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Planned Fiscal Consolidation and Under-Estimated Multipliers: Revisiting the Evidence and Relevance for the Euro Area

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Abstract

The Great Financial Crisis caused a deep recession and led to very large public deficits. When financial market tensions erupted, many European countries were forced to reduce their deficits. This 'austerity' is often credited with the disappointingly slow recovery during the years after the financial crisis. One reason for such a slow recovery could have been that the impact of a reduction in the fiscal deficits is larger than anticipated during a recession, especially if it is accompanied by financial market tensions. At the height of the financial crisis and in its immediate aftermath, this might not have been properly taken into account.

Blanchard and Leigh (2013) pioneered a novel approach which suggests that one can recover the under-estimation of fiscal policy multipliers by examining the link between surprises in output growth and planned fiscal consolidation.

In this paper, we provide an analytical framework for this approach, which clearly shows that one cannot just explain output surprises with planned fiscal consolidation. One also has to take into account actual fiscal consolidations (which are sometimes not highly correlated with the planned fiscal adjustments).

We also replicate the Blanchard and Leigh approach using the (spring) forecasts released by the European Commission between 2004 and 2019, finding that fiscal multipliers were higher than assumed in forecasts mainly in one particular crisis year, i.e. 2011, but the best estimate of the true multiplier never exceeds one.

We conclude that the narrative whereby austerity had large, and not properly anticipated negative effects, on output growth is simply not validated by the available data.

1. Introduction

During recessions, especially during recessions accompanied by financial stress, the fiscal multiplier (measuring the impact that increases of deficit spending will produce on output) should be higher because more agents (both households and firms) are more likely to be cash constrained (DeLong et al., 2012).

The hypothesis advanced by Blanchard and Leigh (2013) is that during the aftermath of the late 2000s Great Financial Crisis policymakers might not have considered these arguments, stating that multipliers could be higher than normal. They propose to test this hypothesis by relating planned fiscal consolidations to surprises in growth. They argue that if forecasters under-estimate the multipliers, growth should be lower than expected for countries undertaking a fiscal consolidation, which they define as a lower structural fiscal balance, as measured by staff working for the International Monetary Fund (IMF).

The basis of the approach proposed by Blanchard and Leigh (the BL approach) is that a correlation between planned fiscal consolidation and growth surprises constitutes evidence for an under- or over-estimate of the fiscal multipliers used in budgetary planning. This is because if the planners had used the right multiplier, growth surprises should not be correlated with the size of the planned consolidation. However, this argument also applies to actual fiscal consolidation. The size of the actual fiscal consolidation implemented should not be correlated with growth surprises if the planners had used the correct multiplier – in other words, if the forecasts are unbiased. We show more formally within a simple analytical framework that a regression of growth surprises on actual fiscal consolidation should in principle also yield an estimate of the difference between the actual multiplier and the one used by the forecasters.

The BL approach links (ex-post) growth forecast errors to (ex-ante) planned fiscal consolidation. The actual deficit does not appear at all in the regressions. Neglecting the actual deficit would not be a matter of interest if only the planned and the actual fiscal consolidation were very highly correlated. However, we document below that this is not always the case. For many years one finds that the correlation between the actual and the planned fiscal consolidation is rather low.

Ignoring the importance of actual fiscal policy introduces an omitted variable bias because the decision not to implement a fiscal plan is very likely to be related to actual growth and thus to the growth surprise which will be measured ex post.

One advantage of linking planned fiscal consolidations to growth surprises is that the value of the fiscal adjustment planned in a certain year is not subject to revision. However, the variable to be explained, i.e. growth surprises, is also revised as new data about actual growth becomes available. Estimates of the growth of real GDP can be assumed to be rather stable over time, at least for advanced countries with strong national accounting frameworks[1].

[1] However, we found that, using the IMF's WEO April 2019 data vintage as the data source for growth, the results are slightly different from the ones taken from the Blanchard and Leigh 2012 and 2013 publications, given that they used the growth rates as measured at that time.

One problem which the BL approach cannot avoid is that of defining the fiscal stance. It argues that the change in the structural balance of general government constitutes the appropriate measure of fiscal policy, and thus the basis for the multiplier to be estimated. The structural balance is defined as the actual balance adjusted for the effect of the cycle and one-off items which might be counted as expenditure, such as bank rescue operations. The latter affected a number of countries in the aftermath of the financial crisis. This means that it is preferable to use the structural balance, instead of the cyclically adjusted balance.

The cyclical adjustment, which is the first step in calculating the structural balance, creates conceptual problems because any statistic of the change in the structural balance cannot be divorced from a view about the evolution of the output gap. The output gap is defined as the difference between actual and potential output. There is a large body of literature on the measurement of potential output and the output gap (Kangur et al., 2019; see Blondeau et al., 2021 for an explanation of the approach used by the European Commission and the replication software) without any clear conclusion on which method is best. Different international organisations (the European Commission, OECD, IMF etc.) employ different methods and thus (sometimes) arrive at rather different results.

Estimates of the output gap became particularly variable when the financial crisis led to large falls in output, suggesting that potential output had been lower than previously estimated as the fall in output was not accompanied by deflation. What is called 'planned' fiscal consolidation by Blanchard and Leigh is thus in reality the result of IMF staff making a judgement on the likely change in the headline deficit combined with a view concerning the change in the output gap. Another organisation might have a different definition of the output gap and thus could come to quite different conclusions regarding the fiscal stance. The importance of these differences will be documented below.

Existing contributions in the literature have used this approach of linking growth surprises to planned fiscal adjustment and have generally confirmed the original BL results (at least for the crisis period), see Ramey (2019) or Mohlmann and Suyker (2015). The exception is Cronin and McQuinn (2021), who find that 'multiplier estimates in the EU have been overestimated in the post-crisis period'. However, these papers do not explicitly consider which analytical framework would make this approach appropriate.

This paper proceeds as follows. The following section presents a simple analytical framework which formalises the idea that growth surprises should be linked to the difference between the true multiplier and those used in forecasts. This is followed by a brief description of the data used in our empirical work, showing the differences between forecasts made by IMF staff and those made by the European Commission, which are much more policy relevant. Section 4 then mainly presents the results using Commission data. Section 5 concludes.

2. Analytical framework

It is notoriously difficult to estimate the multiplier effect of fiscal policy (see Ramey, 2019 for a recent survey). One cannot just correlate actual fiscal policy with actual growth because fiscal policy not only influences demand, but also reacts to the overall state of the economy.

The BL approach seemed to provide a new avenue by focussing on growth surprises. It argues that the correlation between growth surprises and planned fiscal policy should yield information about the difference between the multiplier used to make forecasts and the real one. The purpose of this section is to provide a simple analytical framework to capture this basic idea.

We start with a simple definition of the growth forecast error, defined as:

Equation 1

$$growth\ forecast\ error \equiv y_{t+1} - F_t y_{t+1}$$

Following Blanchard and Leigh, we consider the forecast prepared in period t for t+1. But the growth refers to the percentage difference in GDP between t-1 and t. We use the notation F instead of the expectations operator E because the empirical work uses forecasts from international institutions, which do not necessarily represent optimal expectations (and maybe do not even reflect the expectations of the staff of these institutions as the forecasts have to be based on assumptions which may not be realistic. Moreover, the published forecasts are often subject to political pressure).

The two elements of the growth forecast error can now be described separately:

Actual growth is determined by the sum of potential growth, $\bar{y}$ (implicitly over the two-year period between t+1 and t) and the impact of the fiscal adjustment (the two-year change in the structural balance) denoted by sb_{t+1}. The key object of the exercise is the impact of the fiscal adjustment on output, which is given by the product of the actual fiscal adjustment (between t+1 and t-1) times the true multiplier, μ, plus a surprise term, an exogenous shock denoted by e_{t+1}., which is distributed i.i.d. with mean zero.

Equation 2

$$y_{t+1} = \bar{y} - \mu sb_{t+1} + e_{t+1}$$

The multiplier is defined as a positive value (a positive value for structural balance indicates a higher surplus, which should have a negative impact on demand).

Expected growth refers, for this line of research, to the growth forecast of the international organisation whose data is used in the empirical analysis. It is determined using the estimate by the government of potential growth, denoted by g_t, plus the forecast of the fiscal adjustment ($\widehat{sb}_{t+1}$) multiplied by the estimate of the fiscal multiplier, denoted by $\hat{\mu}$. The potential growth rate (as assumed by the forecaster) has a time index as it could vary over time (as new information about actual growth is released). However, as it will be shown below, this

element is not relevant for the cross-sectional correlations. Actual potential growth, $\bar{y}$, is assumed to be constant over time, but of course potentially different across countries. Beaudry and Willems (2022) analyse the factors which determine IMF growth forecasts (including the bias of mission chiefs).

The growth forecast is thus given by:

Equation 3

$$F_t y_{t+1} = g_t - \hat{\mu}\widehat{sb}_{t+1}$$

The forecasts considered in applied work are *de facto* of the institution whose data is analysed. These forecasts could be quite different from those of the government. In this sense it is not appropriate to speak of 'planned' fiscal consolidation.

A key element in equations (2) and (3) is the absence of any hysteresis effects (Fatás and Summers, 2016; Genchert et al., 2019). If fiscal policy had any delayed effects in future years, one would not be able to write the growth forecast as a function of the (change in) fiscal policy stance of only one year[2].

The growth forecast error is simply given by the difference between actual and forecasted growth (equation 1):

Equation 4

$$growth\ forecast\ error = \bar{y} - \mu sb_{t+1} - \left(g_t - \hat{\mu}\widehat{sb}_{t+1}\right) + e_{t+1}$$

Equation 5

$$growth\ forecast\ error = (\bar{y} - g_t) - \left(\mu sb_{t+1} - \hat{\mu}\widehat{sb}_{t+1}\right) + e_{t+1}$$

The surprise in growth is thus given by the sum of two elements, the over- or under-estimation of potential growth and the combined impact of the difference between estimated and real multipliers and actual versus planned fiscal adjustment. This second element can be split into the deficit implementation surprise times the true multiplier and the planned adjustment times the error in the multiplier.

Equation 6

$$growth\ forecast\ error = (\bar{y} - g_t) - \mu\left(sb_{t+1} - \widehat{sb}_{t+1}\right) + (\hat{\mu} - \mu)\widehat{sb}_{t+1} + e_{t+1}$$

The intuition that growth forecast errors and 'planned' fiscal adjustments should yield information about the differences between the assumed and the actual multiplier is thus fully confirmed in this simple set-up.

[2] This also implies that the two-stage procedure employed by Fatás and Summers (2018) is not valid. These authors use the predicted growth impact of planned fiscal consolidation as a proxy for the impact of fiscal policy on output in the short run for a second regression in which they explain longer run growth shortfalls. However, their first stage regression yields only an estimate of the impact of planned fiscal policy, not of actual fiscal policy.

However, the equation above is not the only way the determinants of the growth forecast error can be written. Another way would be to add and subtract $\hat{\mu}sb_{t+1}$, which yields:

Equation 7

$$growth\ forecast\ error = (\bar{y} - g_t) + \hat{\mu}\left(sb_{t+1} - \widehat{sb}_{t+1}\right) + (\hat{\mu} - \mu)sb_{t+1} + e_{t+1}$$

Given any actual structural surplus, a growth forecast error must follow if the multiplier used to make that growth forecast is wrong, and the forecast error should be proportional to the difference between the true multiplier and the one used to make the forecast. This immediately suggests that one could also relate growth forecast errors to actual fiscal consolidation and should expect the same result as using planned fiscal consolidation. This will be exploited more fully below.

The key question for Blanchard and Leigh is whether at a particular point in time, i.e. when the economy is in deep recession, the multiplier can be higher than assumed by the forecaster (Blanchard and Leigh use IMF data, and thus implicitly refer to the forecasts of IMF staff, which might not coincide with the budgetary planning done by the countries concerned). Blanchard and Leigh thus perform a cross-sectional analysis of the growth forecast error at time t, across a set of countries, indexed by i. In this simply analytical framework one should then estimate the following cross-section equation:

Equation 8

$$growth\ forecast\ error_{t,i} = \left(\bar{y}_i - g_{t,i}\right) - \mu_i\left(sb_{t+1,i} - \widehat{sb}_{t+1,i}\right) + (\hat{\mu}_i - \mu_i)\widehat{sb}_{t+1,i} + e_{t+1,i}$$

The cross-section analysis must be based on the assumption that the multipliers are the same across countries. This is a key assumption, which is difficult to maintain if one considers the underlying hypothesis of this work, namely that in the wake of a financial crisis the multiplier should be higher. This argument should logically also imply that if the financial systems of different countries are affected differently by a financial crisis, they should also experience different increases in multipliers. The period originally considered by Blanchard and Leigh was around 2010/11, which represents the aftermath of the global financial crisis that began in 2007/8. The sovereign debt crisis in the euro area, which peaked in 2011/12, had even more differentiated effects as the banking systems of some countries were impacted by considerable financial stress, while those of Germany and most northern European countries actually experienced capital inflows. The assumption that the multiplier for fiscal policy is the same thus seems particularly difficult to defend for the years Blanchard and Leigh chose to highlight to seek confirmation and validation for their approach.

However, the assumption that the fiscal multipliers are the same across countries is necessary to perform a cross-section analysis. The subscript i for the multipliers will therefore be henceforth suppressed[3].

[3] *A priori*, one would have thus expected that the financial stress within the euro area after 2010 would have led to a very different impact on the multipliers.

The time subscript can be left out for the cross-section regressions, which are performed here (and by Blanchard and Leigh). A key point is that Blanchard and Leigh only use one of the two variables from the right-hand side of equation (8), concentrating only on (the change in) the forecast for the fiscal balance, which they call the planned fiscal consolidation, estimating:

Equation 9

$$growth\ forecast\ error_i = \alpha + \beta\left(\widehat{sb}_i\right) + e_i$$

Where α represents the average forecast error made for the chosen group of countries (over the two-year period from which the data is taken), the parameter β measures the link between planned fiscal consolidation and the forecast error and e_i represents a country specific error term.

A regression of this type would indeed yield for α the average (across countries) error made in estimating potential growth.

However, the least squares estimate of β would recover an unbiased estimate of the difference between the actual multiplier and the one used in planning $(\hat{\mu} - \mu)$ only when the 'planned' fiscal consolidation is not correlated with other variables that might influence the growth outcome (for the following year). Blanchard and Leigh use the argument that expectations should not be correlated with surprises, but this argument could only be used if the forecasts were unbiased and efficient (using all available information)[4].

This is unlikely to be the case.

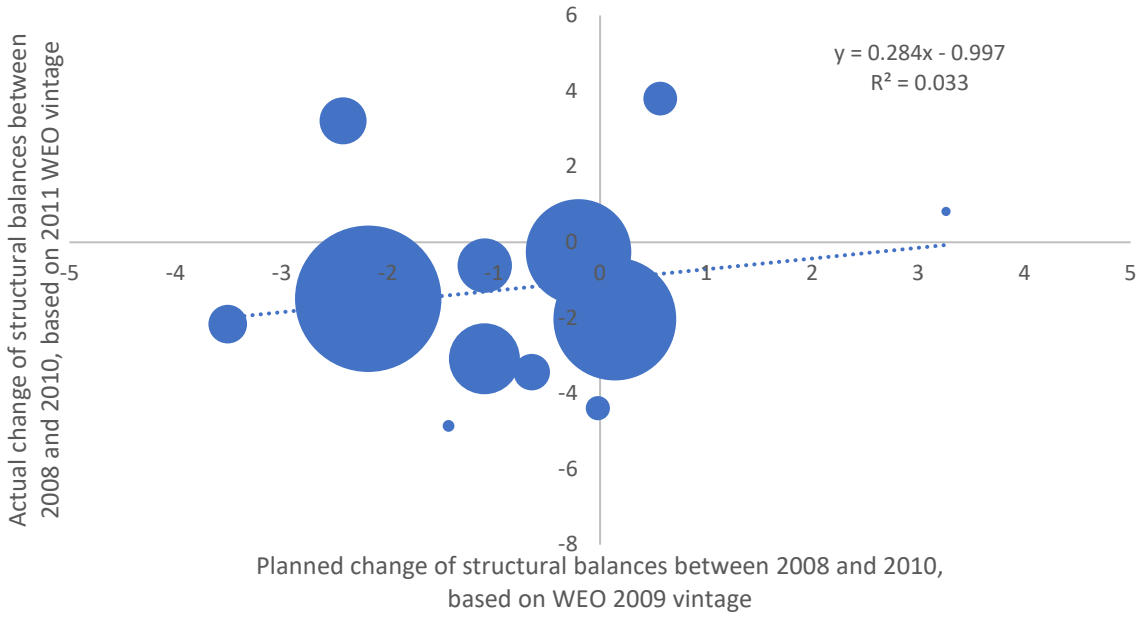
First of all, the forecasts made by IMF staff do not necessarily coincide with the official budgets or fiscal plans drawn up by its member governments.

Second, these budgets are rarely perfectly implemented – or, equivalently, IMF forecasts have a poor forecasting track record (see Genberg and Martinez, 2014). One cannot thus assume that $sb_{t+1,i} = \widehat{sb}_{t+1,i}$ is valid for all countries (during the year for which the data is being used). Paloviita and Ikonen (2018) find 'that budget balance forecasts are systematically biased and subject to mean reversion (tendency towards more balanced budgets)'. For example, one finds that the difference between the structural balance adjustment (i.e. the structural balance change between 2010 and 2008) actually implemented (as measured by the 2011 WEO vintage) and the forecasted adjustment (as measured by the April 2009 WEO vintage) was on average minus 0.5 points of GDP (i.e., on average, the actual structural balance deteriorated by about 0.5 % of GDP more than the planned one). The standard error in the forecast error across euro area member countries was about 2.5 percentage points of GDP. The forecasted fiscal adjustment seems to represent a rather weak proxy of actual fiscal policy.

[4] Under the BL approach, one measures the correlation between growth forecasts errors and planned fiscal adjustment across countries, not over time. This is another reason why the question over whether growth forecasts are unbiased (over time) is not a key concern. The correlation is measured over the cross-section at one point in time. This implies that one has to take into account possible cross-sectional differences in (national) potential growth rates (real and expected).

The chart below shows that, using the data from WEO 2009 and 2011 vintages, the planned fiscal adjustment had no relationship with the actual one (as measured by the data from WEO 2011 vintage). For other years, one finds a much stronger correlation between planned and implemented fiscal adjustments. The year 2009, when the depth of the recession caused by the financial crisis became apparent, might indeed be a special case. But Blanchard and Leigh show a significant coefficient in their regressions for that year, using only the 'planned' fiscal consolidation. This is clearly not appropriate for that particular year.

Figure 1. Correlation between planned and actual fiscal adjustment (euro area sample)



Source: own calculations based on IMF data (WEO), April 2009 and 2011 vintages.
N.b. The bubble size indicates the GDP of each country.

The omitted variable would bias the estimate of β as a measure of the difference in multipliers, $(\hat{\mu} - \mu)$, if the implementation gap is correlated with the size of the planned fiscal adjustment (across countries). This might very well be the case in practice as countries with an especially ambitious adjustment plan are, *ceteris paribus*, more likely to fail when attempting to implement their plans. Paloviita and Ikonen (2018) find evidence of this.

2.1 Additional determinants of growth

Actual growth can also be impacted by other factors, besides fiscal policy. This is why the BL approach implements several robustness tests, including both the planned fiscal adjustment and other control variables. However, these additional factors that might impact growth should be treated in the same way as fiscal policy.

Consider for example the risk premium, which was one of the major new elements to emerge during the financial crisis.

Adding this factor, denoted by rp, adds one element to equation (2), ρrp_{t+1}, which is given by the product of the actual risk premium during the forecast period times the 'multiplier', i.e. the impact factor which shows the magnitude of the impact of any given risk premium on GDP, denoted here by ρ.

Equation 10

$$y_{t+1} = \bar{y} - \mu sb_{t+1} - \rho rp_{t+1}$$

(ρ is positive as a risk premium should have a negative impact on output).

Expected growth can also be written as the product of the expected risk premium $\widehat{rp}_{t+1}$times the expected impact multiplier of the risk premium on output $\hat{\rho}$. Expected growth should thus be given by:

Equation 11

$$E_t y_{t+1} = g_t - \hat{\mu}\widehat{sb}_{t+1} - \hat{\rho}\widehat{rp}_{t+1}$$

The growth forecast error is thus determined by:

Equation 12

$$growth\ forecast\ error = (\bar{y} - g_t) - \left(\mu sb_{t+1} - \hat{\mu}\widehat{sb}_{t+1}\right) - (\rho rp_{t+1} - \hat{\rho}\widehat{rp}_{t+1})$$

The surprise in growth is now given by the sum of three elements: the over- or under-estimation of potential growth, plus the combined impact of the difference between estimated and real multipliers on actual versus planned fiscal adjustment and on actual vs expected risk premium.

The risk premium element can also be split into the surprise element of the risk premium (which might turn out to be higher or lower than expected) times the true multiplier, and the expected risk premium times the error in the multiplier. The growth forecast error can therefore be reframed as:

Equation 13

$$growth\ forecast\ error = (\bar{y} - g_t) - \mu\left(sb_{t+1} - \widehat{sb}_{t+1}\right) + (\hat{\mu} - \mu)\widehat{sb}_{t+1}$$
$$-\rho(rp_{t+1} - \widehat{rp}_{t+1}) + (\hat{\rho} - \rho)\widehat{rp}_{t+1}$$

This implies that one should not just add the actual risk premium to the equation to be estimated. If the impact of the risk premium has been properly anticipated, i.e. if $\hat{\rho} = \rho$, one would not expect to find a significant coefficient of the (expected) risk premium. Unfortunately, there is no available data for the risk premium forecasters expected for the following period: Blanchard and Leigh thus use actual data. If the risk premium follows a random walk (which should be the case in efficient markets), the actual data should constitute a good proxy of the expected risk premium.

2.2 Insights from the analytical framework

The simple analytical framework proposed here delivers three insights:

Firstly, it shows that one can recover estimates of mistaken multipliers used in forecasts from the data pertaining to both actual and planned fiscal consolidations. One can directly recover an estimate of the actual multiplier from the correlation between growth surprises and fiscal policy surprises. The coefficients of the regression, including additional factors that determine growth, should also be interpreted as representing the difference between the actual multipliers and those used in forecasting.

The second insight delivered by the analytical framework refers to the multipliers' magnitude. This is important because Blanchard and Leigh find that actual multipliers were about one point higher than implicitly assumed during the years following the financial crisis. They then combined this with their presumption that the pre-crisis literature suggested a multiplier of about 0.5 (based on Spilimbergo et al., 2009). This would suggest that the overall multiplier was about 1.5 during the crisis years. This hypothesis will be tested below.

Finally, the third insight relates to the best method of checking the robustness of Blanchard and Leigh's results. The BL approach finds that the correlation between planned fiscal consolidation and growth surprises holds up in all cases and that none of the controls have a significant impact on growth surprises. This should be expected if in all these cases the 'multiplier' of the control variable was correctly incorporated into fiscal plans.

3. Data

In our empirical work we rely on two sources: First, we simply use the replication dataset provided by Blanchard and Leigh. Second, we collected the relevant variables (real GDP, fiscal balance, structural fiscal balance and the output gap) ourselves from two sources, the IMF's World Economic Outlook (WEO) and the European Commission's 'Annual Macroeconomic Database' (AMECO).

We collected each variable from all available vintages for the Spring editions of the WEO and AMECO databases from 2004 to 2019. This means that the databases contain up to 15 values for a single variable. Time t in the regression tables refers to data included in spring forecasts released in time t-1. For instance, the year 2011 in the regression table contains the data of spring 2010 forecasts (for planned variables) and of spring 2019 forecasts (for actual/ex-post variables). The planned structural fiscal balance (for any given country) in year t is available as

a forecast a year earlier (t-1), then again as an estimate based on partial data for the same year, t, and as a first estimate based on actual data in year t+1. This process is reiterated every year up to 2019.

In the replication exercise we use a sample of 26 countries which was at the centre of Blanchard and Leigh's publication (27 EU Member States minus Estonia, Latvia and Lithuania plus Iceland, Norway and Switzerland).

In our own empirical analysis on Europe, we work with two samples: EU countries (28 minus Croatia but including the UK, as the data runs up until 2019, before the UK's official departure from the EU) and euro area countries (19), wherever past vintages of the European Commission database (AMECO) provide data for all countries.

3.1 WEO versus AMECO databases

In our own work we concentrate on the results based on European Commission data because the projected fiscal adjustment has important political implications in the context of the EU's fiscal rules. These rules apply formally to all EU Member States. The only difference between euro area and non-euro area members is that the potential sanctions for 'excessive deficits' apply only to those countries which use the euro. We thus present the results for both samples, the euro area and the entire EU.

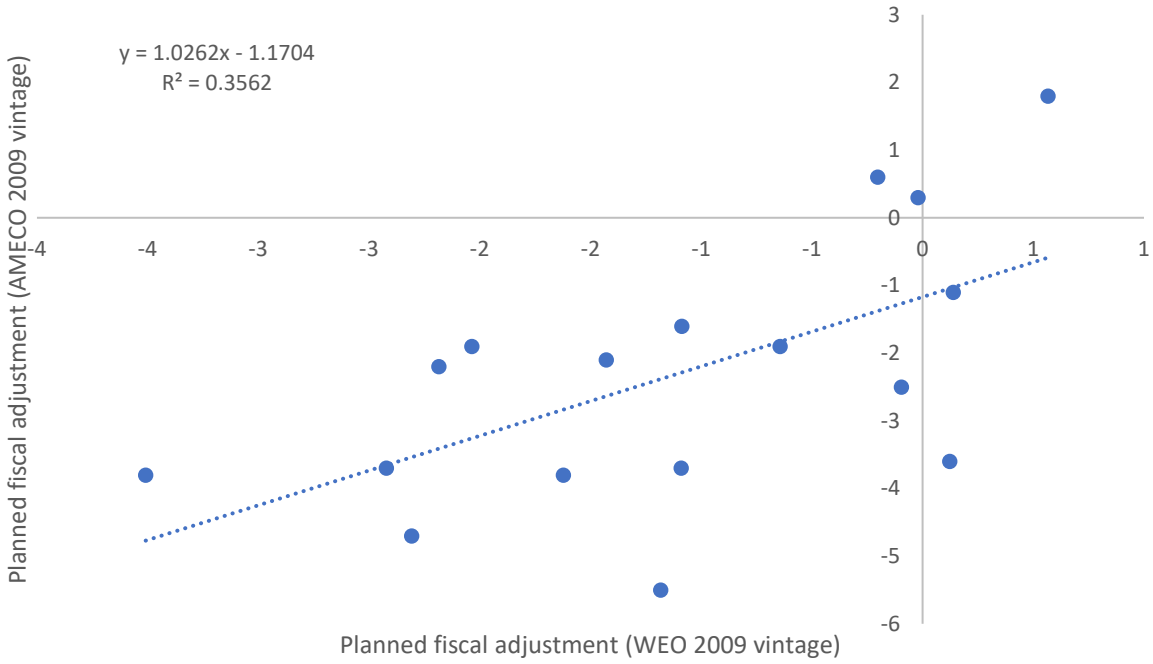
The Commission's AMECO data has been used less often in the empirical work because past vintages of the AMECO database are much less easily accessible than those of the IMF's WEO database.

The fiscal deficit projections by the IMF play no role in the convoluted mechanisms of the Growth and Stability Pact. They represent the results of forecasting by an international organisation, which are influenced by the personal bias of the person leading the particular mission (Beaudry and Willems, 2022). The regression results based on IMF data can thus show only a correlation between a (not necessarily unbiased) forecast of the fiscal policy stance from IMF staff and subsequent growth surprises. Such a correlation could come about because for those countries where IMF staff make over-optimistic growth forecasts, one is more likely to find (in the following year) a negative growth forecast error (actual growth being lower than forecasted growth). For these countries, the IMF is also likely to predict a contraction in the structural deficit (because growth is predicted to be high). This would then result in a negative correlation between growth forecast errors and fiscal consolidation.

We note that there are considerable differences between the IMF's WEO data and those from the European Commission's AMECO database, especially for projected fiscal consolidation. In some years, the average fiscal consolidation forecasted by these two institutions differ by one percentage point of GDP (i.e. in these cases the average adjustment in the structural balance is one percentage point of GDP higher for the IMF than for the European Commission[5]).

[5] Differences in the forecasts for growth, as well as the difference in the definition of what constitutes the structural balance of general government might contribute to these variations and to those also found in the results.

Figure 2. Planned fiscal adjustment in the euro area: a comparison between the AMECO and WEO databases (2009 vintage)



Source: own calculations based on IMF and European Commission data.
N.b. The planned fiscal adjustment is defined as the difference between the structural balance of general government in year t+1 and that of year t-1, both measured as of year t.

As mentioned above, we prefer to work with European Commission forecasts as they are the ones that have real importance in policymaking. Blanchard and Leigh also use some European Commission data for their robustness test, but only for growth rates. For the planned fiscal consolidation, they revert to WEO data because, according to them, the European Commission does not publish forecasts of the structural balance. Blanchard and Leigh find that the explanatory power of the equation is lower when they explain European Commission growth surprises with the IMF (WEO) planned fiscal consolation. This indicates again the importance of being aware of the differences between these two institutions' forecasts.

The AMECO database contains data for the structural balance starting from 2013. For the years prior, we used the cyclically adjusted balance, which in most cases is very close to the structural balance.

3.2 Measuring fiscal outcomes

The problem that arises in this context is the well-known phenomenon (Mourre et al., 2014; Coibion et al., 2017; Deroose et al., 2019) that estimates of the structural balance vary over time; real time data is different from later measurements (Cimadomo, 2012; Cimadomo, 2016). In year t, say 2011, the planned fiscal consolidation is defined as the difference between the forecast for the structural balance for year t+1, (2012 in this example), and the structural balance in year t-1, (2010), with both variables based on information available as of year t, i.e. 2011 (to be precise, April of year t).

The structural fiscal balance is calculated as the actual fiscal balance plus a cyclical adjustment which is proportional to the output gap, with the proportionality factor for European OECD countries between 0.4 and 0.5, corresponding roughly to the share of government revenues in GDP (Mourre et al., 2014). A key input in both structural balances is thus the estimate of the output gap. It is customary to continuously adjust the estimate of the output gap as new information becomes available. This is done by all the major international forecasters, including the IMF and the European Commission (Alichi, 2015) [6].

This means that a few years later, say by year t+3, which would be 2014 in the above example, the estimate of the difference between the structural balances between 2012 and 2010 might be quite different for two reasons:

i) the actual fiscal balance in 2012 might have been different from the planned one;
ii) the estimate of the structural element might have changed.

A further (but in practice less important) source of potential changes is that the data on the actual fiscal balance in 2010 might not have been entirely correct by April 2011.

The first reason for changing estimates of the fiscal consolidation relates to actual changes in fiscal policy – expenditure might have been increased by more than planned or some taxes might have yielded less revenue than anticipated in year t.

The second reason for the changing estimate of the fiscal consolidation arises from changing estimates of the output gap. With the new information about actual growth reported a few years later, the output gaps for 2012 (year t+1 here) and 2010 (t-1) may have changed. The measured fiscal consolidation would not be affected if revisions of the output gap resulted in the same adjustment for all preceding years, because in this case the structural element for both 2012 and 2010 would be changed by the same amount, leaving the difference between the two years unchanged. However, this is not the case.

[6] Guérin et al. (2011) combine forecasts from nine models measuring various unobserved components of output, and accounting for the impact of inflation. They calculate three different model-averaged measures of the output gap (considering the arithmetic average and the median estimates of the nine models, as well as including the uncertainty in the estimation). Uncertainty in the estimation of the output gap is calculated by giving higher weights $w_t(l)$ to the models with smaller variances attached to the estimated output gaps: $w_t(l) = \frac{\left[V_t\left(z_t^{(l)}\right)\right]^{-1}}{\Sigma_{l=1}^{L}\left[V_t\left(z_t^{(l)}\right)\right]^{-1}}$ where $w_t(l)$ are the weights given to model l at time t, $z_t^{(l)}$ is the output gap from model l at time t and $V_t\left(z_t^{(l)}\right)$ is the corresponding variance estimated from the Kalman filter. In this way, the weights are time-varying, positive and sum to one.

Figure 3(a). Greece: differences in estimates of output gap and structural balance between 2021 and 2013 WEO vintages

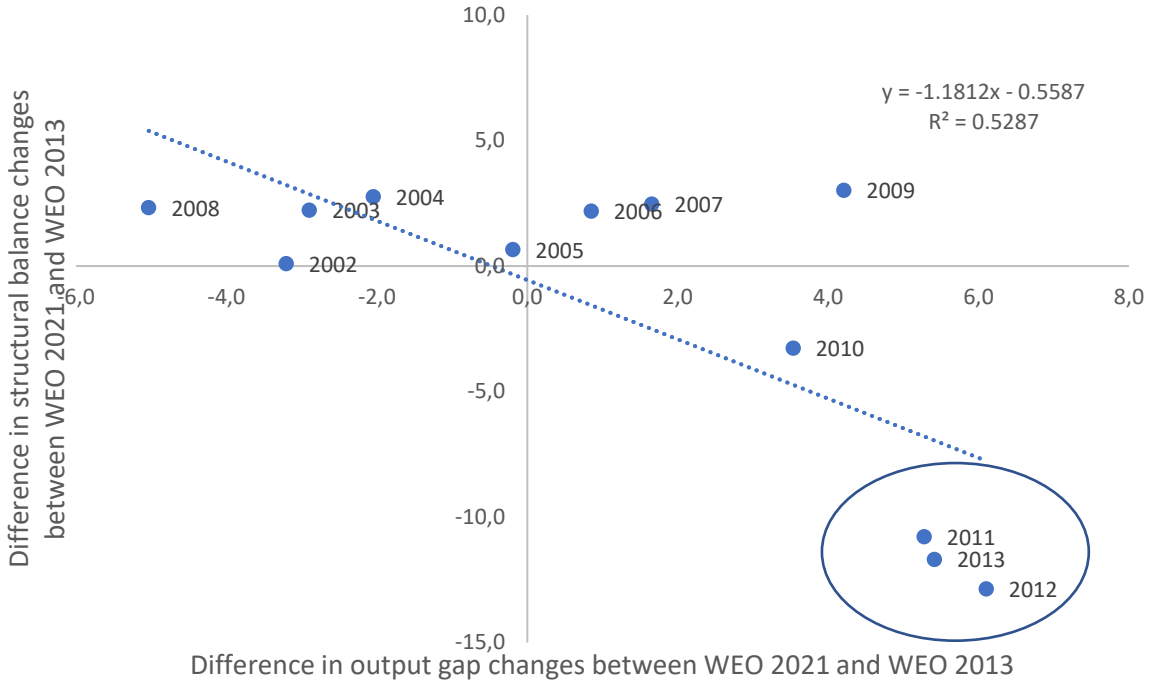
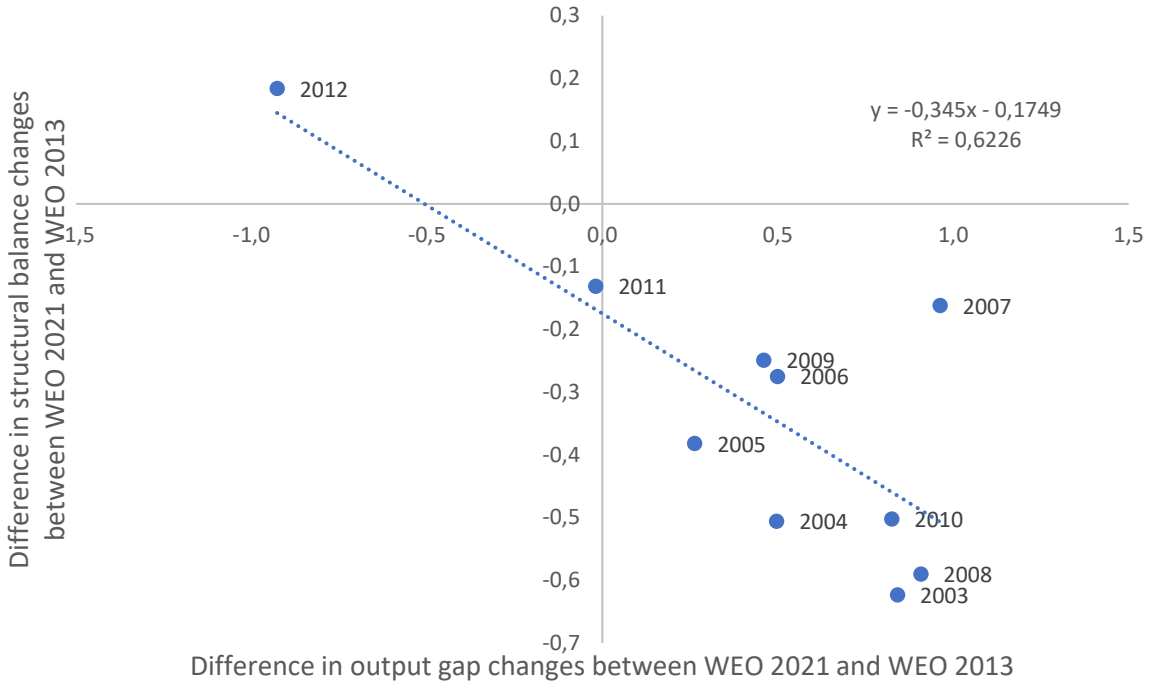


Figure 3(b). Italy: differences in estimates of output gap and the structural balance between 2021 and 2013 WEO vintages



Source: own calculations based on IMF data (WEO)

4. Results

4.1 Replication exercise

We start by replicating the regression results of Blanchard and Leigh, using their dataset (WEO 2012 vintage) and their sample of countries, which includes three non-EU countries (see table 1). We also re-run the same equation using the actual fiscal adjustment (as measured in WEO 2012 vintage) instead of the planned one. Comparing the first two set of results in table 1 shows that there are substantial differences between the estimates of $(\hat{\mu} - \mu)$ using either planned or actual fiscal consolidations. For the years 2010-11 and 2012-13 the results are very similar, but they diverge considerably for the other two years considered here (2009-10 and 2011-12).

The results are summarised in table 1 below. For each regression we report only the estimated coefficient on the independent variable (planned fiscal adjustment and actual fiscal adjustment in one case). More regression results are displayed in the Annex and are available upon request.

Table 1. Planned and actual fiscal adjustments: comparison between Blanchard and Leigh (2013) and the replication exercise's results from 2009-10 to 2012-13

Year	2009-2010	2010-2011	2011-2012	2012-2013
Dependent variable throughout: growth forecast error				
Panel A: Blanchard and Leigh dataset (WEO vintage October 2012)				
Planned fiscal consolidation (^μ-μ)	-0.70***	-1.10***	-0.47	-0.36**
	(0.19)	(0.26)	(0.45)	(0.15)
Actual fiscal consolidation (^μ-μ)	-0.29	-0.73***	-0.74**	-0.43***
	(0.381)	(0.141)	(0.346)	(0.147)
Panel B: Full equation with both planned and surprise fiscal consolidation				
planned fiscal consolidation (^μ-μ)	-0.65**	-1.08***	-0.65	-0.46***
	(0.30)	(0.21)	(0.38)	(0.16)
planned minus actual fiscal consolidation (μ)	-0.09	0.31	0.88**	0.40
	(0.36)	(0.19)	(0.41)	(0.27)

Source: own calculations using the WEO data as reported by Blanchard and Leigh.
N.b. Shown only the point estimate of the slope coefficient and its standard error.

To check for robustness regarding data revisions, we re-run Blanchard and Leigh's equation in different ways.

First, we simply use more recent (2019) data for actual growth (which is the key variable to be explained). National accounts data is continuously revised, but growth rates should be less subject to revisions than other variables, such as the structural balance. This is indeed borne out by the results (shown in the Annex). We also used the 2019 vintage of the WEO database to calculate the 'planned' fiscal adjustment, i.e. the difference between the structural balance of year t+1 and that of t-1, which yields similar results (panel C of table A1).

We then implement equation (6), in which the growth surprise is explained by two variables: the surprise (or error) fiscal consolidation (actual minus planned) and the planned fiscal consolidation. This yields the results shown in panel B of table 1. The results of the exercise confirm (for three of the four years considered) a significant difference between actual multipliers and those used by the forecasters, with the negative sign confirming that in general the actual multiplier is higher $(\hat{\mu} < \mu)$. However, the direct estimate of the multiplier (i.e. the estimate of μ) is not significantly different from zero in these cases as can be seen from the last two rows of table 1.

One simple explanation for this surprising result could be that the IMF forecasters assumed a negative multiplier. For countries under financial stress, it has been sometimes argued that a reduction in the deficit would have such strong positive effects that it would lead to higher growth (Alesina et al., 2014). The regression results show that $\hat{\mu} < \mu$. The hypothesis that fiscal adjustment would be expansionary was thus mistaken, in the sense that the estimated multiplier was not negative, but the estimates were only slightly above zero. For only one year (2011-12) the results suggest a significant multiplier (of 0.88), but that is the year when there is little evidence of a discrepancy between actual and assumed multipliers.

4.2 Results obtained using European Commission forecasts

After these initial partial replication tests, we turn to the results obtained using AMECO data for the reasons outlined above (in short, they are policy relevant). For each year we run the same two main regressions for two separate samples of countries: All EU (27), or all EA (19) countries.

In the first regression, we explain growth surprises only with planned fiscal consolidation. In the second regression, we explain growth surprises using both planned fiscal consolidation and the surprises in fiscal consolidation.

We perform these regressions for 15 years (from 2004-5 to 2018-9), using the corresponding vintages of AMECO up to just before the beginning of the Covid-19 pandemic. As one would expect to find evidence for a significant difference between actual multipliers and those used in forecasts mainly for the crisis years, we present the results only for four years (2009 to 2012). The detailed results for all 15 years show that these are indeed the only years for which one finds evidence of a difference between actual multipliers and those used implicitly for European Commission forecasts.

Table 2. Estimating actual fiscal multipliers (EU sample)

Year	2009-10	2010-11	2011-12	2012-13
Planned fiscal consolidation only	-0.46*	-1.15***	0.14	-0.33
(^μ-μ)	(0.245)	(0.360)	(0.108)	(0.205)
<u>Complete model</u>				
Planned minus actual fiscal consolidation	0.40***	0.77***	0.92*	-0.08
(μ)	(0.085)	(0.246)	-0,531	(0.140)
Planned fiscal consolidation	-0.44*	-1.18***	0.11	-0.28
(^μ-μ)	(0.215)	(0.207)	-0,115	(0.274)

Source: own calculations based on AMECO data, 2019 vintage.

Table 2 confirms the Blanchard and Leigh result for 2010/11 in that the coefficient of the planned fiscal consolidation is above one and highly significant. Regressions using the complete model, i.e. including actual fiscal consolidation, again confirm that the actual multiplier was higher than the one used in forecasts $(\hat{\mu} < \mu)$. However, the estimate of the multiplier which results from the coefficient of the difference between planned and actual fiscal consolidation is only 0.77 for 2010/11 and 0.4 for the preceding year.

Table 3 provides the results for the sample of euro area countries, for which the forecasts of the European Commission are highly relevant since they influence the judgement on whether a country is in an excessive deficit situation.

Table 3. Estimating actual fiscal multipliers (euro area sample)

Year	2009-10	2010-11	2011-12	2012-13
Planned fiscal consolidation only	-0.53	-1.38***	0.11	-0.78**
(^μ-μ)	(0.405)	(0.323)	(0.131)	(0.350)
<u>Complete model</u>				
Planned minus actual fiscal consolidation	0.43***	0.63***	1.10	-0.23
(μ)	(0.080)	(0.192)	(0.704)	(0.214)
Planned fiscal consolidation	-0.24	-1.39***	0.10	-0.72*
(^μ-μ)	(0.336)	(0.162)	(0.122)	(0.357)

Source: own calculations based on AMECO data, 2019 vintage.

The results of the euro area sample confirm the two key findings already reported for the EU sample, namely evidence of higher than anticipated multipliers in 2010-11 (and 2012-13), but also rather low actual multipliers, with the highest significant estimate at 0.63. This combination of a small actual multiplier and a substantial difference between the actual and the one used for forecasts can only mean that the forecasters used very small, potentially even negative multipliers.

For example, in the year 2010-11, the multiplier is estimated at 0.63 and the difference between the assumed one (in forecasts) and the actual one at (minus) 1.39. This implies that the forecasters used a negative multiplier equal to (0.63-1.39 =) -0.76.

The annex provided also gives a general comparison between the results of using IMF data (April 2019 WEO vintage) for the entire period considered (2005-2019). Unfortunately, we are forced to use a somewhat smaller sample than Blanchard and Leigh because the data for structural balances for the eastern EU Member States are no longer available in past editions of the WEO database. Outside of the years directly following the financial crisis, there is little evidence of a significant difference between the actual multipliers and those used by the forecasters.

5. Conclusion

There is a widely held presumption that the multiplier effect of fiscal policy should be stronger in a recession, especially if accompanied by credit constraints. Blanchard and Leigh's finding that growth surprises are positively correlated with the size of what they call 'planned' fiscal consolidations has been taken as a confirmation of this presumption, arguing that the correlation between growth surprises and planned fiscal consolidation observed for some years was due to an underestimate of the multiplier. But this is not the only explanation. Another reason might have been an overestimate of the output gap, or simply just incomplete growth data. This latter hypothesis is supported by the finding that the correlation between planned fiscal adjustment and growth surprises is weaker if one uses the newest growth data instead of the 2012 data that was employed in Blanchard and Leigh's original work.

At any rate, even if newer data partially confirms the original Blanchard and Leigh results, this only confirms that the growth forecasts of IMF staff were systematically wrong for some of the years discussed. But IMF projections have little impact on fiscal policy. By contrast, European Commission forecasts have a central role in the so-called Excessive Deficit Procedure under which countries can suffer considerable political repercussions if the Commission's projections imply high future deficits. One should thus concentrate on European Commission data if one wants to make the case that an underestimate of fiscal multipliers ultimately contributed to wrong or damaging policy choices in Europe.

Using data from the European Commission, we find, except for one year (2010-11), much weaker evidence of a systematic relationship between growth forecast errors and 'planned' consolidation. Moreover, the estimates of the true multiplier which one can recover by using surprises in fiscal policy (i.e. the gap between actual and planned or forecasted deficits) are in most cases below one.

We argue that only the results using European Commission data can provide evidence for the thesis that the under-estimation of fiscal multipliers had an impact on policy. Our results suggest that this has not been the case, at least not systematically.

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Annex

Table A1. Planned and actual fiscal adjustments: a comparison between Blanchard and Leigh (2013) and multiple replication exercises' results from 2009-10 to 2012-13

Year	2009-2010	2010-2011	2011-2012	2012-2013
Dependent variable throughout: growth forecast error				
Panel A: Blanchard and Leigh dataset (WEO vintage, October 2012)				
Planned fiscal consolidation (^μ-μ)	-0.70***	-1.10***	-0.47	-0.36**
	(0.19)	(0.26)	(0.45)	(0.15)
Actual fiscal consolidation (^μ-μ)	-0.29	-0.73***	-0.74**	-0.43***
	(0.381)	(0.141)	(0.346)	(0.147)
Panel B: Full equation with both planned and surprise fiscal consolidation				
Planned fiscal consolidation (^μ-μ)	-0.65**	-1.08***	-0.65	-0.46***
	(0.30)	(0.21)	(0.38)	(0.16)
Planned minus actual fiscal consolidation (μ)	-0.09	0.31	0.88**	0.40
	(0.36)	(0.19)	(0.41)	(0.27)
Panel C: Using April 2019 WEO data only for growth data				
Planned fiscal consolidation (^μ-μ)	-0.85***	-1.30**	-0.67	-0.58*
	(0.243)	(0.529)	(0.591)	(0.326)
Actual fiscal consolidation (as measured by BL dataset) (^μ-μ)	-0.411	-0.963***	-0.779	-0.375
	(0.376)	(0.231)	(0.553)	(0.266)
Panel D: Using April 2019 WEO data for growth data and actual fiscal consolidation				
Actual fiscal consolidation (^μ-μ)	-0.860**	-0.993***	-0.739**	-0.515***
	(0.342)	(0.193)	(0.278)	(0.127)

Source: own calculations using the WEO data as reported by Blanchard and Leigh (panels A, B and C) and the WEO 2019 vintage (panels C and D).
N.b. Only showing the point estimate of the slope coefficient and its standard error.

Table A2. Results of estimating full equation (6) using European Commission data

Sample: EU															
Dep. var.: growth forecast error	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fiscal consolidation surprise: planned minus actual fiscal consolidation	-0.06	-0.04	0.41	-0.93**	0.89**	0.40***	0.77***	0.92*	-0.08	-0.39	-0.44	-0.66	-0.04	0.89	0.75**
μ	(0.193)	(0.249)	(0.270)	-0.441	(0.384)	(0.085)	(0.246)	-0.531	(0.140)	(0.270)	(1.631)	(0.977)	(0.397)	(0.566)	(0.289)
Planned fiscal consolidation	0.01	0.31	0.74	-1.04**	0.68	-0.44*	-1.18***	0,11	-0.28	0.81	2.13	1.65	-0.00	0.32	0.01
$\hat{\mu} - \mu$	(0.373)	(0.347)	(0.604)	-0,448	(1.152)	(0.215)	(0.207)	-0,115	(0.274)	(0.515)	(2.463)	(1.442)	(0.525)	(0.457)	(0.236)
Constant	0.52	0.86**	2.39***	-1.10*	-12.75***	-0.13	1.45***	-2.24***	-1.26**	0.86	2.60*	1.99**	1.50***	2.26***	-0.29
	(0.416)	(0.385)	(0.459)	-0.622	(1.509)	(0.688)	(0.438)	-0.789	(0.528)	(0.752)	(1.441)	(0.953)	(0.416)	(0.567)	(0.223)
Observations	15	15	25	27	27	27	27	27	27	27	26	27	27	27	27
R-squared	0.004	0.090	0.239	0,192	0.218	0.391	0.659	0,245	0.109	0.110	0.114	0.115	0.001	0.175	0.164

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

$$growth\ forecast\ error = \mu\left(\widehat{def}_{t+1} - def_{t+1}\right) + (\hat{\mu} - \mu)\widehat{def}_{t+1}$$

Source: own calculations using the AMECO data.

Table A3. Results of estimating the planned fiscal adjustment using European Commission data

Mean growth forecast error	1.35	1.83	2.09	-2.42	-10.77	0.50	0.74	-2.85	-1.43	1.44	2.17	1.87	1.54	1.48	-0.42
Standard deviation growth forecast error	2.01	2.21	2.27	4.28	6.21	3.58	3.40	3.48	2.44	3.02	6,13	4.63	2.06	2.04	0.99
Mean planned fiscal consolidation	-0.31	-0.21	-0.31	0.13	0.02	-1.08	-0.05	1,72	0.84	0.53	-0.24	-0.40	-0.32	-0.52	-0.58
Standard deviation planned fiscal consolidation	0.82	1.06	0.75	1.20	0.86	2.65	2.02	4.50	2.34	1.07	1.08	1.02	1.04	0.85	0.71
Sample: EU															
Dep. var.: growth forecast error	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Planned fiscal consolidation	-0.00	0.28	1.08	-0.54	0.54	-0.46*	-1.15***	0.14	-0.33	0.81	1.92	1.34	0.00	0.61	0.06
	(0.366)	(0.283)	(0.680)	(0.434)	(1.654)	(0.245)	(0.360)	(0.108)	(0.205)	(0.528)	(1.884)	(1.086)	(0.511)	(0.647)	(0.295)
Constant	0.56	0.90***	2.42***	-2.35***	-10.78***	0.00	0.69	-3.08***	-1.15**	1.00	2.72*	2.41*	1.54***	1.79***	-0.39
	(0.415)	(0.286)	(0.456)	(0.838)	(1.226)	(0.733)	(0.489)	(0.763)	(0.430)	(0.680)	(1.527)	(1.213)	(0.379)	(0.479)	(0.232)
Observations	15	15	25	27	27	27	27	27	27	27	26	27	27	27	27
R-squared	0.000	0.089	0.126	0.023	0.006	0.116	0.471	0.031	0.103	0.083	0.110	0.087	0.000	0.064	0.002

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: own calculations using the AMECO data.

Table A4(a). Results of estimating full equation (6): comparison between European Commission and IMF data (from 2004-5 to 2011-12)

Mean growth forecast error	1.35	1.65	1.83	2.23	2.09	2.75	-2.42	-1.82	-10.77	-9.63	0.50	0.70	0.74	0.88	-2.85	-2.77
Std. dev. growth forecast error	2.01	2.35	2.21	2.60	2.27	2.50	4.28	4.63	6.21	6.09	3.58	3.86	3.40	3.77	3.48	3.67
Mean fiscal consolidation surprise	-0.80	-0.18	-1.21	-1.01	-0.18	0.71	1.27	2.22	2.20	3.31	0.38	0.22	-1.00	-0.78	-0.87	-0.82
Std. dev. fiscal consolidation surprise	1.52	1.07	1.22	1,10	1.98	1.56	2.01	2.46	3.20	2.80	4.70	1.40	1.91	1.71	1.76	2.18
Mean planned fiscal consolidation	-0.31	0.13	-0.21	-0.33	-0.31	0.39	0.13	0.16	0.02	0.09	-1.08	-0.87	-0.05	0.50	1.72	1.73
Std. dev. planned fiscal consolidation	0.82	0.77	1.06	1.12	0.75	0.99	1.20	0.76	0.86	0.98	2.65	1.51	2.02	1.89	4.50	1.44
sample: EU	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO
Dep. var.: growth forecast error	2005		2006		2007		2008		2009		2010		2011		2012	
Fiscal consolidation surprise: planned minus actual fiscal consolidation μ	-0.06	-0.19	-0.04	0.35	0.41	-0.27	-0.93**	-0.69**	0.89**	-0.28	0.40***	0.64	0.77***	1.15***	0.92*	0.82**
	(0.193)	(0.404)	(0.249)	(0.353)	(0.270)	(0.296)	-0,441	(0.246)	(0.384)	(0.391)	(0.085)	(0.852)	(0.246)	(0.354)	-0,531	(0.342)
Planned fiscal consolidation $\hat{\mu} - \mu$	0.01	0.09	0.31	-0.43	0.74	0.40	-1.04**	0.16	0.68	0.89	-0.44*	-1.04	-1.18***	-1.04**	0,11	-0.44
	(0.373)	(0.628)	(0.347)	(0.371)	(0.604)	(0.407)	-0,448	(0.731)	(1.152)	(1.200)	(0.215)	(0.803)	(0.207)	(0.395)	-0,115	(0.405)
Constant	0.52	0.66	0.86**	1.07**	2.39***	1.79***	-1.10*	-0.72	-12.75***	-6.88***	-0.13	-0.05	1.45***	2.01***	-2.24***	-2.15**
	(0.416)	(0.514)	(0.385)	(0.442)	(0.459)	(0.408)	-0,622	(0.804)	(1.509)	(1.066)	(0.688)	(1.366)	(0.438)	(0.606)	-0,789	(0.937)
Observations	15	12	15	12	25	14	27	14	27	14	27	18	27	18	27	22
R-squared	0.004	0.014	0.090	0.176	0.239	0.086	0,192	0.497	0.218	0.109	0.391	0.169	0.659	0.669	0,245	0.349

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: own calculations using the AMECO and WEO data.

Table A5(a). Results of estimating the planned fiscal adjustment: comparison between European Commission and IMF data (from 2004-5 to 2011-12)

Mean growth forecast error	1.35	1.65	1.83	2.23	2.09	2.75	-2.42	-1.82	-10.77	-9.63	0.50	0.70	0.74	0.88	-2.85	-2.77
Std. dev. growth forecast error	2.01	2.35	2.21	2.60	2.27	2.50	4.28	4.63	6.21	6.09	3.58	3.86	3.40	3.77	3.48	3.67
Mean planned fiscal consolidation	-0.31	0.13	-0.21	-0.33	-0.31	0.39	0.13	0.16	0.02	0.09	-1.08	-0.87	-0.05	0.50	1.72	1.73
Std. dev. planned fiscal consolidation	0.82	0.77	1.06	1.12	0.75	0.99	1.20	0.76	0.86	0.98	2.65	1.51	2.02	1.89	4.50	1.44
sample: EU	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO	AMECO	WEO
Dep. var.: growth forecast error	2005		2006		2007		2008		2009		2010		2011		2012	
Planned fiscal consolidation	-0.00	0.02	0.28	-0.31	1.08	0.21	-0.54	1.05	0.54	0.65	-0.46*	-0.86	-1.15***	-1.18*	0.14	-0.41
	(0.366)	(0.664)	(0.283)	(0.403)	(0.680)	(0.336)	(0.434)	(1.174)	(1.654)	(1.217)	(0.245)	(0.667)	(0.360)	(0.643)	(0.108)	(0.691)
Constant	0.56	0.70	0.90***	0.75	2.42***	1.68***	-2.35***	-2.39***	-10.78***	-7.80***	0.00	0.24	0.69	1.18**	-3.08***	-2.87***
	(0.415)	(0.540)	(0.286)	(0.437)	(0.456)	(0.382)	(0.838)	(0.730)	(1.226)	(0.819)	(0.733)	(1.180)	(0.489)	(0.518)	(0.763)	(1.002)
Observations	15	12	15	12	25	14	27	14	27	14	27	18	27	18	27	22
R-squared	0.000	0.000	0.089	0.084	0.126	0.020	0.023	0.104	0.006	0.045	0.116	0.118	0.471	0.378	0.031	0.034

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: own calculations using the AMECO and WEO data.