Expansionary Austerity and Reverse Causality

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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) find that fiscal consolidations can be expansionary, particularly in the case of spending-cuts. In this paper I state that 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. I show 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 CAPB is endogenously correlated with the economic cycle. Replicating one prominent example of literature on expansionary austerity and comparing both, results based on the BFI and results based on standard cyclical adjustment strategies, only the BFI-based results find 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
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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 for a sound 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 shorter 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 has first been 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), Ardagna (2002 and 2005).
[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, as 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 the recent literature.[7] Leigh et al. (2010) and Guajardo et al. (2014) analyse historical records of fiscal adjustments and contrast the *conventional approach* with the *historical approach*. Their results do not share the expansionary austerity view.

Guajardo et al. (2014) show 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 asset price changes. Jayadev and Konczal (2010) as well as Jordà and Taylor (2016) show that the successful cases of fiscal adjustments in the AAP literature were 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) show that fiscal adjustment episodes as identified by AAP are not exogenous to economic growth and treat fiscal consolidations as weakly exogenous or predetermined, what points to the question of potential feedback effects and reverse causality. Moreover, De-Cos and Moral-Benito (2016) show 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 austerity in the European fiscal crisis.

To account for potential endogeneity in the study of A&A (2010), Holden and Midthjell (2013) as well as Yang et al. (2015) apply alternative measures of discretionary change and show that the expansionary effect of fiscal adjustments disappears after using 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) develop an indicator of fiscal impulse that controls for asset price fluctuations and find 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) discuss potential reverse causality in the study of A&A (2010) and show that the tax multiplier is not higher, 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), as well as Yang et al. (2015) establish 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.

In this paper I build on the previous critical analyses on expansionary austerity and show 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, I do not develop a new fiscal indicator or a new strategy of fiscal adjustment. 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 previous critical studies reasonably argue. Beyond that, in section 2 of this paper I show 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 we use standard assumptions 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.

In section 5 I analyze large changes of the output gap, rather than large changes in the CAPB and show that episodes with large changes in the output gap are very likely to be picked as an episode of large discretionary change if we use the A&P method, rather than the CAPB as computed by the OECD.

Replicating some of the results in A&A (2010), in section 6 I compare the estimated effects 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 we use standard methods 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) $\Delta capb_t$:

(1) $$\Delta y_t = \alpha + \beta\, \Delta capb_t + \varepsilon_t$$

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 however 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 how asset prices might influence 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", we would assume 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 to potential GDP), where potential GDP needs 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 instead of 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 firstly applied 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 I follow in this article is whether and how the cyclically adjustment strategy proposed in A&P suits to the assumptions made in the literature on cyclical adjustment and whether there are potential pitfalls at the spending- or revenue side. I refer in the following to Fedelino et al. (2009) as a benchmark study on cyclical adjustment, even though there are other pioneering discussions of cyclical adjustment strategies, as for instance 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 is assuming 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 results:

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

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 w.r.t. GDP (α_R and α_{Tr}).

To do so, for each country A&P regress 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:

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

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

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

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).

$$\Delta CATr_t = \Delta Tr_t - \hat{b} \cdot \Delta UR_t \tag{9}$$

[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 w.r.t. unemployment $\hat{b}$ is similar to coefficient α_{Tr} in equation no. (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 estimate the primary deficit that would have prevailed in period *t* if unemployment would 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, like 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 to 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 to potential GDP (as a natural reference series). If we do so, following Fedelino et al. (2009), equation (4) and (5) need some modifications:

(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 to 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 to GDP, standard assumptions would suggest adjusting expenditure (as a ratio to GDP), rather than revenue (as a ratio to GDP).[15] It would not be reasonable to adjust revenues if we express the variables as ratios to GDP, since (if the elasticity would be one) revenues are supposed to have the same growth rates as GDP. After scaling however expenditures necessarily need to be adjusted.

2.4. Incomplete cyclical adjustment and reverse causality

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

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

If ε_R = 1 and ε_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 to GDP needs to be corrected for cyclical effects, however, following A&P and correcting only taxes and transfers as a ratio to GDP, the estimated CAPB (as a ratio to GDP) includes cyclical effects (in the denominator) and consists of (adjusted) revenues as a ratio to GDP, (CAR_t), net of (adjusted) transfers as a ratio to 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) as well as 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, if we follow the standard assumptions, that $\varepsilon_R = 1$ and $\varepsilon_G = 0$ or $\varepsilon_G < 0$[16], the risk for 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 would 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 would be particularly likely. From the analysis above, we receive the following testable hypotheses:

1.) The BFI is correlated with changes in the output gap, while other fiscal indicators based on standard assumptions are not (or less)
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, our hypothesis (1) is 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 would 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 figures 1 (e and f) show the comparable behavior of expenditures. Figure 1 a) and 1 e) show that the fiscal indicators measured according to A&P are biased if we do not adjust for cyclical effects (hypothesis 1). While this pattern does not seem 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]

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

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 to 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 would be influenced by negative changes in the output gap, while positive changes in the output gap would 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, we compare the BFI in these episodes with the CAPB (c.a. with OECD method) and find that the CAPB, as estimated with the OECD method, identifies a few large recessions as episodes of discretionary fiscal stimulus, too, however several of the episodes identified by A&A (2010) are not large expansionary episodes if we use the CAPB. For instance,

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

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).

Firstly, 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, no matter 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, we do not elaborate on the countercyclical response problem in more detail and focus 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 assuming 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 1975 and 1981), while there is little support for a large countercyclical response problem in the case of upswing episodes.

Summarizing, 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 we use the CAPB 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) examine 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 with the CAPB.[21] A&A (2010) analyze 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 we use the CAPB 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 austerity, however, the result is not statistically significant. The results based on the CAPB

[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.

(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 lose 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 table 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 do 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 we do not restrict the sample to large episodes of discretionary change. We estimate regressions of the form

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

Here we do not restrict the sample to large cases of fiscal stimuli and adjustments and include country- and time fixed effects. Again, column (1) and (2) present the replication of the A&A results, while column (3) and (4) show the results based on the CAPB (OECD). Comparing column (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 we use CAPB based measure rather than the BFI (column 4). 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 would 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, we apply the method proposed by Leigh et al. (2010) and used in Alesina and Ardagna (2013):

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

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 1 shows the results of this augmented specification. Since A&A (2010) do 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) who compute 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 we use the BFI, but the result turns into opposite after using the OECD measure. This clearly supports the hypothesis 3 and 4 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. We compute dynamic response functions 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.

Figure 6 depicts the results of equation (20), where I distinguish 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. 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 7 shows the estimated effect of a one percentage 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 8 shows the same results for expenditure-cuts. The estimated effect of a one percentage 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 we use data provided by the OECD the results turn into the opposite. The impact multiplier is 0.1 (positive), suggesting that a reduction in government spending has a negative impact on GDP if we adjust for cyclical effects with the OECD-method. This observation is in line with hypothesis (4), where we expected a negative correlation 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, we use an alternative CAPB of the OECD that excludes one-off operations, the so-called underlying balance. As a test for robustness, I estimate all regressions 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 I do not extensively discuss the advantages and disadvantages of using this alternative indicator. Nevertheless, as a test for robustness I show the dynamic response of GDP to large fiscal contractions (computed with the underlying balance rather than the CAPB) in the appendix of this paper. As a suggestion of how to improve the data-based approach, I suggest using underlying balances, as computed by the OECD (Joumard et al., 2008), instead of cyclically-adjusted balance, in order to avoid that the selection of large changes in fiscal policy is influenced by one-off operations.

[24] These results are very much in line with the results in Alesina and Ardagna (2013), who find that a one percentage 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 (2011) 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 AAP 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.

8. Conclusion

The empirical literature on fiscal policy in the tradition of 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). In this line, the literature in the tradition of A&P highlights that adjustments at the spending side are likely to be successful or expansionary, while this is not the case for revenue-based consolidations (A&A, 2010).

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

Guajardo et al. (2014) contrast 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, at this point of time it has not been recognized why the CAPB as proposed by A&P and measured by AA (2010) 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 authors discuss that the BFI fail to address the fiscal effects of changes in asset prices (Guajardo et al., 2014, Yang et al., 2015). The reverse causality argument proposed in this paper can be seen as an answer to this puzzle.

This article focuses on the incomplete cyclical adjustment problem in the approach proposed by A&P (1995) to adjust for cyclical effects in budgetary data with the help of the "*Blanchard method*" or the *Blanchard fiscal impulse* (BFI). This approach has frequently been applied in the subsequent literature, as for instance in A&A (1998, 2010 and 2013). 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 the 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. However, this result is affected by reverse causality, i.e. increasing GDP decreases expenditure-GDP-ratios (and not the other way around), if the method applied fails to adjust for cyclical effects.

The empirical discussion in this paper examines the data used in one of the most prominent studies in the literature on expansionary austerity, A&A (2010), which is based on the method proposed by A&P. Further, we contrast the data and results in A&A (2010) 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. This suggests that the BFI as proposed by A&P and applied by A&A (2010) suffers from an incomplete cyclical adjustment problem.

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 identify the cyclical increase in the budget balance and thus investigates endogenous fiscal consolidations rather than episodes of discretionary changes. The results are driven by non-adjustment of expenditure-GDP-ratios, 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 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, as well as de Cos and Moral-Benito, 2013). It explains why 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. Since the latter finding is in line with standard economic theory, the finding of expansionary effects in case of expenditure cuts has been seen as counter-intuitive and has been frequently cited. While the evidence presented in A&A (2010) has been criticized by a number of studies, I show that the cyclical adjustment strategy proposed in A&P strategy fails to account for cyclical effects and thus systematically provides evidence in favor of expansionary austerity, however, this evidence reflects cyclical increases in the budget resulting from economic upswing, rather than an economic upswing resulting from confidence improvements in the aftermaths of a discretionary cut in expenditure, as the literature on expansionary austerity suggests.

According to the analysis in this paper and based on conventional assumptions on the cyclical sensitivity of the government budget, the surprising results in the literature on expansionary austerity (that expenditure cuts are associated with increasing GDP growth) would, thus, be influenced by reverse causality.

References

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

Alesina, A. and S. Ardagna (2011), "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.

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. (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. (2012), "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

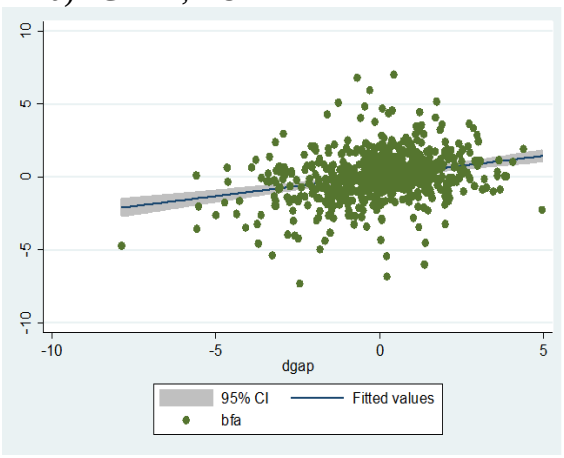
Table 2: Fiscal policy and changes in the output gap

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

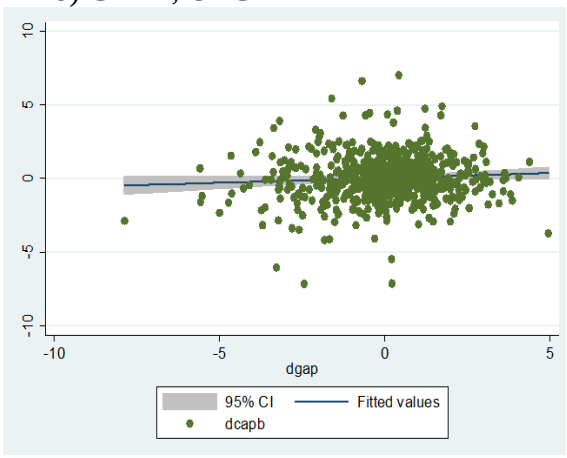
Notes: The table reports point estimates and heteroscedasticity-robust standard errors. All specifications contain full set of country and time fixed effects (not reported in the table).
*** Significant at 1%, ** significant at 5%, * significant at 10%.

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

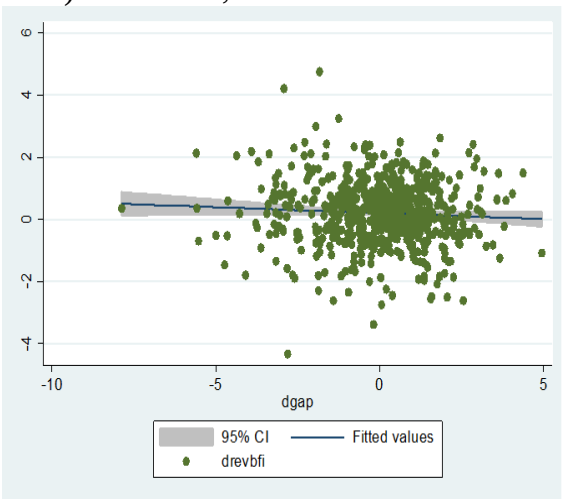
a) CAPB, A&P



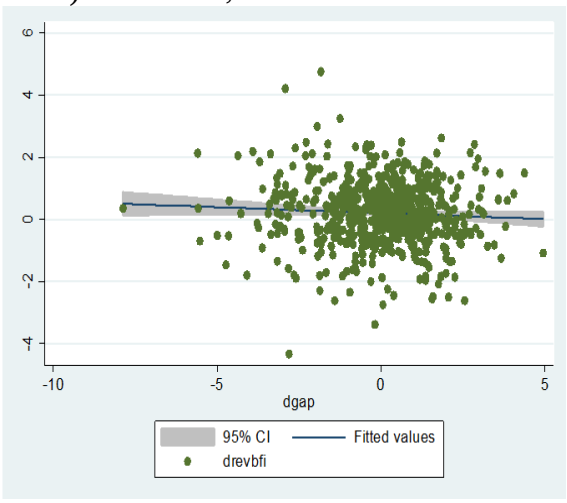
b) CAPB, OECD



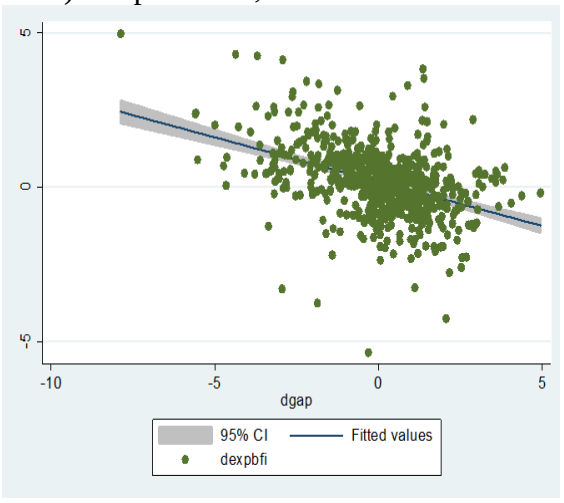
c) Revenues, A&P



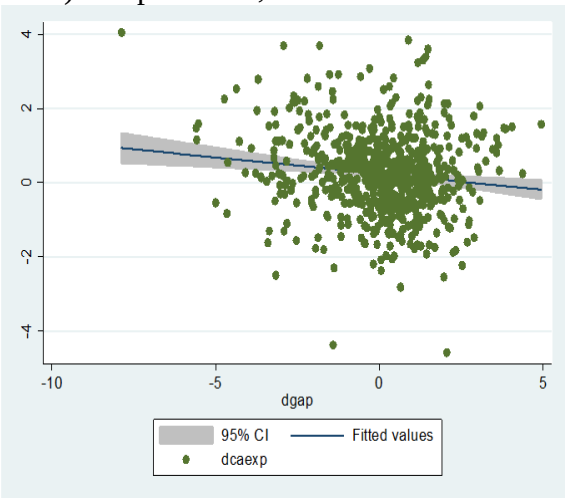
d) Revenues, OECD



e) Expenditure, A&P

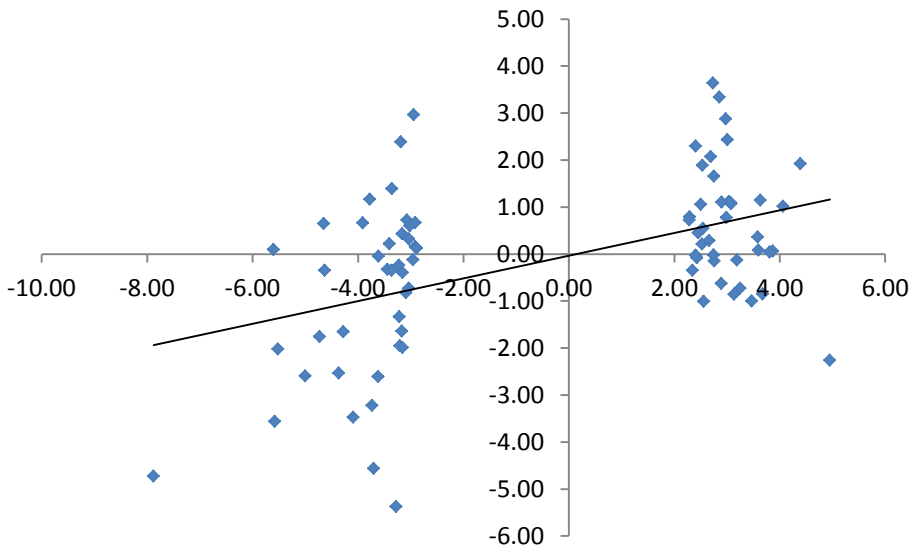


f) Expenditure, OECD



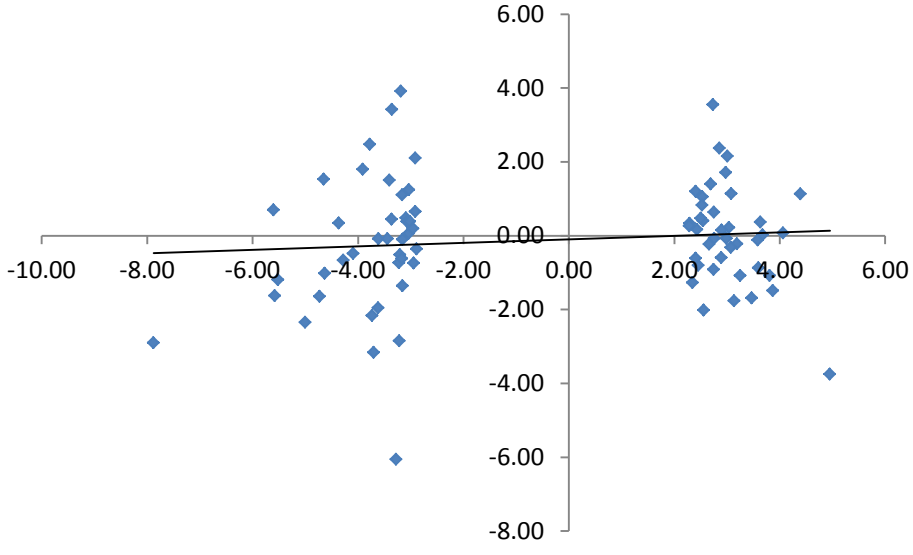
Source: Alesina and Ardagna (2010), OECD Economic Outlook No. 84.

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



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

Table 4: 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: Alesina and Ardagna (2010), OECD Economic Outlook No. 84.

Table 5: 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

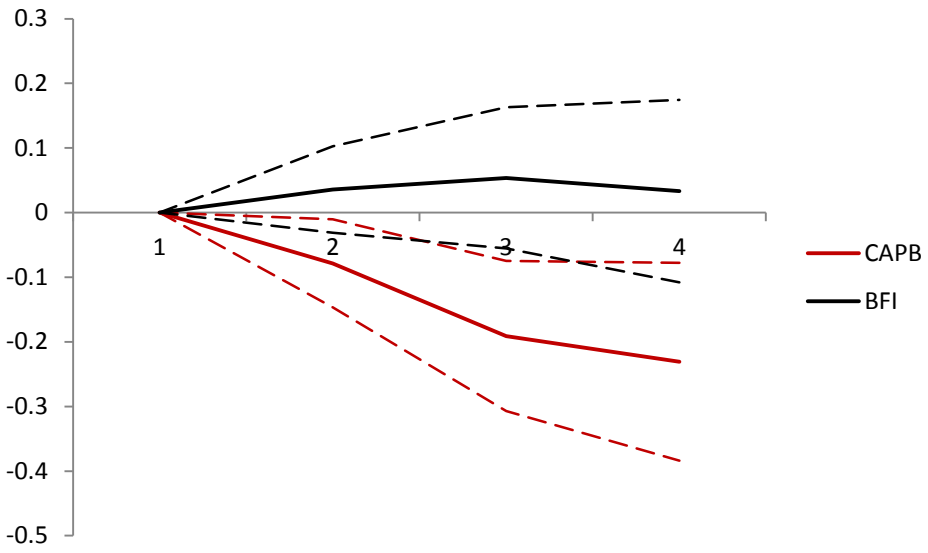
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: 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

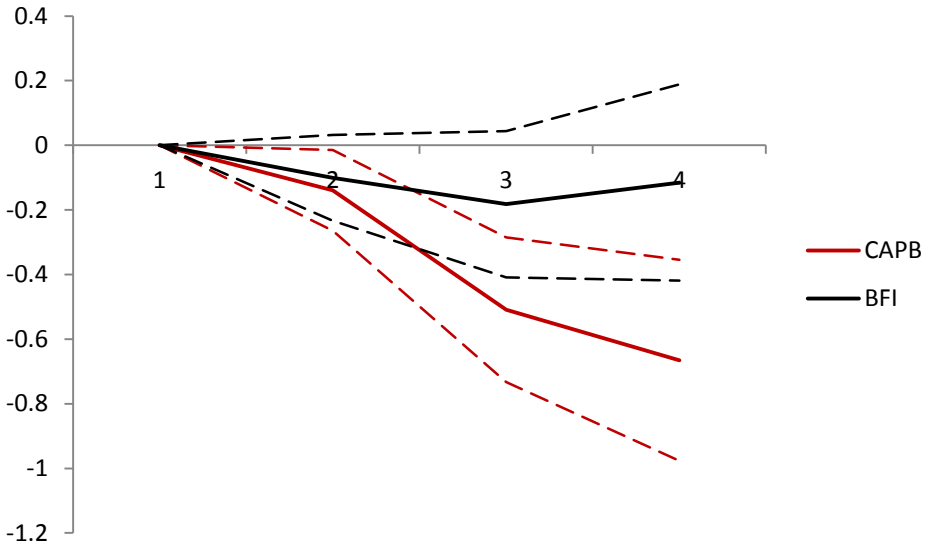
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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



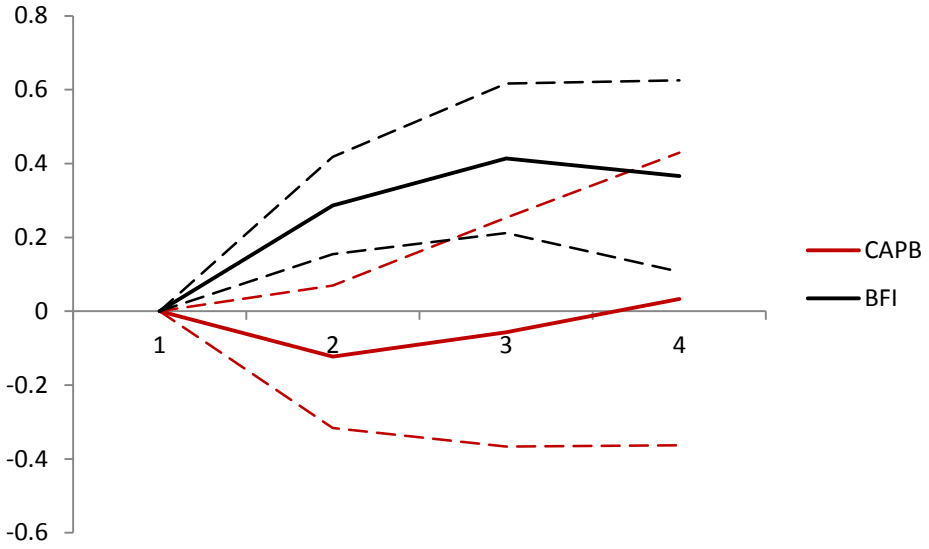
Note: t=0 denotes the year of a 1 percent of GDP fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

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								

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										

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						

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							

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				

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						

Table A7: 40 largest cases of economic downturns

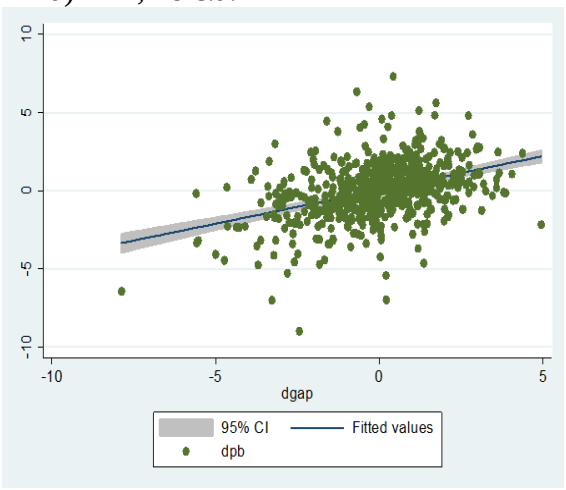
Country	Year	BFI	DCAPB	DGAP	BFI>1.5	CAPB<-1.5
Finland	1991	4.73	-2.90	-7.88	1	1
Japan	1974	-0.09	0.69	-5.60		
Italy	1975	3.56	-1.63	-5.58	1	1
Canada	1982	2.02	-1.20	-5.52	1	
Portugal	1993	2.59	-2.34	-5.00	1	1
Finland	1992	1.75	-1.64	-4.73	1	1
Portugal	1984	-0.65	1.53	-4.65		
United States	1982	0.34	-1.02	-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 A8: 40 largest cases of economic upswings

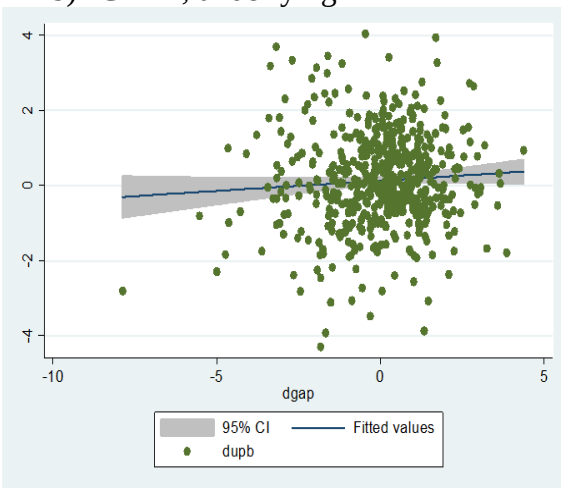
Country	Year	BFI	DCAPB	DGAP	BFI<-1.5	DCAPB>1.5
United Kingdom	1973	2.26	-3.75	4.95		
Portugal	1988	-1.92	1.12	4.39	1	
Denmark	1976	-1.01	0.07	4.06		
Ireland	1990	-0.06	-1.49	3.87		
Greece	1978	-0.04	-1.09	3.81		
United States	1984	0.85	0.02	3.67		
Norway	1985	-1.15	0.37	3.63		
Portugal	1989	-0.08	-0.88	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		

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

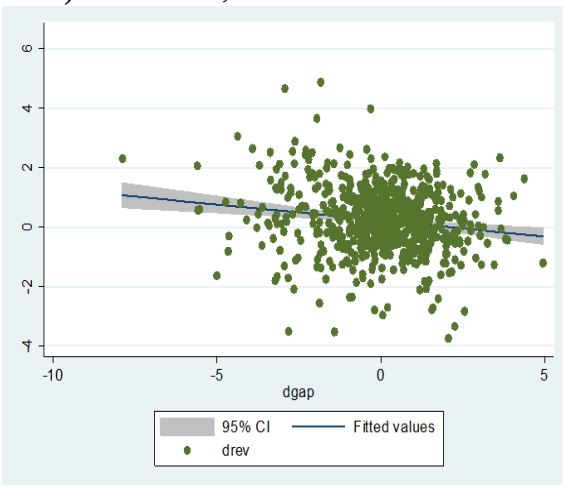
a) PB, no c.a.



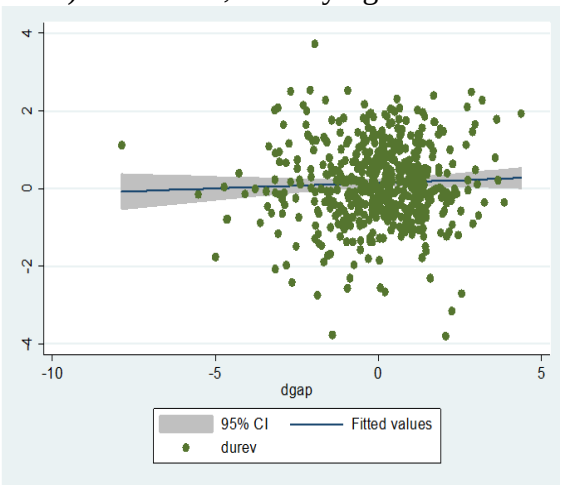
b) CAPB, underlying



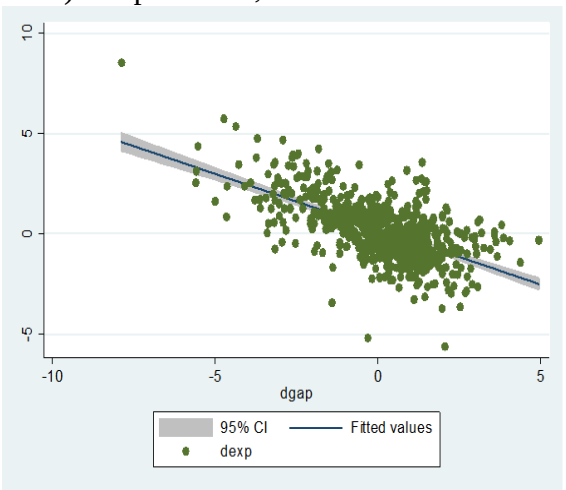
c) Revenues, no c.a.



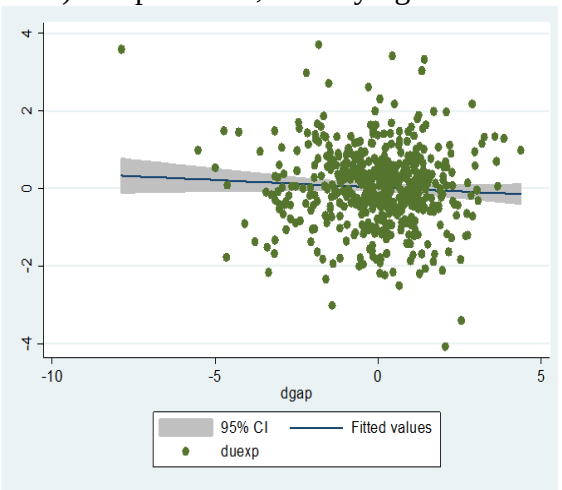
d) Revenues, underlying



e) Expenditure, no c.a.

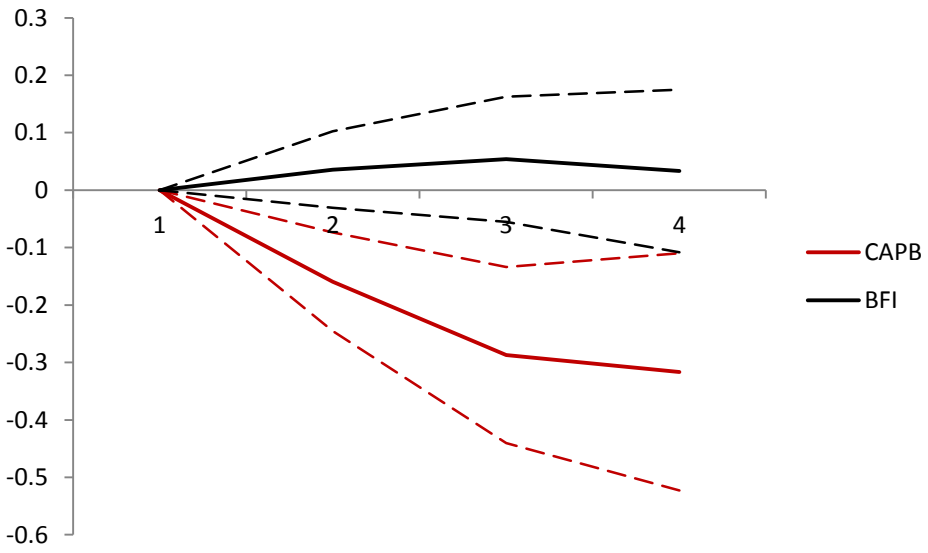


f) Expenditure, underlying



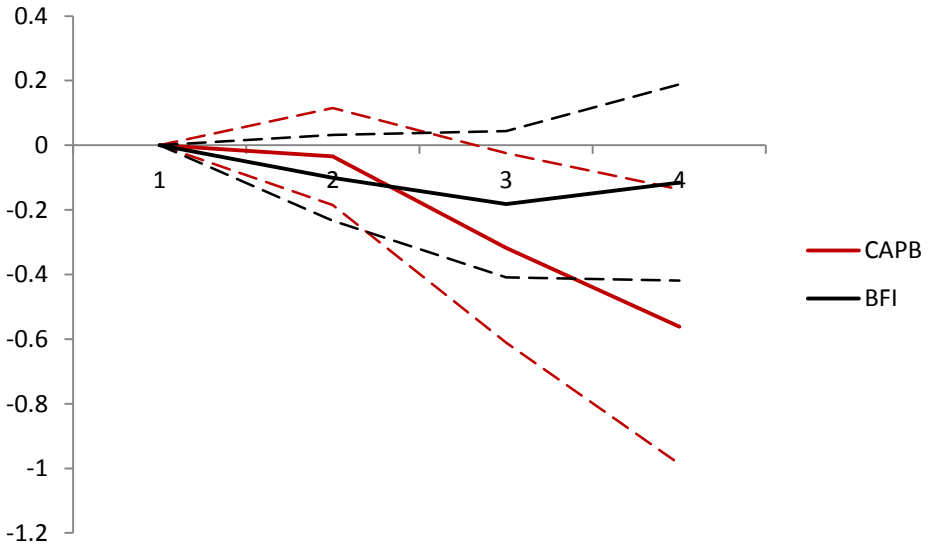
Source: OECD Economic Outlook No. 84.

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



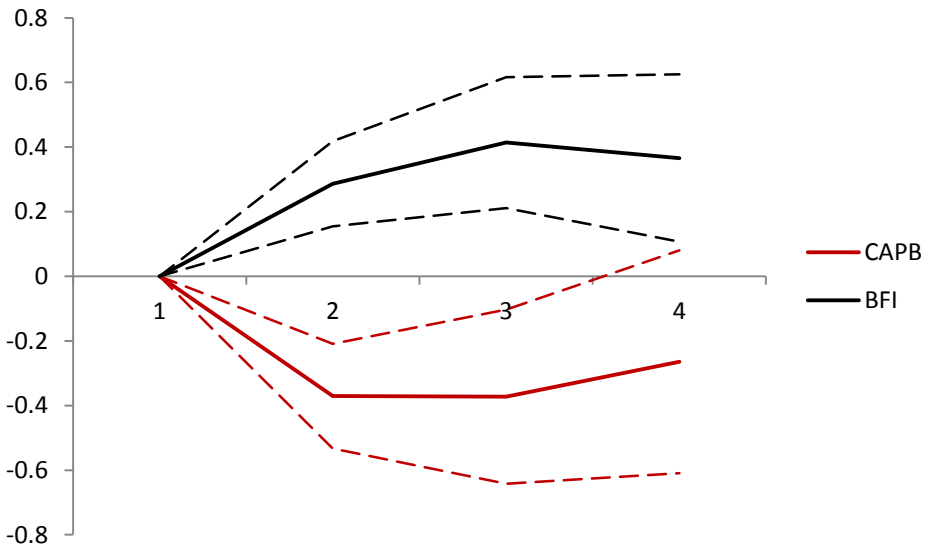
Note: t=0 denotes the year of a 1 percent of GDP fiscal consolidation on GDP. Dotted lines delineate one standard error confidence bands.

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.