On the Identification and Macroeconomic Effects of Discretionary Changes in Fiscal Policy

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Abstract

Empirical studies on the effects of fiscal adjustments apply different approaches to identify discretionary changes in fiscal policy. While the results of one strand of literature suggest that the effects of fiscal adjustments on GDP are small or even positive, particularly for spending cuts (expansionary austerity), this strand of literature is under criticism because of an incomplete cyclical adjustment strategy. I compare the macroeconomic effects of fiscal adjustments using five different identification strategies for a panel of 30 OECD countries over the period 1980 to 2012 and show that the strategy chosen for identifying fiscal policy has a crucial impact on the estimated effects. My results suggest that large fiscal adjustments (both revenue and spending based) lead to economic contractions, after appropriate controlling for cyclical effects and one-off capital transfers. These findings indicate that a great deal of previous empirical research on fiscal adjustments and expansionary austerity is based on an incomplete measure of fiscal policy and needs to be reevaluated.

Keywords: Fiscal Policy · Cyclical Adjustment · Government Expenditures

JEL Classification: E 62 · H30 · H 50

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1. Introduction

Empirical research on the effects of fiscal policy is less than conclusive when it comes to the macroeconomic consequences of fiscal adjustments. While the predominant share of the literature on fiscal policy states that fiscal contractions have negative effects on GDP (e. g. Blanchard and Perotti, 2002, Romer and Romer, 2010, Auerbach and Gorodnichenko, 2012), one strand of literature states that large fiscal adjustments are likely to be expansionary (expansionary austerity), and that spending-based corrections are less damaging for growth compared to fiscal adjustments that involve tax increases (e.g., Alesina and Perotti, 1995, 1997; Alesina and Ardagna, 1998, 2010, 2012). This literature analyses the impact of changes in cyclically-adjusted primary budget balances (CAPB) on GDP (*data-based approach*).

Based on a narrative identification strategy, Leigh et al. (2010) and Guajardo et al. (2011) analyse cases of fiscal adjustments and find no support for expansionary austerity. Each of these points of view leads to alternative policy recommendations for solving the ongoing fiscal crisis in Europe and other OECD countries.

In this paper I focus on the identification strategy of the *data-based approach* and analyse the macroeconomic consequences of fiscal policy in a panel of 30 OECD countries during the period 1980 to 2012. I compare five different *(data-based)* identification strategies and argue that the choice of strategy for how to adjust the data for cyclical effects influences the results. Without appropriate controlling for cyclical effects, large changes in primary budget balances (as a share of GDP) may be driven by cyclical fluctuations and, thus, by changes in the denominator of revenue or expenditure ratios. Since automatic stabilizers decrease government budget balances in economic recessions, the positive (automatic) relationship between (changes in) output gaps and (changes in) budget balances in connection with an incomplete cyclical adjustment would bias the results of *data-based* analyses toward

underestimating the (negative) Keynesian effects of fiscal policy on GDP, and toward suggesting a positive (non-Keynesian) relationship between changes in primary balances and short-run GDP growth (expansionary austerity).[1]

Moreover, changes in (cyclically-adjusted) primary balances include one-off operations in capital transfers with no or only limited impact on economic activity that do not necessarily reflect discretionary changes in fiscal policy and are not designed to stimulate the economy or to adjust deficits in the long run (Joumard et al., 2008). Ignoring this, the *data-based* approach might identify large one-offs in capital transfers, rather than structural fiscal adjustments.

To identify changes in fiscal policy, I propose to correct for cyclical fluctuations in budget data with estimations of trend or potential GDP, and to exclude one-off capital transfers from the analysis. I suggest either excluding government (net) capital transfers from the budget balance, or examining changes in underlying primary balances (CAPBU).[2]

I show that the choice of strategy for identifying changes in fiscal policy has a crucial impact on the results. While the results of conventional *data-based* approaches suggest that the effects of fiscal adjustments on GDP are small or even positive, particularly for spending cuts (expansionary austerity), my results reveal that large fiscal adjustments (both revenue and spending-based) lead to economic contractions, after controlling for cyclical effects and one-off capital transfers. These findings indicate that a great deal of previous empirical research on expansionary austerity needs to be reevaluated, seeing how it is based on an incomplete measure of fiscal policy.

[1] Perotti (2012) discusses the incomplete cyclical adjustment problem in Alesina and Perotti (1995). Note that under common assumptions about the elasticities of government revenue- and spending categories, particularly the share of government spending in terms of GDP exhibits a (counter-) cyclical behavior.

[2] According to Joumard et al. (2008), the underlying balance is the cyclically-adjusted primary balance, after exclusion of one-off operations in capital transfers. Heylen et al. (2013) analyse underlying primary balances to avoid biases that may be induced by one-off budgetary measures. They do not, however, analyse the macroeconomic effects of changes in underlying balances.

2. Data-Based Approach

One standard approach to estimate the effect of fiscal policy on GDP is to regress real GDP growth ΔY_{it} on lagged GDP growth, a measure of fiscal policy (ΔFP_{it}), and a vector of controls X_{it} (Guajardo et al., 2011):

$$\Delta Y_{it} = \alpha_0 + \sum_{j=1}^{2} \alpha_j \Delta Y_{it-j} + \beta \Delta FP_{it} + X_{it}\gamma + \varepsilon_i \qquad (1)$$

where *i* and *t* index countries and years. One strand of the literature, the *data-based approach*, identifies discretionary changes in fiscal policy ΔFP_{it} with changes in cyclically-adjusted government primary balances (CAPB).[3] The data-based approach finds evidence in support of the expansionary austerity hypothesis that fiscal contractions do not necessarily reduce growth, not even in the short run (Alesina and Perotti, 1995, 1997; Alesina and Ardagna, 1998, 2010, 2012). Because of the frequent application of data-based analyses, this approach is referred to as the *conventional approach* (according to Guajardo et al., 2011).

Leigh et al. (2010) and Guajardo et al. (2011) criticize this method and contrast the *data-based approach* with a narrative analysis of historical fiscal contractions (*historical approach*).[4] According to this second strand of the literature, large fiscal adjustments are likely to cause recessions (Devries et al., 2011). Recent studies cast additional doubt on the expansionary austerity hypothesis and argue that the conventional approach is likely to underestimate the effects of fiscal consolidation on economic activity.[5] It is even conceivable that fiscal multipliers are substantially larger than assumed by recent forecasts and policy

[3] De Castro et al. (2010) suggest analyzing changes in CAPB if interest lies in government action. See Heller et al. (1986), Blanchard (1990), and Alesina and Perotti (1995) for a review of fiscal impulse measures.
[4] See Romer and Romer (2010) on the narrative identification strategy and an analysis of exogenous changes in tax policy in the United States.
[5] See Romer (2011) for a critical discussion of the results presented in Alesina and Ardagna (2011), and Guajardo et al. (2011) for a criticism of *data-based analyses*.

simulations (Blanchard and Leigh, 2013). It is thus questionable whether the conventional approach is a viable means of identifying discretionary changes in fiscal policy and whether the expansionary austerity hypothesis is sustainable. For example, Perotti (2012) shows that the conventional approach may be inappropriate if it does not take into account systematic counter-cyclical responses of fiscal policy. Based on Perotti (2012), the response of the budget balance to economic conditions can be formalized as

$$\Delta PB_t = \alpha_c \Delta Gap_t + \alpha_a \Delta Gap_t + \varepsilon_t \qquad (2)$$

where ΔPB denotes changes in the primary surplus and ΔGap represents annual changes in the output gap. The automatic (counter-) cyclical influence of economic cycles on the (primary) budget balance is expressed with α_c, while α_a captures systematic counter-cyclical policy responses to economic conditions (beyond automatic stabilization). According to Perotti (2012), one would assume α_c and $\alpha_a > 0$ if automatic stabilizers and policy activism behave counter-cyclically. Changes in the primary surplus would reveal a cyclical pattern even after controlling perfectly for the effects of automatic stabilization. Perotti (2012) highlights two problems with the conventional approach based on CAPB: firstly, the problem of "imperfect cyclical adjustment" and, secondly, the "countercyclical response" problem.[6] According to Equation (3), only under the assumption that α_c perfectly captures the effects of automatic responses to economic cycles, and if fiscal policy is not counter-cyclical ($\alpha_a = 0$), will CAPB not include a cyclical pattern.[7]

$$\Delta CAPB_t = \Delta PB_t - \alpha_c \Delta Gap_t = \alpha_a \Delta Gap_t + \varepsilon_t \qquad (3)$$

[6] See Section 3 on the issue of cyclical adjustment of budget data and potential pitfalls.
[7] See Lane (2003) on the cyclical behaviour of fiscal policy in OECD countries.

Even if $\alpha_a = 0$, and if α_c perfectly captures automatic stabilizers, however, CAPB contain all expenditures (and revenues) that are not interest expenditures (and revenues). Large changes in cyclically-adjusted primary balances may be one-off expenditures in capital transfers that, for instance, reflect revenues from privatization or losses from nationalization operations.[8]

$$CAPB = \alpha_a Gap_t + O_t + e_t \qquad (4)$$

One-off operations, O_t, thus may influence $\Delta CAPB_{it}$ but have no or only limited effect on economic activity (Joumard et al., 2008), even if we assume $\alpha_a = 0$. The conventional approach provides unbiased estimations of the effects of fiscal policy under the following three assumptions:

a) The CAPS do not include a cyclical pattern (α_c would perfectly capture the effects of automatic responses to economic environments),
b) Fiscal policy is not pro- or counter-cyclical ($\alpha_a = 0$),
c) The fiscal data do not include one-offs in capital transfers ($O_t = 0$).

Based on this, it is conceivable that the conventional approach systematically underestimates the effects of fiscal policy because of imperfect cyclical adjustment and counter-cyclical fiscal policy (Perotti, 2012). The incomplete definition of fiscal policy in *data-based* approaches may have led to the different results found by the *data-based* and *historical approaches*.

[8] I discuss the problem of one-offs in capital transfers in more detail in Section 4.

Under the assumption that a) and b) hold on average and for cases of fiscal adjustments, however, results of the conventional analysis would be unbiased if we exclude one-off operations ($O_t = 0$).

3. Cyclical Adjustment

Automatic stabilizers decrease government budget balances in economic recessions. Because of this positive (automatic) relationship between (changes in) output gaps and (changes in) budget balances, an incomplete cyclical adjustment will bias the results of *data-based analyses* toward underestimating the (negative) Keynesian effects of fiscal policy on GDP, and towards suggesting a positive (non-Keynesian) relationship between changes in primary balances and GDP growth (expansionary austerity). For this reason, a great deal of the literature on fiscal policy focuses on how to adjust for cyclical effects. There are many ways to adjust budget balances for the effects of automatic stabilizers.[9] Budgetary items respond in various ways to cyclical fluctuations and it is almost impossible to account for every cyclical side effect. I distinguish between four different strategies for dealing with the issue of automatic stabilization.

[9] See Blanchard (1990), Alesina and Perotti (1995), Girouard and André (2005), and Fedelino et al. (2009) for a detailed discussion of cyclical adjustment procedures.

a) No Cyclical Adjustment

Alesina and Perotti (1995) discuss using non-adjusted primary budget balances (PB) as a share of GDP as an indicator of fiscal policy and highlight its simplicity.[10] According to Alesina and Perotti (1995), even although it ignores cyclical fluctuations, "this measure is not a bad approximation as long as expenditures and revenues are close to being unit elastic to GDP."[11] In contrast, Perotti (2012) highlights the need to correct for cyclical effects and notes that an incomplete cyclical adjustment would bias the results "again to a less powerful effect of fiscal policy." I use the non-adjusted measure of fiscal policy to verify Alesina and Ardagna's (2010) statement that "the details of how to adjust for the cycle do not matter much for the qualitative nature of the results" and that "in fact, even not correcting at all would give similar results," although a large body of the literature recommends analysing cyclically-adjusted changes in primary balances as a share of GDP (if one does not assume government revenues and expenditures to be unit elastic).

b) The "Alesina Measure"

Blanchard (1990) discusses the necessity of adjusting for cyclical effects and suggests an "indicator of discretionary change": "the value of the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year, both in ratio to GNP in each year."

The literature on expansionary austerity frequently refers to this proposal (e.g., Alesina and Perotti, 1995, 1997; Ardagna, 2004; Alesina and Ardagna, 1998, 2010, 2012) because it

[10] The primary deficit is the government budget deficit net of interest expenditure. There is a broad consensus in the literature to exclude interest expenditure. See Blanchard (1990) and Perotti (2012) on the need to control for changes in inflation and real interest expenditure.

[11] According to a comprehensive literature on the effects of automatic stabilizers, this does not seem to be the case for government expenditure (e.g., Girouard and André, 2005).

avoids complicated estimations of output gaps with production functions or filter methods.[12] Alesina and Perotti (1995) and Alesina and Ardagna (2010) compute the measure in two steps: first with regressions of social transfers as a share of GDP (*TRANS*) on a time trend[13] and on the unemployment rate:

$$TRANSF_t = \alpha_0 + \alpha_1 TREND + \alpha_2 U_t + \varepsilon_t \quad (5)$$

Based on the estimations of Equation (5), Alesina and Perotti (1995) estimate the ratio of social transfers per GDP that would have prevailed if the unemployment rate remains the same as the previous year:[14]

$$TRANSF_t(U_{t-1}) = \hat{\alpha}_0 + \hat{\alpha}_1 TREND + \hat{\alpha}_2 U_{t-1} + \hat{\varepsilon}_t \quad (6)$$

Alesina and Perotti (1995) use the same procedure to adjust current government revenues as a ratio of GDP; however, they do not adjust government expenditure other than social transfers (as a share of GDP).[15]

Together with other (unadjusted) components of the government balance, Alesina and Perotti (1995) compute the primary balance that would have prevailed if unemployment stays at the

[12] Alesina and Ardagna (2010) note that "We prefer this method to more complicated measures like those produced by the OECD because the latter are a bit of a black box based on many assumptions about the fiscal multipliers on which there is much uncertainty."

[13] Alesina and Perotti (1995) apply two time trends (one for the pre-1975 period and one for the post-1975 period); Alesina and Ardagna (2010) apply only one time trend. In the empirical part of this paper, I use data for the period 1980 to 2012 so that one time trend should be sufficient.

[14] Based on Equation (5), I present the estimated unemployment-related elasticities (α_2) for every country and budget item in the Appendix. Data for Estonia, Israel, and Luxembourg are not available for all variables, so I exclude these countries from the analysis based on AFI and BFI.

[15] According to Alesina and Perotti (1995), revenues are comprised of direct taxes, indirect taxes, and social security contributions. In the empirical part of this paper, I use current revenues, which—according to the OECD definitions—additionally includes property income received by the government and other current receipts. The definition of transfers used by Alesina and Perotti (1995) includes social security benefits, social assistance grants, unfunded employee pension and welfare benefits, transfers to the rest of the world, transfers to private nonprofit institutions serving households, and net casualty insurance premiums, as well as other transfers, while I take into account social security benefits paid by the general government, as a share of GDP, which I believe to be consistent with the definitions in Alesina and Ardagna (2010).

previous year's level. Accordingly, the fiscal impulse is computed as the difference between the unemployment-adjusted primary balance and the previous year's primary balance. In the following, I refer to this measure, used in Alesina and Perotti (1995, 1997) and Alesina and Ardagna (1998, 2010, 2012), as the *Alesina measure* of fiscal impulse (AFI). Again, under the assumption that government expenditures other than social transfers are unit elastic, it would be conceivable not to adjust government consumption as a share of GDP for cyclical effects (as the *Alesina measure* does). Under the widely accepted consensus in the literature on cyclical adjustment of fiscal data, however, it seems more reasonable to assume that government expenditures are not unit elastic or that the elasticity is close to zero. If, however, government revenues are unit elastic, it would be more meaningful to adjust expenditures (other than transfers), rather than revenues. To ignore the adjustment of government expenditures as a share of GDP creates an incomplete cyclical adjustment problem that, according to the assumptions made above, biases the results toward a positive relationship between changes in primary balances and GDP growth.[16]

c) The "Blanchard Measure"

To solve the problem of incomplete cyclical adjustment, I compute cyclically-adjusted budget figures using the method suggested by Blanchard (1990) based on Equations (5) and (6), but correct current revenues, as well as current primary expenditures (not only transfers), as a share of GDP for cyclical effects. Following Alesina and Perotti (1995), I refer to this measure as the *Blanchard measure* of fiscal impulse (BFI). The cyclical adjustment of revenues is similar to that under the *Alesina measure*, but the adjustment of primary expenditures as a share of GDP additionally takes into account primary current expenditures

[16] More precisely, decreasing government expenditure (other than transfers), e.g., government consumption (per GDP), may turn out to be associated with increasing GDP growth. Studies that apply the *Alesina measure* find that decreases in government consumption are associated with increasing growth (e.g., Alesina and Perotti, 1995, 1997; Ardagna, 2004; Alesina and Ardagna, 1998, 2010).

other than social transfers.[17] Typhon Kollintzas (1995) criticizes the procedure used to compute the BFI in Alesina and Perotti (1995) and provides a number of reasons why "the BFI could be a poor measure of discretionary fiscal policy changes." Since AFI and BFI express (changes in) fiscal policy in terms of GDP ratios, it is necessary to assume a perfect co-movement of GDP and unemployment to exclude cyclical effects in expenditure ratios, particularly if we assume an elasticity of expenditure close to zero.[18] Kollintzas (1995) suggests applying Hodrick-Prescott filtered series, adjusted for cyclical effects. It is thus questionable whether it is possible to identify the cyclical effects of taxes and spending with the *Blanchard measure*, so that studies based on the BFI may be prone to an incomplete cyclical adjustment problem.[19]

d) The "OECD Measure"

To measure cyclically-adjusted fiscal positions, the OECD provides a measure, different from the one suggested by Blanchard (1990), based on the output gap in connection with GDP elasticities of government revenue and spending categories (Girouard and André, 2005). According to the OECD, the aggregated spending elasticity is close to zero, whereas the revenue elasticity is close to one (Fedelino et al., 2009), because at the expenditure side only unemployment benefits (which represent a small share of total expenditures) respond to cyclical fluctuations, while other expenditure categories are assumed to be inelastic. With the estimated elasticities and estimations of the output gap, cyclically-adjusted budget data are computed. The adjusted series is subsequently expressed in relation to potential GDP. The OECD provides cyclically-adjusted data based on this approach.

[17] According to the OECD definition, primary current expenditures include government final consumption, social security benefits, and other current outlays of the general government.
[18] "Another reason for being concerned with the BFI is that the unemployment rate is typically lagging behind GDP. It means that the intended removal of all contemporaneous business cycle-induced fiscal policy changes may be incomplete" (Kollintzas, 1995).
[19] The same criticism is true for the *Alesina measure*.

4. One-Off Operations

Large changes in cyclically-adjusted budget data may include one-offs in capital transfers that have no or limited effects on demand. Bornhorst et al. (2011) suggest adjusting government balances beyond the business cycle when analysing discretionary changes in fiscal policy. Joumard et al. (2008) propose a new fiscal indicator, the "underlying balances," that identifies and excludes large one-off operations in capital transfers. Most of the one-off operations are classified as expenditures (capital transfers paid and other capital payments). Only a few countries (among them France, Italy, Greece, and Ireland) are affected by large one-off operations on the revenue side. It is conceivable that the presence of one-off operations, particularly on the expenditure side, distort the results toward finding no impact of fiscal stimuli and adjustments.[20] Structural changes in fiscal policy are not predominantly driven by one-off operations in capital transfers. Fiscal adjustments focus on permanently reducing deficits, not just in one year through, for example, privatization operations. Alesina and Ardagna (2012) discuss the pitfalls of the "on-off adjustments" found in Alesina and Ardagna (2010), but do not exclude one-offs from the analysis.[21] For the purpose of fiscal policy analysis, it is more reasonable to identify changes in the underlying balance. Since net capital transfers are low and of low volatility (after excluding one-offs), it is even conceivable to exclude (net) capital transfers from the government budget to obtain a more reliable measure of discretionary fiscal policy, and one that is easy to compute. To exclude one-offs in capital transfers, in the empirical part of this paper I rely on the underlying balances, as suggested by Jourmard et al. (2008).

[20] The data in the Appendix suggest that approximately one-third of the fiscal adjustments, as identified by large changes in CAPB, cannot be identified with large changes in CAPBU, and thus reflect one-offs in capital transfers.

[21] Alesina and Ardagna (2012), for example, identify the period between 1996 and 2000 in Germany as one of the largest episodes of fiscal adjustment in OECD history; however, the multi-year increase in CAPB between 1996 and 2000 in Germany is predominantly driven by the one-offs in 1995 and 2000. The change in the German general government underlying balance during the period 1995 and 2000 is low.

5. Data and Empirical Strategy

To estimate the effect of discretionary changes in fiscal policy on GDP, I regress real GDP growth ΔY_{it} on lagged GDP growth, a measure of fiscal policy ΔPB_{it}, and a vector of controls X_{it}:

$$\Delta Y_{it} = \sum_{j=1}^{2} \alpha_j \Delta Y_{it-j} + \beta \Delta PB_{it} + X_{it}\gamma + \delta_i + \phi_t + \varepsilon_{it} \qquad (7)$$

where *i* and *t* index countries and years. I include country -and time-fixed effects to control for specific factors in a certain year or country. In the baseline-specification ΔPB_{it} represents changes in (cyclically-adjusted or underlying) primary balances, depending on the identification approach. Based on the different treatment of cyclical adjustment (Section 3) and one-off expenditures, I compare five different strategies for identifying fiscal policy:

Strategy 1:

Changes in the primary balance (no adjustment), as a percentage of GDP (PB),

Strategy 2:

Changes in the cyclically-adjusted primary balance, as a percentage of GDP, using the *Alesina measure* of fiscal impulse (AFI),

Strategy 3:

Changes in the cyclically-adjusted primary balance, as a percentage of GDP, using the *Blanchard measure* of fiscal impulse (BFI),

Strategy 4:

Changes in the cyclically-adjusted primary balance, as a percentage of potential GDP, using the OECD measure (CAPB), and

Strategy 5:

Changes in the underlying primary balance, as a percentage of potential GDP (CAPBU).

To distinguish between revenue- and spending-based adjustments, I separately include changes in (current) spending (ΔPE_{it}), changes in (current) revenues (ΔPR_{it}), and changes in capital outlays (ΔCO_{it})[22], according to the respective identification strategy. To explore whether changes in current spending have a different effect on GDP compared to other changes in the primary balance, a third specification includes the measure of discretionary changes in fiscal policy (according to Strategy 1, 2, 3, 4 or 5) and the share of the fiscal adjustment that is based on cuts in current primary expenditures, $\frac{-\Delta PE_{it}}{\Delta PB_{it}}$.

I obtain fiscal data for a panel of 30 OECD countries over the period 1980 to 2012 from the OECD Economic Outlook (No. 93) Database. The OECD provides cyclically-adjusted balances, as well as underlying balances, only starting in 1981. The AFI and BFI measures are computed as outlined in Section 3. For some countries, the OECD provides data only after 1981, which is why the panel is unbalanced. Table 1 provides descriptive statistics.

To identify periods of large fiscal adjustments, I rely on the definition of Alesina and Perotti (1995) and Alesina and Ardagna (2010) and define a period of fiscal adjustment as a year in

[22] In accordance with the OECD definitions, net capital outlays as changes in primary balances minus changes in current revenues plus changes in primary current expenditure.

which the measure of fiscal policy improves by at least 1.5 percent of GDP. Again, I distinguish between five different definitions:

Definition 1:

A (more than) 1.5 percentage point increase in the primary balance, as a percentage of GDP (PB),

Definition 2:

A (more than) 1.5 percentage point increase in the cyclically-adjusted primary balance, as a percentage of GDP, using the *Alesina measure* of fiscal impulse (AFI),

Definition 3:

A (more than) 1.5 percentage point increase in the cyclically-adjusted primary balance, as a percentage of GDP, using the *Blanchard measure* of fiscal impulse (BFI),

Definition 4:

A (more than) 1.5 percentage point increase in the cyclically-adjusted primary balance, as a percentage of potential GDP, using the OECD measure (CAPB), and

Definition 5:

A (more than) 1.5 percentage point increase in the underlying primary balance, as a percentage of potential GDP (CAPBU).

I show all periods of fiscal adjustments based on these five definitions in the Appendix. According to definition 1, there are 139 cases of fiscal adjustment. The number of cases decreases to 128 (definition 2), 125 (definition 3) and 96 (definition 4). A more restrictive

approach to control for cyclical effects reduces the number of observations, indicating how to best adjust for cyclical effects matters, even for the identification of large cases of fiscal adjustments. The number of cases as identified by definition 5 decreases again substantially, from 84 to 58. The difference between Definitions 4 and 5 is the exclusion of one-offs. A large share of periods identified by CAPS thus reflect large one-offs in capital transfers with no or limited impact on economic demand (GDP).

6. Results

Table 2 shows the estimated impact of discretionary changes in fiscal policy on GDP, using the full information for 30 OECD countries over the period 1980 to 2012, and without restricting the sample size to particular periods of fiscal consolidation.

The number of the column indicates the identification strategy, as outlined in Section 5 (Strategies 1 to 5). The table shows that positive changes in primary balances (fiscal adjustments) are associated with increasing GDP growth in the same year, without taking into account the problem of cyclical adjustment, suggesting evidence for the expansionary austerity view. The effect of a 1 percentage point increase in the primary balance is associated with a 0.12 percent increase in real GDP (Column 1). Using cyclically-adjusted data, however, changes the results. The *Alesina measure* of fiscal impulse still shows a positive correlation with annual GDP growth, but it is insignificant (Column 2) and the positive effect is even less pronounced for the *Blanchard measure* (Column 3).

The relationship between the *OECD measure* and annual GDP growth is negative, but statistically not significant. After excluding one-offs in capital transfers, the results indicate a large negative impact of changes in underlying balances on GDP growth in the short run. According to the analysis in Sections 3 and 4, the results in Columns 1 to 3 may suffer from

incomplete cyclical adjustments. While the measure of fiscal impulse in Column 4 includes one-offs, Column 5 shows that the negative effect of fiscal adjustments on GDP is particularly pronounced after excluding one-offs in capital transfers. One-offs in capital transfers thus distort the findings in previous analyses that do not control for capital transfers, at least if the object of interest is not the macroeconomic effects of one-offs in capital transfers, but the effect of adjustments in current revenues or current primary spending.

Another key finding in the literature on expansionary austerity involves the composition of changes in fiscal policy (Alesina and Perotti, 1995; Alesina and Ardagna, 1998, 2010, 2012). Table 3 shows the estimated effect of a 1 percentage point increase in three different components of the primary balance (current revenues, current primary expenditures, and net capital outlays, respectively). Column 1 shows that both increases in revenues and increases in expenditures negatively correlate with GDP. Thus, a reduction in (current) expenditures should be associated with increasing GDP (expansionary austerity). This interpretation, however, ignores the issue of cyclical adjustment.

Columns 2 and 3 show the results for the AFI and BFI, respectively. While the estimated impact of revenue-based adjustments remains unchanged, the estimated coefficient for increases in current primary spending decreases (from -0.6 to -0.2), but is statistically significant in Columns 1, 2, and 3. The results are very much in line with the evidence presented in previous studies (e.g. Alesina and Ardagana, 2010). However, it is possible that these results are to some extent reflecting a problem of imperfect cyclical adjustment (Kollintzas, 1995).

Using the OECD measure, the impact of increasing (current) spending on annual GDP growth is the opposite (Column 4 of Table 3). That is, contrary to previous findings, current spending now has a positive effect on GDP. This indicates that the first results (Columns 1, 2, and 3) suffer from incomplete cyclical adjustment, which biases the coefficient towards non-Keynesian effects. If cyclical unemployment and cyclical GDP are not perfectly correlated,

the BFI fails to control for cyclical effects in budgetary positions (as shares of GDP), which turns out to be particularly pronounced for current expenditures (because they are assumed to be inelastic, so that the ratio of expenditures as a share of GDP exhibits large fluctuations, while the ratio of taxes (as a share of GDP) does not, if the elasticity is approximately one).

The results remain robust after excluding one-offs in capital transfers (Column 6 of table 3). The effect of increasing primary expenditures becomes even more pronounced and statistically significant. This result contrasts with previous findings based on other definitions of discretionary changes in fiscal policy (Columns 1 to 3). The exclusion of one-offs in capital transfers, however, does not change the insignificant effects of changes in (net) capital outlays on GDP. It is, thus, conceivable that changes in (net) capital transfers do not have a strong impact on economic activity in the short run compared to current spending. The essential finding in Table 3 is that the positive correlation of increases in government spending with GDP changes into a negative one, after controlling for cyclical effects and the influence of one-offs in capital transfers. According to Columns 5 and 6, the effect of decreases in (cyclically-adjusted or underlying) current primary spending on GDP is not less pronounced than the effect of tax cuts. This result indicates that the composition of fiscal adjustment is unimportant for the effects on GDP. Specifically, the effects of spending-side adjustments are not less contractive than tax cuts.

7. Cases of Fiscal Adjustments

I compare the macroeconomic effects of large cases of fiscal adjustment based on five different definitions of fiscal adjustment (Definitions 1 to 5). Following Alesina and Ardagna (2010), I exclude country- and time-fixed effects from the analysis of particular episodes of fiscal consolidations.

a) Definition 1

The results in Table 4 are based on non-adjusted fiscal data (Definition 1). According to Perotti (2012), the problem of "imperfect cyclical adjustment" would bias the results towards an underestimation of the effects of fiscal policy on GDP. The effect of an improvement in the primary balance on GDP is negative, but statistically not significant at conventional levels (Column 1). Taking into account that the PB includes counter-cyclical feedback of automatic stabilizers, it is conceivable that the coefficient could be biased toward showing a positive correlation (imperfect cyclical adjustment), reflecting the positive response (of budget balances to GDP). A look at the results in Column 2 suggests that both spending cuts and tax cuts might have a positive influence on GDP. That is, spending cuts would increase GDP, even in the short run, providing support for the expansionary austerity hypothesis. However, this result may also be flawed due to the problem of imperfect cyclical adjustment. If GDP is low, the expenditure-to-GDP ratio increases, showing a negative relationship between expenditures and GDP, without adjusting for cyclical fluctuations.

Column 3 of Table 4 suggests that fiscal adjustments are less damaging for GDP if they involve mainly (current primary) expenditure cuts. The results based on Definition 1 suggest that the composition of budget cuts does matter. This is a finding very much in accordance with the results of the literature on expansionary austerity, but probably biased because the effects of automatic stabilization have been ignored.

b) Definition 2

Table 5 shows the results when fiscal adjustments are measured according to *Definition 2*. The fiscal data are cyclically adjusted, based on the *Alesina method*. The cases identified by this method do not differ substantially from those found under *Definition 1* (see the

Appendix). Under Definition 2, increasing primary balances have a significant negative influence on GDP, suggesting that large fiscal adjustments tend to decrease growth (Column 1 of Table 5). This effect, however, is mainly based on the contractive effect of increases in current revenues, rather than on current primary expenditures, while (net) capital outlays have a positive influence on GDP (Column 2). Despite the fact that the expansionary effect of spending cuts is not significant, column 3 indicates that the composition of fiscal adjustments influences the macroeconomic effects, so that spending-based adjustments seem to be less harmful for growth.[23]

c) *Definition 3*

Table 6 replicates the analysis, this time with fiscal adjustments measured according to *Definition 3*. The fiscal data are cyclically adjusted based on the *Blanchard measure*. The results are very similar to the results based on the *Alesina measure*. Specifically, while the effect of increases in primary balances is negative (Column 1), this effect is particularly pronounced for increases in revenues, while the adjustment of expenditures does not seem to influence GDP (Column 2). If adjustments are predominantly based on current spending, the effect on GDP might be less contractive, but the coefficient is not significant at conventional levels (Column 3). However, it is possible that both measures, the AFI and the BFI, fail to control for cyclical effects in primary balances (per GDP), as discussed in chapter three.

d) Definition 4

Table 7 presents the results of the analysis based on *Definition 4*. The fiscal data are cyclically adjusted according to the OECD method. According to this definition, both spending and tax-

[23] As stated in Alesina, the difference between results based on non-adjusted series and the AFI is low. It is, however, reasonable to assume that the way cyclical effects have been adjusted for influences the results.

based adjustments significantly reduce GDP. Column 1 indicates that large fiscal adjustments reduce growth; the result is significant at the 1 percent level. Column 2 suggests that an increase in primary expenditures, as well as in (net) capital outlays, increases growth, whereas increases in current revenues decrease growth. The findings are very pronounced and statistically significant. Column 3 shows that fiscal adjustments based on current (primary) expenditures more heavily affect growth compared to other contractive measures. This finding indicates that the composition of fiscal adjustments matters, but the sign of the coefficient is different from that of the previous analysis, and statistically significant. Contrary to previous findings, it is conceivable that fiscal adjustments that mainly involve current primary expenditures are particularly harmful for growth in the short run, according to the *OECD measure*.

e) Definition 5

Table 8 shows the results, based on Definition 3, after excluding one-offs in capital transfers. The estimated effect of fiscal adjustments on GDP is negative (Column 1). A one percentage point increase in fiscal adjustments would decrease GDP in the same year by 0.55 percentage points. The finding is significant at conventional levels, and in accord with previous work employing narrative methods. Column 2 shows that both tax increases and spending cuts are likely to have a significant positive effect on GDP, while the coefficient of (net) capital outlays is insignificant. Column 3 shows that the composition of fiscal adjustments is not likely to affect growth; the coefficient is positive, but statistically not significant.

8. Conclusion

The empirical literature on the macroeconomic effects of fiscal policy applies different ways of identifying discretionary changes in fiscal policy. The *data-based* or *conventional approach* examines changes in cyclically-adjusted budget balances and finds evidence for expansionary austerity; the *historical approach* uses historical information to identify discretionary changes in fiscal policy and finds that fiscal adjustments are contractive. I criticise the identification strategy as applied by a large body of the *data-based* literature (Alesina and Perotti, 1995 and 1996 and Alesina and Ardagna, 1998, 2010, 2012). Firstly, the cyclically adjustment procedure applied by Alesina and Perotti (1995) fails to control for cyclical effects, particularly in government expenditures. Secondly, the presence of one-offs in capital transfers biases the estimated effects of data-based analyses again towards non-Keynesian results.

I compare the macroeconomic effects of fiscal policy based on five different strategies for identifying fiscal policy changes. The five strategies are: (1) changes in (non-adjusted) primary budget balances (PB); (2) cyclically-adjusted balances (AFI), as suggested by Alesina and Perotti (1995); (3) cyclically-adjusted balances (BFI), as suggested by Blanchard (1990); (4) cyclically-adjusted primary balances, as computed by the OECD (CAPB); and (5) underlying primary balances (CAPBU), which excludes one-offs in capital transfers and which is, as I argue, a better measure of fiscal stance.

The estimations show that the way of adjusting for cyclical effects influences the results. While the results based on non-adjusted data, the AFI and BFI, suggest that expenditure-based consolidations are not contractive, and may even be expansionary, the results based on CAPB and UPB indicate that both revenue- and spending-based adjustments are associated with recessions.

My interpretation of these findings is that estimations based on changes in non-adjusted data (PB), the *Alesina measure* or the *Blanchard measure*, are prone to an incomplete cyclical adjustment problem. According to Perotti (2012), an incomplete cyclical adjustment can bias the results toward non-Keynesian effects of fiscal policy. The cyclical adjustment of PB, as well as the AFI, is particularly incomplete because it does not exclude cyclical fluctuations in government spending (as a ratio of GDP). Moreover, according to Kollintzas (1995), the AFI and BFI are ineffective at adjusting the ratios of government revenues and expenditures if the cyclical component of unemployment and GDP is not perfectly contemporarily correlated. The lagged (and varying) relationship between GDP and unemployment suggests that this criticism holds for both unemployment-adjusted measures of fiscal policy (AFI and BFI).

Consequently, if in a recession GDP decreases, but unemployment does not increase immediately, the ratio of expenditures per GDP will increase; however, AFI and BFI do not assign this to cyclical effects, but to a discretionary increase in the expenditure ratio. In this regard, the positive association of AFI or BFI with increasing expenditure ratios is a result of an incomplete cyclical adjustment, reflecting an increase of the denominator in expenditure ratios.

Moreover, the findings indicate that the exclusion of one-offs affects the results. Without controlling for one-offs in capital transfers, the results do not necessarily indicate that fiscal adjustments are contractive, while the results based on the underlying balance show that increases in primary balances (on average) negatively influence GDP (Table 2). Results based on the CAPB thus may underestimate the macroeconomic effects of fiscal policy, if, that is, the object of interest is not the effects of one-offs in capital transfers, but changes in current revenues or spending.

I propose using cyclically-adjusted measures, based on the OECD approach, and excluding one-off capital transfers in *data-based* / *conventional* analyses of fiscal policy. Using underlying balances, I show that the results of the *data-based* approach are in line with the

results of the narrative approach. Based on this strategy of identifying changes in fiscal policy, large fiscal adjustments (at the revenue- and spending-side) have sizeable contractive effects on GDP.

Table 1

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP growth	890	2.59	2.91	-14.21	12.27
GDP growth OECD	990	2.44	1.55	-3.60	4.84
Government debt	732	65.06	32.86	7.31	219.12
Δ PB	815	-0.02	2.35	-19.27	17.61
Δ R	765	0.09	1.05	-3.91	4.50
Δ E	760	0.20	1.36	-4.94	8.32
Δ CO	743	-0.10	1.68	-16.76	17.21
Δ CAPB (AFI)	738	0.02	2.34	-17.78	17.85
Δ CAR (AFI)	760	0.09	1.03	-3.54	3.97
Δ CAE (AFI)	750	0.17	1.20	-5.24	5.71
Δ CACO (AFI)	738	-0.09	1.66	-16.76	17.21
Δ CAPB (BFI)	738	0.04	2.28	-18.04	18.06
Δ CAR (BFI)	760	0.09	1.03	-3.54	3.97
Δ CAE (BFI)	750	0.15	1.17	-5.56	4.93
Δ CACO (BFI)	738	-0.09	1.66	-16.76	17.21
Δ CAPB (OECD)	687	-0.06	2.11	-19.93	16.41
Δ CAR (OECD)	690	-0.02	1.16	-5.63	6.19
Δ CAE (OECD)	714	0.14	1.02	-5.15	4.65
Δ CACO (OECD)	684	-0.11	1.66	-15.45	15.75
Δ CAPBU	677	-0.06	1.42	-5.97	6.40
Δ CARU	683	-0.03	1.16	-5.65	6.13
Δ CAEU	711	0.10	1.16	-5.78	4.83
Δ CACOU	677	-0.06	0.35	-3.42	1.47

Source: OECD Economic Outlook, own calculation.

Table 2

GDP Growth and Different Measures of Fiscal Policy

	(1)	(2)	(3)	(4)	(5)
GDP growth (-1)	0.478***	0.492***	0.495***	0.529***	0.533***
	(0.040)	(0.047)	(0.047)	(0.045)	(0.043)
GDP growth (-2)	-0.123	-0.047	-0.046	-0.121	-0.139
	(0.078)	(0.054)	(0.054)	(0.085)	(0.086)
OECD growth (-1)	-0.228***	-0.224***	-0.222***	-0.214**	-0.170**
	(0.067)	(0.070)	(0.070)	(0.082)	(0.068)
Debt (-1)	-0.006	-0.002	-0.001	-0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Δ PB	0.122***				
	(0.039)				
Δ CAPB, AAP		0.066			
		(0.044)			
Δ CAPB, BFI			0.042		
			(0.038)		
Δ CAPB, OECD				-0.061	
				(0.058)	
Δ CAPBU					-0.268***
					(0.093)
Observations	669	639	639	616	607
R-squared	0.640	0.647	0.645	0.662	0.675
Countries	29	27	27	30	30

Note: Dependent variable: Real GDP growth. Explanatory variables are changes of fiscal variables (PB, AFI, BFI, CAPB, CAPBU), lagged GDP growth, lagged GDP growth in OECD countries, and lagged government debt (as a percentage of GDP). All regressions include cross-section and period-fixed effects. Robust standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 3

GDP Growth and Revenue- vs. Spending-Based Fiscal Policy

	(1)	(2)	(3)	(4)	(5)
GDP growth (-1)	0.402***	0.500***	0.520***	0.540***	0.532***
	(0.057)	(0.049)	(0.045)	(0.042)	(0.043)
GDP growth (-2)	0.002	-0.007	-0.017	-0.132	-0.141
	(0.052)	(0.052)	(0.051)	(0.081)	(0.085)
OECD growth (-1)	-0.125**	-0.185***	-0.201***	-0.231**	-0.139**
	(0.061)	(0.065)	(0.067)	(0.085)	(0.062)
Debt (-1)	-0.009	-0.004	-0.001	-0.000	0.001
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
Δ Revenues	-0.196**	-0.225**	-0.242***	-0.254*	-0.229*
	(0.095)	(0.086)	(0.081)	(0.136)	(0.115)
Δ Expenditures	-0.584***	-0.371***	-0.214**	0.254*	0.313***
	(0.106)	(0.108)	(0.087)	(0.128)	(0.102)
Δ Net capital outlays	-0.046*	-0.065***	-0.074***	-0.024	-0.243
	(0.024)	(0.022)	(0.022)	(0.035)	(0.263)
Observations	640	639	639	613	607
R-squared	0.712	0.676	0.664	0.672	0.677
Countries	27	27	27	30	30

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (current revenues, current expenditures, net capital outlays, based on five strategies for identifying discretionary changes—PB, AFI, BFI, CAPB, and CAPBU), lagged GDP growth, lagged GDP growth in OECD countries, and lagged government debt (as a percentage of GDP). All regressions include cross-section and period-fixed effects. Robust standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 4

GDP Growth in Periods of Fiscal Adjustments (Definition 1)

	(1)	(2)	(3)
GDP growth (-1)	0.336***	0.459***	0.239**
	(0.092)	(0.100)	(0.094)
GDP growth (-2)	0.006	-0.001	0.053
	(0.070)	(0.064)	(0.070)
OECD growth (-1)	-0.019	-0.102	-0.010
	(0.145)	(0.128)	(0.140)
Debt (-1)	-0.032***	-0.018***	-0.029***
	(0.006)	(0.006)	(0.006)
Δ PB	-0.107		-0.076
	(0.093)		(0.091)
Δ R		-0.345*	
		(0.176)	
Δ E		-0.456***	
		(0.160)	
Δ CO		0.165**	
		(0.083)	
- Δ E/ Δ PB			1.468***
			(0.462)
Constant	4.802***	3.395***	4.108***
	(0.600)	(0.609)	(0.618)
Observations	119	115	117
R-squared	0.408	0.520	0.429

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (primary balance, current revenues, current primary expenditures, and net capital outlays), lagged GDP growth, lagged world GDP growth, and lagged government debt (as a percentage of GDP). Standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 5

GDP Growth in Periods of Fiscal Adjustments (Definition 2)

	(1)	(2)	(3)
GDP growth (-1)	0.489***	0.483***	0.468***
	(0.119)	(0.116)	(0.118)
GDP growth (-2)	-0.122	-0.042	-0.089
	(0.076)	(0.076)	(0.077)
OECD growth (-1)	-0.026	-0.031	-0.021
	(0.136)	(0.131)	(0.135)
Debt (-1)	-0.024***	-0.022***	-0.023***
	(0.006)	(0.006)	(0.006)
Δ PB	-0.201***		-0.199***
	(0.074)		(0.073)
Δ R		-0.660***	
		(0.188)	
Δ E		-0.124	
		(0.163)	
Δ CO		0.213***	
		(0.074)	
- Δ E/ Δ PB			0.862*
			(0.450)
Constant	4.189***	4.111***	3.845***
	(0.605)	(0.611)	(0.624)
Observations	109	109	109
R-squared	0.416	0.475	0.436

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (cyclically-adjusted primary balance, cyclically-adjusted current revenues, and cyclically-adjusted current primary expenditures, based on the AFI), lagged GDP growth, lagged world GDP growth, and lagged government debt (as a percentage of GDP). Standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 6

GDP Growth in Periods of Fiscal Adjustments (Definition 3)

	(1)	(2)	(3)
GDP growth (-1)	0.367***	0.421***	0.384***
	(0.117)	(0.116)	(0.117)
GDP growth (-2)	-0.134*	-0.068	-0.107
	(0.077)	(0.078)	(0.078)
OECD growth (-1)	0.056	0.013	0.049
	(0.130)	(0.126)	(0.129)
Debt (-1)	-0.020***	-0.015**	-0.017***
	(0.006)	(0.006)	(0.006)
Δ PB	-0.209***		-0.198**
	(0.076)		(0.075)
Δ R		-0.508***	
		(0.183)	
Δ E		-0.116	
		(0.159)	
Δ CO		0.214***	
		(0.076)	
- Δ E/ Δ PB			0.708
			(0.440)
Constant	3.907***	3.399***	3.416***
	(0.563)	(0.605)	(0.636)
Observations	103	103	103
R-squared	0.311	0.368	0.329

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (cyclically-adjusted primary balance, cyclically-adjusted current revenues, and cyclically-adjusted current primary expenditures, based on the BFI), lagged GDP growth, lagged world GDP growth, and lagged government debt (as a percentage of GDP). S. E. in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 7

GDP Growth in Periods of Fiscal Adjustments (Definition 4)

	(1)	(2)	(4)
GDP growth (-1)	0.778***	0.823***	0.818***
	(0.152)	(0.154)	(0.151)
GDP growth (-2)	-0.358***	-0.375***	-0.375***
	(0.102)	(0.102)	(0.101)
OECD growth (-1)	-0.136	-0.188	-0.170
	(0.201)	(0.203)	(0.199)
Debt (-1)	-0.018*	-0.015	-0.018*
	(0.009)	(0.009)	(0.009)
Δ CAPB	-0.407***		-0.422***
	(0.120)		(0.118)
Δ CAR		-0.629**	
		(0.290)	
Δ CAE		0.882***	
		(0.288)	
Δ CO		0.389***	
		(0.121)	
- Δ CAE/ Δ CAPB			-1.224*
			(0.681)
Constant	3.867***	4.118***	4.222***
	(0.910)	(0.970)	(0.918)
Observations	84	83	84
R-squared	0.486	0.512	0.507

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (cyclically-adjusted primary balance, cyclically-adjusted current revenues, and cyclically-adjusted current primary expenditures, based on the *OECD measure*), lagged GDP growth, lagged world GDP growth, and lagged government debt (as a percentage of GDP). Standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

Table 8

GDP Growth in Periods of Fiscal Adjustments (Definition 5)

	(1)	(2)	(3)
GDP growth (-1)	1.007***	1.044***	1.008***
	(0.158)	(0.156)	(0.159)
GDP growth (-2)	-0.438***	-0.415***	-0.437***
	(0.143)	(0.141)	(0.144)
OECD growth (-1)	-0.324	-0.295	-0.334
	(0.247)	(0.244)	(0.250)
Debt (-1)	-0.015	-0.011	-0.015
	(0.011)	(0.011)	(0.011)
ΔCAPBU	-0.547*		-0.548*
	(0.317)		(0.320)
ΔCARU		-0.714*	
		(0.371)	
ΔCAEU		0.474	
		(0.326)	
ΔCO		-1.303	
		(1.090)	
-ΔCAEU/ΔCAPBU			0.273
			(0.631)
Constant	3.567***	2.960**	3.410**
	(1.232)	(1.254)	(1.294)
Observations	58	58	58
R-squared	0.623	0.650	0.624

Note: Dependent variable: GDP growth. Explanatory variables are changes of fiscal variables (underlying primary balance, underlying current revenues, and underlying current primary expenditures, based on Definition 5), lagged GDP growth, lagged world GDP growth, and lagged government debt (as a percentage of GDP). Standard errors in parentheses. *, **, *** indicate significance at the 10, 5, 1% level, respectively.

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Appendix

Table A.1

Episodes of Fiscal Adjustments (Definition 1)

Australia	1998, 2011
Austria	1984, 1996, 1997, 2001, 2005, 2011
Belgium	1982, 1984, 1987, 2006, 2010
Canada	1981, 1986, 1987, 1994, 1995, 1996, 1997
Czech Republic	1996, 2004, 2007, 2011
Denmark	1983, 1984, 1985, 1986, 2004, 2005
Estonia	1997, 2000, 2010
Finland	1984, 1988, 1994, 1996, 1997, 1998, 2000, 2011
France	1996, 2011
Germany	1996, 2000, 2006, 2007, 2011
Greece	1996, 1998, 2005, 2010, 2011
Hungary	1996, 1999, 2003, 2007, 2011
Iceland	1984, 1987, 1990, 1995, 2004, 2005, 2009, 2011, 2012
Ireland	2000, 2011, 2012
Israel	
Italy	1982, 1992, 1995, 1997, 2007
Japan	1984, 1999, 2004, 2006
Korea	2000, 2004, 2010
Luxemburg	1993, 1997, 2000, 2007
Netherlands	1991, 1996
New Zealand	1987, 1989, 1993, 1994, 2000, 2002, 2011, 2012
Norway	1983, 1985, 1994, 1995, 1996, 1997, 1999, 2000, 2004, 2005, 2006, 2011
Poland	2011
Portugal	1982, 1983, 1988, 2006, 2011
Slovenia	1996, 2012
Spain	1986, 1987, 1996, 2010
Sweden	1981, 1984, 1986, 1987, 1994, 1995, 1996, 1997, 1998, 2000, 2005
Switzerland	
United Kingdom	1982, 1988, 1996, 1997, 1998, 2000, 2010, 2011
United States	

Source: OECD Economic Outlook No. 93; own calculations.

Table A.2

Episodes of Fiscal Adjustments (Definition 2)

Australia	2011
Austria	1984, 1996, 1997, 2001, 2005, 2011
Belgium	1982, 1984, 1987, 2006, 2010
Canada	1981, 1986, 1987, 1995, 1996, 1997
Czech Republic	1996, 1999, 2004
Denmark	1983, 1984, 1985, 1986, 2004, 2005
Estonia	
Finland	1984, 1988, 1994, 1996, 1997, 1998, 2000
France	1996, 2011
Germany	1996, 2000, 2011
Greece	1996, 1998, 2005, 2010, 2011
Hungary	1996, 1998, 2003, 2007, 2011
Iceland	1984, 1987, 1990, 1992, 1997, 2004, 2005, 2009, 2011, 2012
Ireland	2011, 2012
Israel	
Italy	1982, 1990, 1991, 1992, 1997, 2006, 2007
Japan	1984, 1999, 2001, 2006
Korea	2000, 2004, 2010
Luxemburg	
Netherlands	1985, 1991, 1996
New Zealand	1987, 1989, 1991, 1993, 2002, 2011, 2012
Norway	1983, 1985, 1994, 1995, 1996, 1999, 2000, 2004, 2005, 2006, 2011
Poland	1999, 2011
Portugal	1982, 1983, 1995, 2002, 2006, 2007, 2011
Slovenia	2012
Spain	1983, 1987, 1992, 2010
Sweden	1981, 1983, 1984, 1986, 1987, 1994, 1995, 1996, 1997, 1998, 2000, 2004, 2005
Switzerland	2003
United Kingdom	1982, 1997, 1998, 2000, 2010, 2011
United States	

Source: OECD Economic Outlook No. 93; own calculations.

Table A.3

Episodes of Fiscal Adjustments (Definition 3)

Australia	
Austria	1984, 1996, 1997, 2001, 2005, 2011
Belgium	1982, 1984, 1987, 2006, 2010
Canada	1981, 1996, 1997
Czech Republic	1996, 1999, 2004
Denmark	1983, 1984, 1986, 2004, 2005, 2010
Estonia	
Finland	1981, 1984, 1988, 1994, 1996, 1998, 2000
France	1996, 2011
Germany	1996, 2000, 2011
Greece	1996, 2005, 2010
Hungary	1996, 1998, 2003, 2007, 2011
Iceland	1984, 1987, 1990, 1992, 1997, 2004, 2005, 2009, 2011, 2012
Ireland	2011, 2012
Israel	
Italy	1982, 1990, 1991, 1992, 1997, 2000, 2006, 2007
Japan	1984, 1999, 2001, 2006
Korea	2000, 2004, 2010
Luxemburg	
Netherlands	1983, 1991, 1993, 1996, 2004
New Zealand	1987, 1989, 1991, 1993, 2002, 2011, 2012
Norway	1983, 1989, 1995, 1996, 1999, 2000, 2004, 2005, 2008, 2010, 2011
Poland	2011
Portugal	1982, 1983, 1988, 1995, 2002, 2006, 2007, 2011
Slovenia	2002, 2012
Spain	1983, 1987, 1992, 1994, 2010
Sweden	1981, 1983, 1984, 1986, 1987, 1994, 1995, 1996, 1997, 2004, 2005
Switzerland	2003
United Kingdom	1981, 1982, 2000, 2010, 2011
United States	

Source: OECD Economic Outlook No. 93; own calculations.

Table A.4

Episodes of Fiscal Adjustments (Definition 4)

Australia	2011
Austria	1996, 1997, 2001, 2005, 2011
Belgium	1993, 2006
Canada	1986, 1987, 1995, 1996, 1997
Czech Republic	1999, 2004
Denmark	2004, 2005
Estonia	2009
Finland	1988, 1994, 1996, 1998, 2000
France	1996, 2011
Germany	1996, 2000, 2011
Greece	1996, 1998, 2005, 2010, 2011
Hungary	1999, 2007, 2008, 2009, 2011
Iceland	1984, 1990, 1992, 1995, 2004, 2005, 2009, 2010, 2011, 2012
Ireland	2011, 2012
Israel	
Italy	1991, 1992, 1993, 1997, 2007, 2012
Japan	1999, 2006
Korea	2000, 2004, 2010
Luxemburg	1997
Netherlands	1991, 1993, 1996, 2004, 2010
New Zealand	1987, 1989, 1993, 1994, 2000, 2011
Norway	1983, 1994, 1995
Poland	2011, 2012
Portugal	1992, 2002, 2006, 2011
Slovenia	2012
Spain	1992, 1996, 2010
Sweden	1994, 1996, 1997, 2000
Switzerland	
United Kingdom	1996, 1997, 1998, 2000, 2010, 2011
United States	

Source: OECD Economic Outlook No. 93; own calculations.

Table A.5

Episodes of Fiscal Adjustments (Definition 5)

Australia	2011
Austria	1996, 1997, 2001
Belgium	1993
Canada	1995, 1996, 1997
Czech Republic	2004, 2012
Denmark	2005
Estonia	2009
Finland	1988, 1994, 1996, 1998, 2000
France	2011
Germany	
Greece	2010, 2011, 2012
Hungary	2007, 2012
Iceland	1984, 1995, 2005, 2010, 2011, 2012
Ireland	2010, 2011, 2012
Israel	2004
Italy	1993, 1995, 2012
Japan	
Korea	2000
Luxemburg	1997
Netherlands	1991, 1993
New Zealand	1993, 1994, 2000
Norway	1983, 1994, 1995, 2000
Poland	2011, 2012
Portugal	1992, 2006, 2011
Slovenia	2012
Spain	1992, 1996, 2010, 2012
Sweden	1996, 1997, 2005
Switzerland	2000
United Kingdom	1997, 1998, 2011
United States	

Source: OECD Economic Outlook No. 93; own calculations.

Table A.6

Estimated Elasticities, Equation (5)

Country	Transfers	Current Revenues	Current Expenditures
Australia	0.325	-0.323	0.741
Austria	0.458	0.232	0.877
Belgium	0.346	0.553	0.729
Canada	0.675	0.324	1.461
Czech Republic	0.165	-0.004	0.431
Denmark	0.522	-0.198	1.053
Estonia	0.306	-	0.704
Finland	0.748	0.533	1.054
France	0.314	0.390	0.628
Germany	0.488	-0.256	0.185
Greece	0.149	0.275	0.423
Hungary	0.253	0.432	0.232
Iceland	0.514	-1.197	0.215
Ireland	0.554	0.247	0.830
Israel	0.099	-	-
Italy	0.171	0.839	0.054
Japan	0.430	-1.191	1.388
Korea	0.102	0.405	0.467
Luxembourg	0.736	-0.288	-
Netherlands	0.632	0.578	0.941
New Zealand	0.608	-0.468	0.575
Norway	1.219	0.062	2.509
Poland	0.101	-0.162	0.044
Portugal	0.320	-0.295	0.160
Slovenia	0.667	0.524	1.329
Spain	0.256	-0.139	0.416
Sweden	0.404	0.109	0.822
Switzerland	0.783	0.185	1.421
United Kingdom	0.599	0.136	1.012
United States	0.525	-0.563	1.043

Note: The elasticities are computed using Equation (5), based on the suggestions by Blanchard (1990) and the method proposed by Alesina and Perotti (1995) and Alesina and Ardagna (2010).

Supplementary Material

In figure A.1, I use Germany as an example to illustrate the influence of one-off capital transfers on CAPB. It shows three indicators of fiscal policy over the period 1991 to 2012 for Germany. One series shows the (non-adjusted) general government primary balance (PB), the second is cyclically-adjusted (CAPB), and the third series shows the underlying primary balance (CAPBU) after excluding one-offs in capital transfers. Figure A.2 shows the annual changes in the three balances as shown in Figure A.1, as well as the *Alesina measure* (AFI) and the *Blanchard measure* (BFI).[24]

According to Alesina and Perotti (1995) and Alesina and Ardagna (2011), a large change in fiscal policy is an annual change of more than 1.5 percentage points of GDP. Between 1991 and 2007, Alesina and Ardagna (2010) identify four cases of large changes in fiscal policy in Germany. Based on their identification strategy, there have been two cases of fiscal stimuli (1995 and 2001) and two cases of fiscal adjustments (1996 and 2000). Other studies, however, do not identify 1996 and 2000 as periods of fiscal adjustments (e.g., Breuer et al., 2011). Figure 2 show that all four periods of changes in fiscal policy as identified by Alesina and Ardagna (2010) reflect one-off expenditures. As discussed by Leigh et al. (2010), the increase in the German general government budget balance in 1995 does not reflect discretionary fiscal policy, but one-off expenditures. The one-off in 1995 reflects an accounting operation in the aftermath of German Reunification (Guajardo et al., 2011). In 1995, the German general government incurred the financial liabilities of former East German state-owned companies (*Treuhandanstalt*).

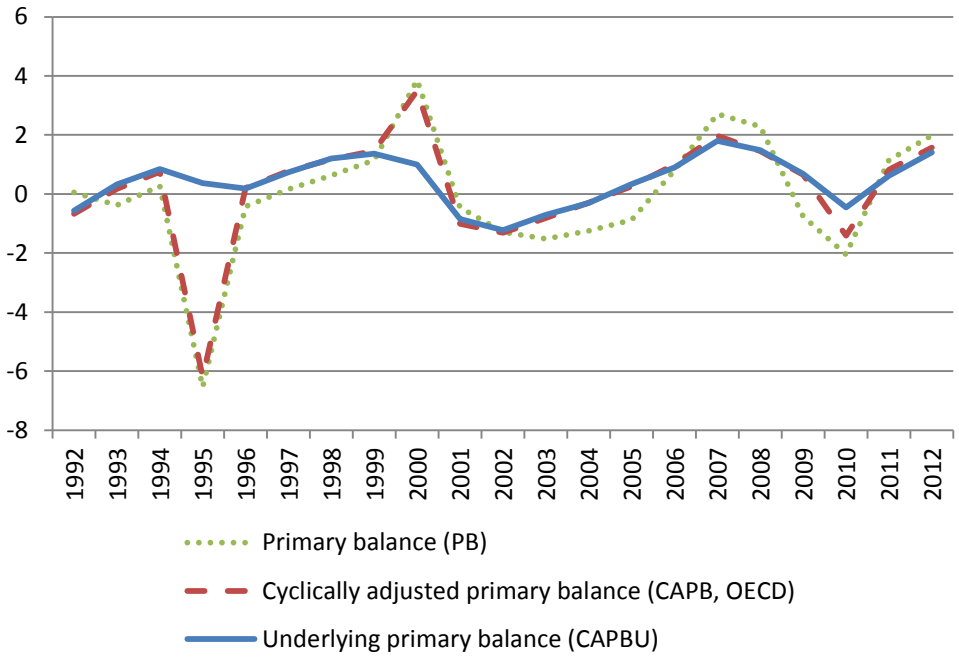
The change in 2000 involves one-off revenues from a UMTS license auction.[25] The changes in 1996 and 2001 reflect that the effects of 1995 and 2000 disappeared in the budget of the next year. Figure A.2 shows that—without controlling for one-off expenditures in capital transfers—the change in the CAPS in all four periods is greater than 1.5 percentage points because of two outliers in capital expenditures. Only the expansion in 2001 appears to be a fiscal stimulus, after exclusion of one-offs, since Germany enacted an additional corporate tax reform in 2001. The estimated stimulus in this year decreases, however, to a large extent. This example shows that one-off operations influence the government budget through net capital transfers and thus undermine the accuracy of CAPS as a measure of discretionary change.

[24] Since AFI and BFI correct only for year-over-year changes, I only express these measures as changes in fiscal policy, but do not included them in Figure 1.

[25] According to the German Federal Ministry of Finance (2000), the yield of 99.4 bn. DM (50.8 bn Euro) is posted as sales of nonfinancial assets, so that "general government will show a clear surplus in 2000."

Figure S.1

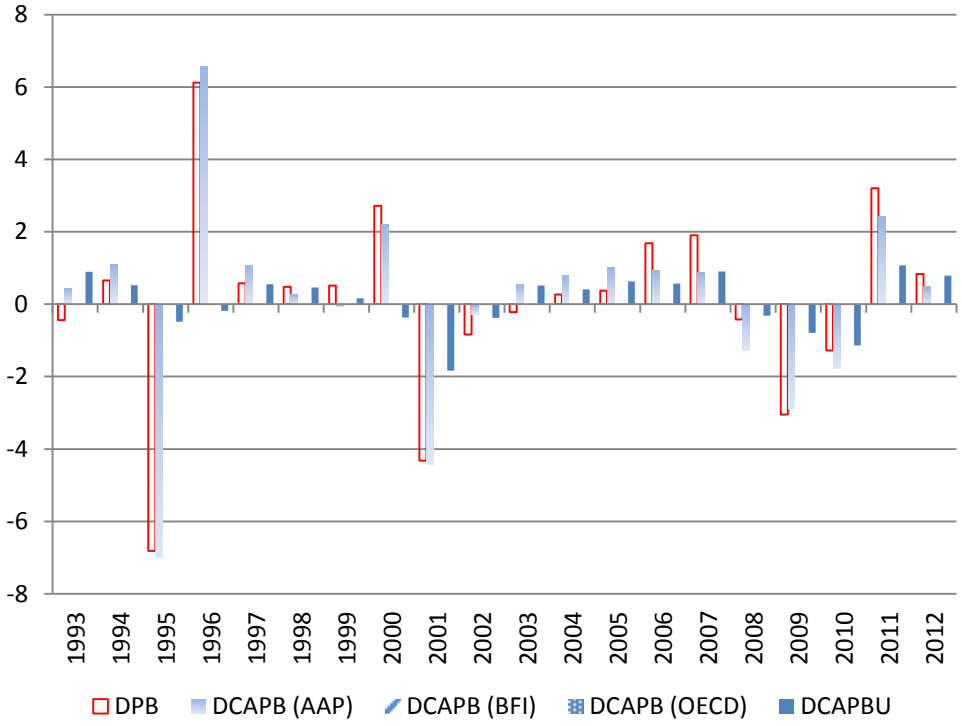
PB, CAPB, and CAPBU as a Share of (Potential) GDP, Germany



Source: OECD Economic Outlook Database, No. 93.

Figure S.2

Different Measures of Fiscal Policy, Germany



Source: OECD Economic Outlook Database, No. 93; own calculations.