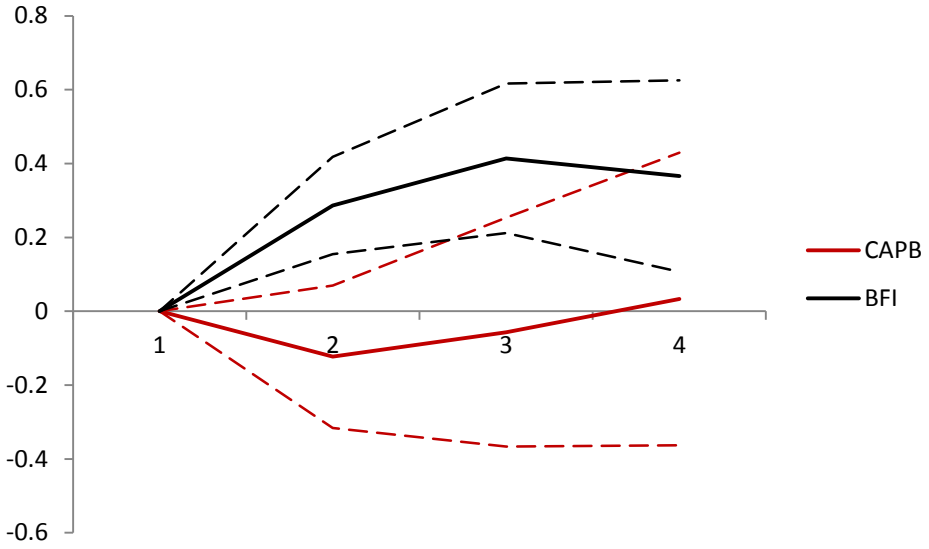
Note: t=0 denotes the year of a 1 percent of GDP fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

Figure 5: Effects of a 1 percent of GDP revenue-based fiscal consolidation



Note: t=0 denotes the year of a 1 percent of GDP revenue-based fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

Figure 6: Effects of a 1 percent of GDP expenditure-based fiscal consolidation



Note: t=0 denotes the year of a 1 percent of GDP expenditure-based fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

Appendix

Table A1

Fiscal Stimuli (BFI)

Country	Fiscal Stimuli (c.a. with the Blanchard method)								
Australia	1990	1991							
Austria	1975	2004							
Belgium	1975	1981	2005						
Canada	1975	1982	1991	2001					
Denmark	1974	1975	1980	1981	1982				
Finland	1978	1982	1983	1987	1990	1991	1992	2001	2003
France	1975	1981	1992	1993	2002				
Germany	1995	2001							
Greece	1981	1985	1989	1995	2001				
Ireland	1974	1975	1978	2001	2007				
Italy	1972	1975	1981	2001					
Japan	1975	1993	1998	2005	2007				
Netherlands	1975	1980	1995	2001	2002				
New Zealand	1988								
Norway	1974	1976	1977	1986	1987	1991	1998	2002	2007
Portugal	1978	1985	1993	2005					
Spain	1981	1982	1993						
Sweden	1974	1977	1978	1979	1980	1991	1992	2001	2002
Switzerland									
U. Kingdom	1971	1972	1973	1990	1991	1992	2001	2002	2003
United States	2002								

Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

Table A2

Fiscal Adjustments (BFI)

Country	Fiscal Adjustment (c.a. with the Blanchard method)									
Australia	1987	1988								
Austria	1984	1996	1997	2005						
Belgium	1982	1984	1987	2006						
Canada	1981	1986	1987	1994	1995	1996	1997			
Denmark	1983	1984	1985	1986	2005					
Finland	1973	1976	1981	1984	1988	1994	1996	1998	2000	
France	1979	1996								
Germany	1996	2000								
Greece	1976	1986	1991	1994	1996	2005	2006			
Ireland	1976	1984	1987	1988	1989	2000				
Italy	1976	1980	1982	1990	1991	1992	1997	2007		
Japan	1984	1999	2001	2006						
Netherlands	1972	1973	1983	1988	1991	1993	1996			
New Zealand	1987	1989	1993	1994	2000					
Norway	1979	1980	1983	1989	1996	2000	2004	2005		
Portugal	1982	1983	1986	1988	1992	1995	2002	2006		
Spain	1986	1987	1994	1996						
Sweden	1981	1983	1984	1986	1987	1994	1995	1996	1997	2004
Switzerland										
U. Kingdom	1977	1982	1988	1996	1997	1998	2000			
United States										

Source: A&A (2010), OECD Economic Outlook No. 84, own calculations.

Table A3

Fiscal Stimuli (CAPB)

Country	Fiscal stimuli (CAPB)								
Australia	1991								
Austria	1975	2004							
Belgium	1972	1980	1981	2005					
Canada	1975	1977	2001						
Denmark	1975	1982							
Finland	1978	1979	1982	1987	1990	1991	1992	2001	
France									
Germany	1995	2001							
Greece	1981	1985	1988	1989	1995	2001	2003	2004	
Ireland	2001	2007							
Italy	1975	1981	2001						
Japan	1972	1975	1978	1993	1998				
Netherlands	1975	1978	1989	1995	2001				
New Zealand	1988								
Norway	1987	1990	1991	1992	1996	2000	2003		
Portugal	1985	1993	2005						
Spain	1990								
Sweden	1974	1977	1978	1979	1980	1991	1992	2001	2002
Switzerland									
U. Kingdom	1973	1978	1990	1992	2002	2003			
United States	1975	2001	2002						

Source: OECD Economic Outlook No. 84, own calculations.

Table A4

Fiscal Adjustments (CAPB)

Country	Fiscal adjustment (CAPB)							
Australia	1998							
Austria	1984	1996	1997	2001	2005			
Belgium	1977	1982	1984	1993	2006			
Canada	1981	1986	1987	1995	1996	1997		
Denmark	1983	1984	1986	2004	2005			
Finland	1981	1984	1988	1994	1996	1998	2000	
France	1996							
Germany	1996							
Greece	1986	1987	1991	1994	1996	2005	2006	
Ireland	1983	1984	1986	1987	1988			
Italy	1976	1982	1983	1991	1992	1993	1997	2007
Japan	1984	1999	2006					
Netherlands	1972	1983	1991	1993	1996	2004		
New Zealand	1987	1989	2000					
Norway	1983	1994	1995	2007				
Portugal	1982	1983	1984	1986	1992	2002	2006	
Spain	1987	1992	1996					
Sweden	1976	1981	1986	1987	1994	1996	1997	1998
Switzerland								
U. Kingdom	1980	1982	1996	1997	1998			
United States	1976							

Source: OECD Economic Outlook No. 84, own calculations.

Table A5

Fiscal Stimuli (UPB)

Country	Fiscal stimuli (UPB)					
Australia	1991					
Austria						
Belgium						
Canada	2001					
Denmark	1987					
Finland	1982	1983	1987	1991	1992	2001
France						
Germany	2001					
Greece	1981	1985	1989	1995	2000	2003
Ireland	1990	1995	2001	2007		
Italy	1981	2003				
Japan	1993	1994				
Netherlands	1989	2001				
New Zealand						
Norway	1987	1991	1992	1996	2000	2003
Portugal	1987	1993				
Spain	1990					
Sweden	1991	1992	2001	2002		
Switzerland						
U. Kingdom	1992	2002	2003			
United States	2001	2002				

Source: OECD Economic Outlook No. 84, own calculations.

Table A6

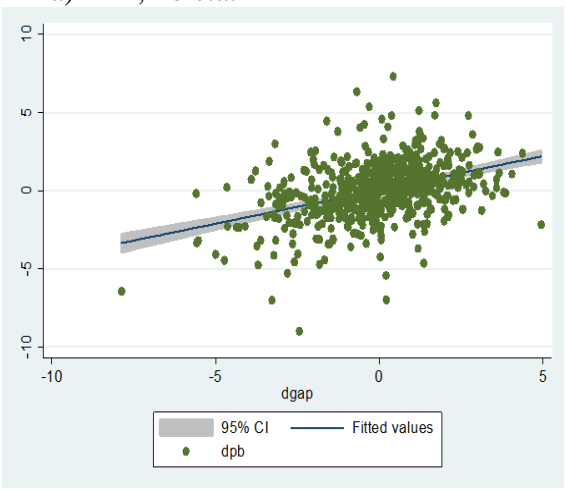
Fiscal Adjustments (UPB)

Country	Fiscal adjustment (UPB)					
Australia	1987					
Austria	1984	1996	1997	2001		
Belgium	1982	1983	1984	1987	1993	
Canada	1981	1986	1995	1996	1997	
Denmark	1983	1984	1986	2005		
Finland	1981	1984	1988	1994	1998	2000
France						
Germany						
Greece	1982	1986	1990	1994	1996	
Ireland	1983	1984	1986	1987	1988	1994
Italy	1982	1993	1995	2006		
Japan	1984					
Netherlands	1983	1991	1993	2004		
New Zealand	1992	1994	2000			
Norway	1983	1994	1995	2007		
Portugal	1982	1983	1992	1995	2006	2007
Spain	1992					
Sweden	1983	1987	1996	1997		
Switzerland	2000					
U. Kingdom	1981	1995	1996	1997	1998	
United States						

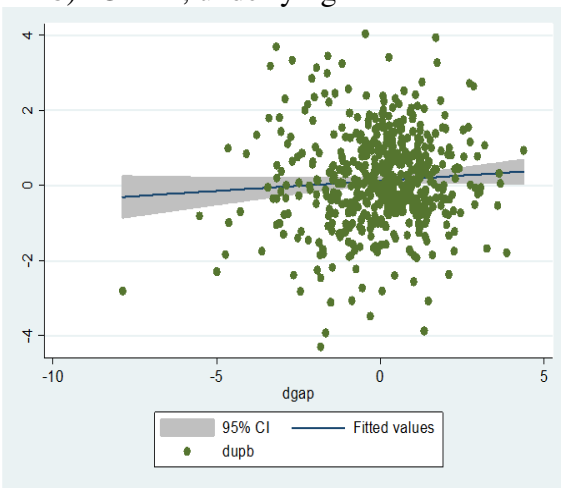
Source: OECD Economic Outlook No. 84, own calculations.

Figure A1: Indicators of fiscal policy (no c.a. and underlying) vs. output gap

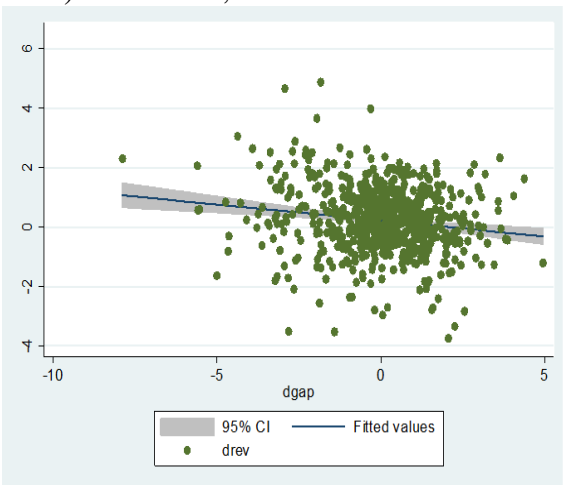
a) PB, no c.a.



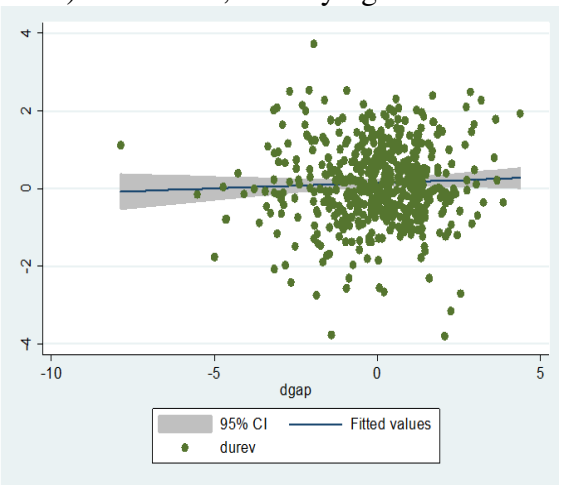
b) CAPB, underlying



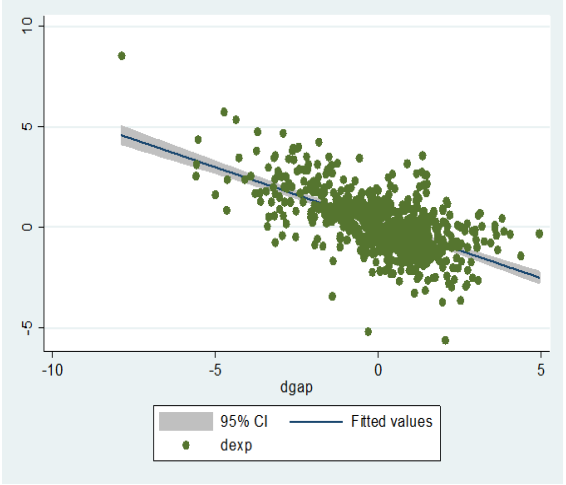
c) Revenues, no c.a.



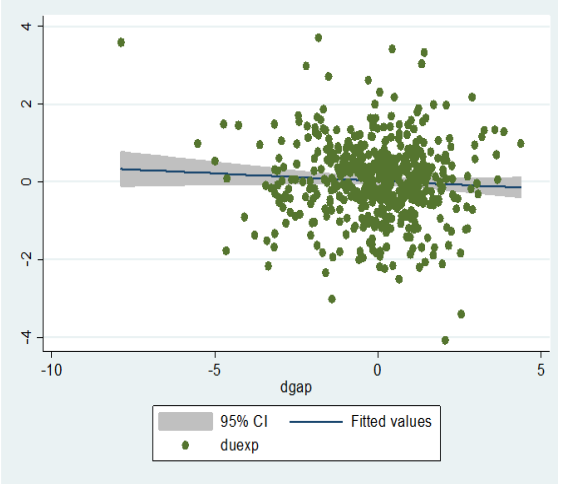
d) Revenues, underlying



e) Expenditure, no c.a.

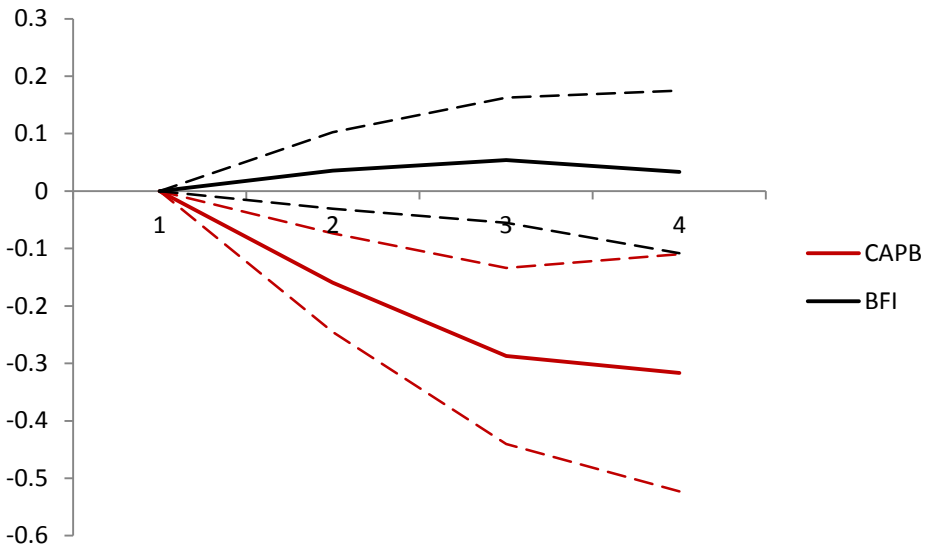


f) Expenditure, underlying



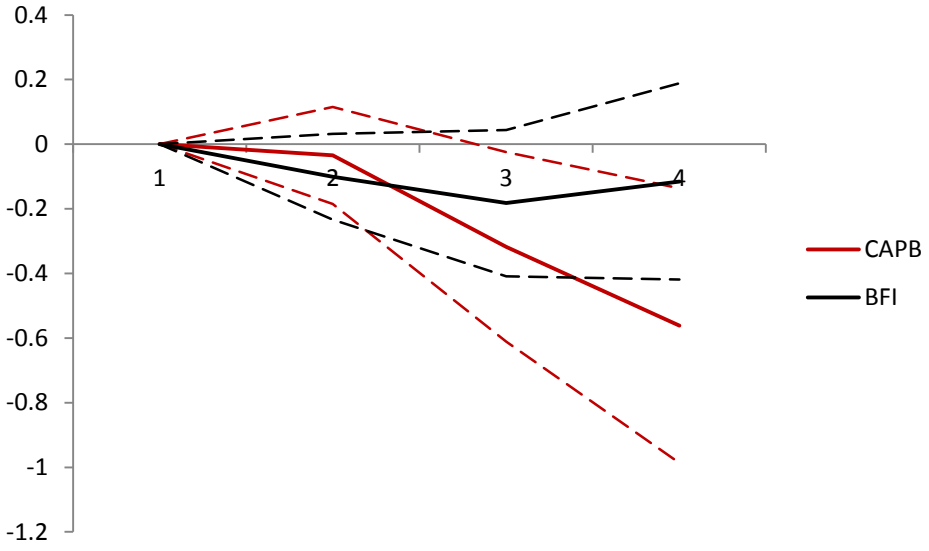
Source: OECD Economic Outlook No. 84, own calculations.

Figure A2: Effects of a 1 percent of GDP fiscal consolidation (no c. a. vs. underlying)



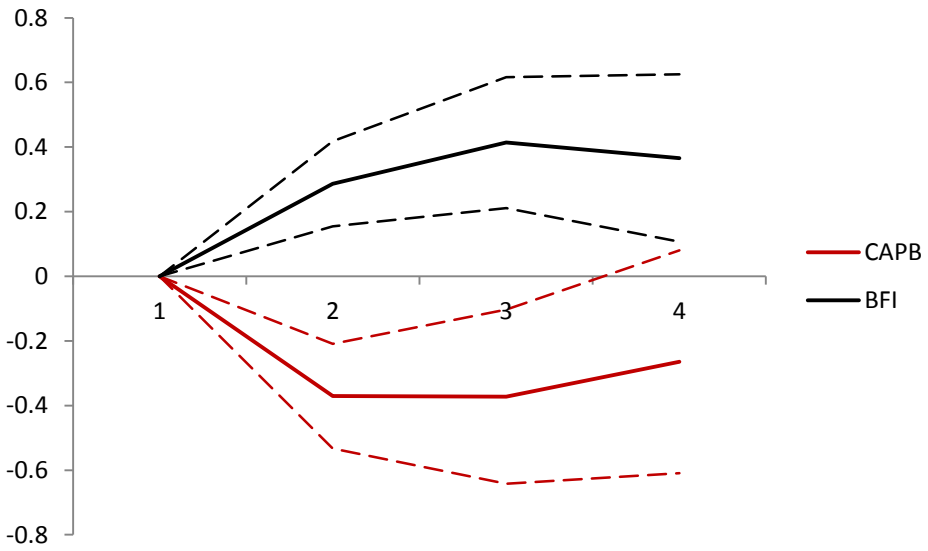
Note: t=0 denotes the year of a 1 percent of GDP fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

Figure A3: Effects of a 1 percent of GDP revenue-based fiscal consolidation (no c. a. vs. underlying)



Note: t=0 denotes the year of a 1 percent of GDP revenue-based fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

Figure A4: Effects of a 1 percent of GDP expenditure-based fiscal consolidation (no c. a. vs. underlying)



Note: t=0 denotes the year of a 1 percent of GDP expenditure-based fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.