Small fiscal multipliers do not justify austerity: a macroeconomic accounting analysis of public debt-to-gdp dynamics

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Abstract In the aftermath of a crisis which has now been lasting for more than five years, the debate about the size of fiscal multipliers arouse. Whatever the estimation approach, fiscal multipliers assumed for projections are the result of extrapolations from time series data. The present contribution aims at taking a different perspective, by answering the following question: is it really necessary to know the value of fiscal multipliers to take sensible policy decisions?

Keywords Fiscal multipliers, Debt-to-gdp ratio, Consolidation programmes, Eurozone Crisis.

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1 Introduction

"With many economies in fiscal consolidation mode, there has been an intense debate about the size of fiscal multipliers. At the same time, activity has disappointed in a number of economies undertaking fiscal consolidation. A natural question therefore is whether forecasters have underestimated fiscal multipliers, that is, the short-term effects of government spending cuts or tax hikes on economic activity" (Blanchard and Leigh 2013, p. 3).

This by-now famous paper by Olivier Blanchard explicitly acknowledged that the IMF was wrong in the Spring 2010 *World Economic Outlook* (International Monetary Fund 2010) forecasts of growth and fiscal consolidation for 26 European economies. Blanchard's findings revealed "that multipliers implicit in the forecasts were, on average, too low by about 1" (Blanchard and Leigh 2013, p. 4)

More specifically, the implicit multipliers used in forecasts were around 0.5, while *ex post* evidence suggested that they were around 1.5.

A great deal of literature appeared, both before and after the "Great Crisis", concerning the size, persistence and variability of fiscal multipliers. While a comprehensive literature review can be found in Boussard, Castro, and Salto (2012), we shall recall here some of the most relevant contributions.

Among the VAR based methodologies for estimating fiscal multipliers, Blanchard and Perotti (2002) employed structural VAR combined with event analysis to describe the dynamic effects of fiscal shocks – both related to change in government spending and to tax rates – on the US economy in the post-war period. Their findings suggest that fiscal multipliers associated to increases in government spending "are small, often close to one" (Blanchard and Perotti 2002, p. 1364), due to the fact that while public expenditure makes private consumption to increase, it induces a reduction in private investment, exports and imports, thus partially counteracting the former positive effect.

Favero and Giavazzi (2007) criticise traditional structural VAR approaches to the estimation of fiscal multipliers because they usually do not include the level of debt and keep track of its evolution in the estimated equation, in so doing getting biased estimates which might also lead to concluding that interest rates do not depend on the level of debt-to-gdp ratio.

In fact, Boussard, Castro, and Salto (2012, p. 4) regard the role of monetary policy as "one of the most important factors determining the size of government spending multipliers [especially] in situations near to the Keynesian liquidity trap, in which the nominal interest rate remains at the so-called "zero lower bound"."

Nonetheless, the fact that "fiscal multipliers are likely to be larger when there is a great deal of slack in the economy" (Blanchard and Leigh 2013, p. 5) is by now a well recognised piece of evidence. "If fiscal multipliers were larger than normal and growth projections implicitly assumed multipliers more consistent with normal times, then growth forecast errors should be systematically correlated with fiscal consolidation forecasts." (ibid.)

As a matter of fact, whatever the estimation approach, fiscal multipliers implicitly assumed for projections – and policy statements – are the result of some kind of *ex post* extrapolation from time series data, which by definition can only approximate, in the luckiest case, the actual value – that cannot be objectively defined nor measured in a univocal way. This is a most worrying issue. Consolidation programmes implying budget restrictions in times of recession can have extremely severe consequences on growth, and thus on employment and on the standards of living of thousands of people. The case of Greece, but also of Italy and other peripheral European countries, provides a precious example of how many damages such programmes can produce without even reaching their objective.

The present contribution therefore aims at taking a different perspective, by answering the following question: is it really necessary to know the value of fiscal multipliers in order to draw conclusions on the viability of consolidation programmes? Or would it be possible to take more sensible decisions by simply sticking to what we can actually observe?

In order to answer these questions, the paper is organised as follows. Section 1 departs from the accounting definition of debt-to-gdp ratio to derive debt-stabilising rates of growth of government spending as a function of the fiscal multiplier – i.e. to compute, *for each possible level of the multiplier*, the set of rates of growth of public expenditure which allows for debt stabilisation – and studies the form of such a function, finding a critical value of the multiplier. Section 2 provides an alternative derivation of the critical level of the multiplier, showing its economic meaning. Section 3 is a discussion on how policies can change the sign of the function parameters in order to reach the most favourable situation. Section 4 compares the critical value of the multiplier emerging from the foregoing analysis to the findings of Boussard, Castro, and Salto (2012), and provides a counterfactual exercise applied to EU data, comparing different scenarios. Finally, Section 6 concludes, providing an answer to the research question stated above.

2 Fiscal multiplier and debt GDP ratio

The fiscal multiplier (β) is defined as the ratio of a change in GDP (Y) to the change in government spending (G): $\beta=\Delta Y/\Delta G$. A given rate of change of government spending $\Delta G/G$ thus makes GDP increase according to:

$$\frac{\Delta Y}{Y} = \beta \frac{\Delta G}{G}\frac{G}{Y} \equiv \beta g_G \gamma_0, \quad g_G \equiv \frac{\Delta G}{G}, \quad \gamma_0 \equiv \frac{G}{Y}$$

Given the rate of growth of GDP registered at time *0* – g_0, which we will take as the baseline for our counterfactual exercise – the rate of growth at time *1* will be given, *ceteris paribus*, by the sum of g_0 and the increase induced by an eventual change in public expenditure itself:

$$g_1 = g_0 + \beta g_G \gamma_0$$

Given the rate of interest to be paid on consolidated debt i and the tax rate t – i.e. the revenues-to-gdp ratio – the debt-to-gdp ratio at time *1* can be expressed as:

$$\frac{D_1}{Y_1} = \frac{D_0(1+i) + G_1 - tY_1}{Y_1} = \frac{D_0(1+i) + G_0(1+g_G) - tY_0(1+g_0+\beta g_G \gamma_0)}{Y_0(1+g_0+\beta g_G \gamma_0)}$$

and the condition for debt sustainability is:[1]

$$\frac{D_0(1+i)+G_0(1+g_G)-tY_0(1+g_0+\beta g_G\gamma_0)}{Y_0(1+g_0+\beta g_G\gamma_0)}\leq\frac{D_0}{Y_0}$$

i.e.

$$[G_0-(tY_0+D_0)\gamma_0\beta]g_G\leq D_0(g_0-i)+tY_0(1+g_0)-G_0$$

The rates of change of government expenditure which satisfies such condition – the *sustainability area* for g_G – can be defined by solving the above expression for g_G, depending on the sign of the expression in square brackets:

$$g_G\begin{cases}\leq g_G^*\equiv\dfrac{D_0(g_0-i)+tY_0(1+g_0)-G_0}{G_0-(tY_0+D_0)\gamma_0\beta} & if\quad \beta<\dfrac{G_0}{(tY_0+D_0)}\\ \geq g_G^*\equiv\dfrac{D_0(g_0-i)+tY_0(1+g_0)-G_0}{G_0-(tY_0+D_0)\gamma_0\beta} & if\quad \beta>\dfrac{G_0}{(tY_0+D_0)}\end{cases}\quad(1)$$

There is therefore a critical value of the fiscal multiplier for which the above expression is not defined:

$$\tilde{\beta}=\frac{G_0}{(tY_0+D_0)\gamma_0}\quad(2)$$

The resulting sustainability area can be graphically represented *as a function of the fiscal multiplier* β as in Figure 1, where we distinguish two cases according to the sign of $D_0(g_0-i)+tY_0(1+g_0)-G_0$. Following Pasinetti (1998), we define $D_0(g_0-i)\equiv S_p^*$ as the level of primary surplus which would stabilize debt-to-gdp ratio if $g_1=g_0$ and $G_1=G_0$, i.e. without any fiscal contraction/expansion; $tY_0(1+g_0)-G_0\equiv S_p$ is the corresponding level of *actual* primary surplus. Hence, we can define

$$D_0(g_0-i)+tY_0(1+g_0)-G_0\equiv S_p-S_p^*$$

as the "primary-balance gap", and distinguish the following two cases, depicted in Figure 1:

(a). $S_p<S_p^*$: the primary-balance gap is negative, i.e. current primary surplus is smaller than its debt-stabilising level. In this case, as shown in Figure 1a, debt stabilisation would require an *increase* in public expenditure if $\beta>\tilde{\beta}$, while it would require reducing public expenditure

[1] See e.g. Pasinetti (1998).

if $\beta < \tilde{\beta}$. In case a reduction is needed, this should be at least equal to $\tilde{g}_G$.

(b). $S_p > S_p^*$: the primary-balance gap is positive, i.e. current primary surplus is greater than its debt-stabilising level. In this case, as shown in Figure 1b, debt stabilisation can be achieved by an *increase* in public expenditure *whatever the value of the fiscal multiplier*, provided that $\beta \neq \tilde{\beta}$. Moreover, whatever the multiplier, the minimum stabilising government spending increase is given by $\tilde{g}_G$.

[Figure 1 here]

3 The critical value of the fiscal multiplier

The variation of debt-to-gdp ratio can be written as:

$$\frac{D_1}{Y_1} - \frac{D_0}{Y_0} = \frac{D_0(i - g_0) + G_0 - tY_0(1 + g_0)}{Y_0(1 + g_0 + \beta g_G \gamma_0)} + \frac{G_0 g_G - (tY_0 + D_0)(\beta g_G \gamma_0)}{Y_0(1 + g_0 + \beta g_G \gamma_0)} \quad (3)$$

The second addendum in expression (3) is the net contribution of government expenditure to the growth of the debt-to-gdp ratio: an increase in government expenditure makes the debt-to-gdp ratio increase according to $G_0 g_G$, and at the same time decrease according to $(tY_0 + D_0)(\beta g_G \gamma_0)$. Such a net contribution is neutral if $\beta = \tilde{\beta}$; it is positive – i.e. government expenditure and the debt-to-gdp ratio move in the same direction – when $\beta < \tilde{\beta}$. Finally, it is negative – i.e. the level of the debt-to-gdp ratio can be reduced only by *increasing* government expenditure – when $\beta > \tilde{\beta}$.

It is interesting to notice that when $\beta = \tilde{\beta}$ expression (3) reduces to:

$$\frac{D_0(i - g_0) + G_0 - tY_0(1 + g_0)}{Y_0(1 + g_0 + \beta g_G \gamma_0)} \quad (4)$$

In expression (4), the only exogenous variable – i.e. the only variable that can be chosen as a policy variable, being all the others dated to time 0 – is the interest rate on consolidated debt. By simple algebraic manipulation, it is straightforward to verify that in such a case the level of the interest rate which would guarantee a non-increasing debt-to-gdp ratio is given by:

$$i^* \leq \frac{D_0 g_0 + tY_0(1 + g_0) - G_0}{D_0} = [t(1 + g_0) - \gamma_0]\delta_0 + g_0$$

which could even be negative.

4 Debt stabilisation in time of recession

Section 2 illustrated that debt sustainability area can have two entirely different forms according to whether the primary-balance gap at time *0* (a_0) is negative or positive. We can now ask which the consequences in each case are.

If $a_0 > 0$ we are in the situation depicted in Figure 1b; as already stated above, in this case keeping the debt-to-gdp ratio constant from one period to the following one is compatible with increasing government expenditure for *any* $\beta \neq \tilde{\beta}_0$. There is only one constraint to be satisfied, precisely concerning the sign of the primary-balance gap, which should be kept positive.

The opposite situation, i.e. $a_0 < 0$, is especially likely to occur during recessions and stagnation, due to the so-called "snow ball effect". In this case, a single country finds itself in a different position according to whether β is smaller or greater than $\tilde{\beta}_0$. In the latter case, debt stabilisation at time *0* is compatible with increasing government spending; in the former, it requires a contraction in public expenditure according to g_G^*. However, this would lead to a decrease in gdp, and eventually to a kind of negative growth trap. Moreover, if government expenditure is reduced less than g_G^* – e.g. due to a wrong estimate of the actual level of β, or to the change in some exogenous variable – this pro-cyclical intervention would lead to a further increase in the debt-to-gdp ratio, thus being ineffective. This is so much so if we consider that $\tilde{\beta}_0$ can be written as:

$$\tilde{\beta}_0 = \frac{G_0}{(tY_0 + D_0)\gamma_0} = \frac{1}{t + \delta_0}, \quad \delta_0 \equiv \frac{D_0}{Y_0}$$

which implies that a decrease/increase in debt-to-gdp ratio makes the level of $\tilde{\beta}_0$ to increase/decrease: an effective consolidation would increase $\tilde{\beta}$, making it necessary further shrink public expenditure in order to keep budget balance. On the contrary, a less than effective consolidation would eventually lead $\tilde{\beta}$ to decrease below the actual multiplier. However, since the latter is unknown (and immeasurable), it is not possible to realise when this is going to happen; in

the meanwhile, consolidation would have hampered growth to an unpredictable extent.

Parallelly, when $\beta > \tilde{\beta}_0$ debt stabilisation can be achieved by increasing government expenditure *at least* by g_G^*; a less than effective expansion would increase debt-to-gdp ratio, and hence reduce $\tilde{\beta}$. Eventually, this could lead debt-to-gdp to an ever-ending increase – though, with respect to the previous case, without the undesired effect of hampering growth.

Given that it is not possible to know whether we are at the right or the left of $\tilde{\beta}$, the best measure to be taken subject is that of choosing g_G in order to turn the primary-balance gap – which depends on *current*, and thus known, magnitudes, and on β and i.

Whatever the sign of the primary-balance gap, therefore, the first best strategy is that of choosing g_G in such a way as to turn it positive in the following period. The condition for this to happen can be written as:

$$D_1(g_1 - i) - G_1 + tY_1(1 + g_1) > 0$$

from which, by simple algebraic manipulation we get:

$$Ag_G^2 + Bg_G + C > 0 \quad (5)$$

where

$$A \equiv G_0\gamma_0\beta > 0,$$
$$B \equiv (D_0 + tY_0)(1 + i)\beta\gamma_0 + G_0\beta\gamma_0 - G_0(1 + i - g_0),$$
$$C \equiv [D_0(g_0 - i) + tY_0(1 + g_0)](1 + i) - G_0(1 + i - g_0) = a_0(1 + i) + G_0g_0$$

$Ag_G^2 + Bg_G + C$ is a second order polynomial, with $A > 0$ and $\Delta = B^2 - 4AC$. According to the sign of Δ, we can colcude that:

(a). if $\Delta < 0$ the polynomial has two non-real distinct solutions; its sign is positive for any value of g_G – and thus *whatever the fiscal multiplier*. This case can occur only if $C > 0$.

(b). if $\Delta > 0$ the polynomial has two distinct real solutions: $g_G^{(1)} < g_G^{(2)}$; the sign of the polynomial is positive for $g_G < g_G^{(1)}$ and $g_G > g_G^{(2)}$.

Hence, *whatever the actual fiscal multiplier*, there always exists a *positive* value of g_G satisfying condition (5), irrespectively of the sign of $g_G^{(1)}$ and $g_G^{(2)}$. We can define the corresponding range of

values of g_G the "sustainability area for the primary-balance gap". The question is whether there is a criterion to determine a level of g_G which is within the primary-balance gap sustainability area independently of β_0 itself.

To answer this question, we can characterise the behaviour of the boundaries as a function of β_0, distinguishing two different cases according to the sign of *C*:

(a). $C > 0$. In this case, the boundaries of the primary-balance gap sustainability area are either both negative or both positive. What is relevant here is to identify the presence of a minimum value of the *lower* bound, $\tilde{g}_G^{(1)}(\beta)$: any rate of growth of public spending such that $g_G \in \left(0, \tilde{g}_G^{(1)}(\beta)\right)$ will in fact be in the primary-balance gap sustainability area, whatever $\beta > 0$.

Figure 2a depicts the behaviour of $\tilde{g}_G^{(1)}$. As can be seen, a minimum (for positive values of the multiplier) occurs in correspondence of $\beta \to 0$:

$$\tilde{g}_G^{(1)}(0) = \frac{a_0(1+i) + G_0 g_0}{G_0(1+i-g_0)}$$

(b). $C < 0$. In this case, Δ is always positive, and $\tilde{g}_G^{(2)} > 0 > \tilde{g}_G^{(1)}$. In order to have a range of values of g_G which is in the primary-balance gap sustainability area whatever the multiplier, the corresponding upper(lower) bound should display a finite maximum(minimum). As can be seen in Figure 2b, however, while the lower bound still reaches a minimum in correspondence of $\beta \to 0$, the upper bound does not. This means that determining a positive rate of growth compatible with turning (or keeping) the primary-balance gap positive requires an estimate of the actual value of β. The only counclusion that can be reached is that, whatever the multiplier, rates of change of government spending smaller than $\tilde{g}_G^{(1)}$ are in the primary-balance gap sustainability area.

[Figure 2 here]

5 European countries facing the crisis: the folly of the 3% deficit-to-gdp parameter

In a recently published article (Boussard, Castro, and Salto 2012) the European Commission provided a definition – formally analogous to expression (4) – of a level of fiscal multipliers above which budget consolidation have the short term effect of increasing, rather than decreasing, debt-to-gdp ratio.

The European Commission then concluded, on the basis of their estimates and of the following elaborations – that "with high levels of public debt and sizeable fiscal multipliers, debt ratios are likely to increase in the short term in response to fiscal consolidations. Hence, the typical horizon for a consolidation during crises episodes to reduce the debt ratio is two-three years, although this horizon depends critically on the size and persistence of fiscal multipliers and the reaction of financial markets. Anyway, such undesired debt responses are mainly short-lived. This effect is very unlikely in non-crisis times, *as it requires a number of conditions difficult to observe at the same time*, especially high fiscal multipliers" (Boussard, Castro, and Salto 2012, p. 1, emphasis added).

In order to provide such definition, the authors explicitly assume that "the structural primary balance of the basic scenario is small"[2] (p. 10) that "the economy was at the steady-state before the adjustment was made" (p. 10); and that the rate of interest paid on consolidated debt is exogenous (and constant). With these assumption, they can define the fiscal multiplier as:

$$\widehat{m} \equiv -\frac{\mathrm{d}Y}{Y\mathrm{d}a} = -g\frac{1}{\mathrm{d}a}$$

where $\mathrm{d}a$ is the annual structural effort implied by consolidation, which "is represented by a diminution in the cyclically-adjusted primary balance, $capb_i$. A permanent consolidation is thus a change in which is constant in terms of ratio of GDP, i.e. $\mathrm{d}capb_i = \mathrm{d}capb_{i-1} = \mathrm{d}a$ where the notation means that the change in *capb* has been put in place at the first period so that the variation of the cyclically-adjusted primary balance remains constant with respect to baseline throughout all years onwards." (Boussard, Castro, and Salto 2012, p. 9)[3].

[2] Actually, they assume that it is null.

[3] By definition, the primary balance *pbal* is given by the sum of a structural, or cyclically adjusted, component (*capb*) and by a cyclical component (*cb*): $pbal_t = capb_t + cb_t$.

Moreover, budget balance semi-elasticity is defined as:[4]

$$\varepsilon \equiv \frac{\mathrm{d}pbal}{\mathrm{d}Y} Y$$

Starting from the standard debt-to-gdp evolution equation and assuming that consolidation starts at time *t*, the variation of debt-to-gdp ratio following consolidation can be written as:

$$\frac{\mathrm{d}b_t}{\mathrm{d}a} = -b_{t-1}\frac{\mathrm{d}g_t}{\mathrm{d}a} - \frac{\mathrm{d}pbal_t}{\mathrm{d}a} = b_{t-1}\widehat{m} + \varepsilon\widehat{m} \geq 0 \quad if \quad \widehat{m} \geq \widetilde{m} = \frac{1}{b_{t-1} + \varepsilon}$$

Since it is assumed to start from steady state, debt-to-gdp ratio can only change due to "cyclical" changes in the rate of growth of gdp, which in turn depend on the consolidation effort via both the multiplier and budget balance semi-elasticity. The critical multiplier crucially depends on b_{t-1} – which, given the assumptions made, is the steady-state level of the debt-to-gdp ratio – and on ε. The latter magnitude is not directly measured but *derived* via a quite complex econometric estimation.[5] Hence, the authors conclude, there might "special, peculiar cases where counter-intuitive effects from fiscal consolidation strategies are more likely" (Boussard, Castro, and Salto 2012, p. 29): when actual multipliers are higher than the critical value, which is more likely to happen in presence of economic recessions, consolidation in the short term might lead to an increase, rather than a decrease, in debt-to-gdp ratios.

In order to prove that such counter-intuitive effects are only short-lived, the authors introduce a mechanism through which the interest rate on consolidated debt is endogenously determined by the behaviour of the 'financial markets' as a function of the changes in the debt-to-gdp ratio. Since markets know that consolidation is bound to lead to a reduction of debt-to-gdp ratio, interest rates do not increase in response to short term increases due to exceptionally high multipliers, and thus the debt-to-gdp ratio almost immediately starts to decline, the "counter-intuitive" effect disappearing at most after two or three years. Of course, with myopic markets, long-lasting recession and persistent higher-than-normal multipliers, the perverse effect can last much longer.

[4] According to the OECD, budget balance semi-elasticity "is defined as the difference between the cyclical sensitivity of the four categories of taxes and the one expenditure item, weighted by their respective shares in GDP" (Girouard and André´ 2005, p. 49, footnote 28). See Mourre et al. (2013, p. 12) for details.

[5] For details about estimation techniques, see Mourre et al. (2013) and Girouard and André (2005).

This event, however, is seen as highly unlikely.

[Table 1 here]

Before going on, it may prove useful to compare value of the critical multiplier as estimated by the EC, $\tilde{m}$, to that computed on the basis of expression (2). Though the latter is derived starting from an apparently simpler framework – which at first sight might seem less rigorous than that described in Boussard, Castro, and Salto (2012, sections 3-4) – Table 1 shows that the two approaches almost lead to the same estimates; the only country for which there is a relevant difference in estimation is Estonia. For all other countries estimates are identical or only slightly different.[6]

We can now go back to expression (2). The critical value of the fiscal multiplier is straightforwardly derived from a simple accounting identity, as the asymptote of the function linking the possible values of actual multipliers to the rate of growth of government spending allowing for debt stabilisation.

When the problem is looked at from this perspective, it clearly emerges that the effect of consolidations depends not only on the relation between actual and critical fiscal multipliers, but most of all on the sign of a. If it is negative, which almost always holds during stagnations or recessions unless in presence of very high primary surpluses, then consolidations shall have the counter-intuitive effects mentioned by the EC.

In such a case, when actual multipliers are smaller than the corresponding critical level, not only debt stabilisation would require a fiscal restriction: any restriction smaller than g_G^* would lead to an increase in debt-to-gdp ratio. In other words, even when the multiplier is lower than its critical level, debt-to-gdp ratio is bound to increase if the consolidation effort is not big enough as to satisfy condition (1). Thus an insufficient consolidation in the context of an economic stagnation or recession would be not only pro-cyclical, but also ineffective.

Parallelly, when actual multipliers are higher than the critical level, consolidations would inevitably

[6] Incidentally, this result implies that the "complex and time-consuming simulations using detailed information of the change in the tax codes and micro data on household income, since it means computing both the elasticity of individual tax revenues /expenditures with respect to their base and the reaction of the different tax/expenditure bases to the output gap" (Mourre et al. 2013, p. 6) which are necessary to estimate ε lead to a result which is almost the same as the tax rate which can be straightforwardly computed as the revenues-to-gdp ratio.

bring about the effect of increasing debt-to-gdp ratio. Not only debt stabilisation would require a fiscal expansion: any expansion smaller than g_G^* would lead to an increase in debt-to-gdp ratio.

[Table 2 here]

This evidence has clear-cut implications on the viability of the forecasts of the so called Convergence and Stability Programmes (CPS). The objectives in terms of balance-to-gdp ratios for the period 2014-2016 planned by the stability programmes submitted by the governments of the EU Member States (MSs) are listed in Table 1, together with the main relevant macroeconomic indicators for the year 2013, and estimates of g_G^*, $g_G^{(1)}$ and $g_G^{(2)}$ corresponding to three different possible values of fiscal multipliers ($\beta = 0.5, \beta = 1, \beta = 1.5$) for the year 2013.[7]

Consider the Italian case. In 2013, Italy experienced a negative growth of nominal gdp (-0.5%). Though the deficit-to-gdp ratio was beyond 3%, debt-to-gdp ratio was well above 60%, following a constantly increasing trend in the years after 2008. For this reason, the Italian government set the objective of further decreasing deficit-to-gdp ratio in the period 2014-2016, bringing it down to -0.9%, in order to achieve a slowdown of debt-to-gdp towards the Treaty reference value.[8]

However, given that the primary surplus gap was negative in 2013, Italy found itself in the position depicted in Figure 1a, with a critical multiplier $\tilde{\beta} = 0.55$. In such a situation, with a low multiplier ($\beta = 0.5 < \tilde{\beta}_0$) debt sustainability would imply reducing government spending by at least 92.6%, which of course is not a viable objective. However, increasing public expenditure by 43% would turn the primary surplus gap positive; from 2014 onwards, debt stabilisation could be achieved with strictly positive rates of growth of government spending, provided they are compatible with keeping the primary surplus gap non-negative. With an average level of the multiplier ($\beta = 1 > \tilde{\beta}_0$) debt-to-gdp stabilisation could in turn be achieved increasing public expenditure by at least 10.8%; given that $g_G^{(2)} = 7.2$, this would also imply turning the primary surplus gap positive – and make nominal

[7] The three scenarios correspond to the low-, average- and high-multiplier scenarios considered by Castro, and Salto (2012) and Berti, Castro, and Salto (2013).

[8] Such objectives were set by the Italian government while the Council was deciding whether to abrogate the Decision, taken in January 2010 (Council of the European Union, 2010), on the existence of an excessive deficit in Italy. Italian SCP was thus scrutinised by the Council in order to take the corresponding Decision (Council of the European Union, 2013).

gdp grow by 4.4%. Finally, with a high multiplier ($\beta = 1.5 > \tilde{\beta}_0$) the same result could be achieved increasing government spending by 5.1%; in this case, the nominal gdp growth rate would be 3%.

In general, even without knowing the actual value of the fiscal multiplier, it is possible to conclude that any fiscal restriction in Italy would have to imply – in order to be effective, i.e. to actually reduce debt-to-gdp ratio, and assuming a fiscal multiplier lower than its critical level – reducing government spending by not less than 8.7%. On the other hand, turning the primary-balance gap positive would require *either* reducing public expenditure by more than 9.2% – a minimum restriction which becomes higher and higher as the actual multiplier grows above zero – *or* increasing it by an amount that is impossible to be computed independently of β.

The Stability Programme for Italy is detailed in Section I of the *Economic and Financial Document* prepared by the Treasury Department (EFD 2013), which analyses the results of the reforms implemented during the previous year and of the macroeconomic scenario, together with an update of growth an public finance prospects – which led to dramatically change the latter with respect to the previous stability programme.[9] As stated above (see Table 1), according to such forecasts net borrowing should be -1.8% of gdp in 2014, -1.5% in 2015 and -0.9% in 2016.[10] Table 2 shows the consolidation effort which would be required in order to meet the forecasts of the Document under the low-, average- and high-multiplier scenarios.

In the low-multiplier scenario, reaching a total deficit-to-gdp ratio in line with forecasts would require government spending to decline, on average, by 4.4% each year. Given the indirect effect on gdp (and thus revenues) exerted by the multiplier, such restriction would lead the debt-to-gdp to increase by 14.6 p.p. in 2016 with respect to 2013 – thus reducing the critical level of the multiplier. Under the average-multiplier scenario, a similar pattern would have to emerge in order to fulfil forecasts, but characterised by a much sharper decrease in government spending – and hence in the rate of growth of gdp – and increase in debt-to-gdp ratios. In 2016, the critical multiplier would be lower than the 2013 Greek one. Under the high-multiplier scenario meeting the forecasts would

[9] See EFD (2013, Table III.1, p. 17).

[10] The figure is -0.4\% for 2017; though having been presented in the EFD (2013), it has been omitted here for homogeneity with respect to other countries' programmes, many of which were limited to the 2012-2016 period.

clearly be impossible, since this would entail ending up with negative public expenditure and debt-to-gdp ratio after an explosion of the latter in 2015.

6 Discussion and conclusions

The counterfactual exercise carried out in the foregoing sections aims at showing that fiscal restrictions are not an effective way of obtaining public finance consolidation. In fact, given that the value of the fiscal multiplier is unknown at the time in which policy decisions have to be taken – and that even afterwards it can only be estimated via more or less reliable econometric procedures – the only certain data are whether a country has a positive or negative primary-balance gap – i.e. in which of the two states represented in Figure 1 it is – and the *critical value* of the fiscal multiplier. If the primary-balance gap is positive, it is always possible to define a minimum positive rate of growth of public expenditure which are both debt-stabilisation and in the primary-balance gap sustainability areas. To take Germany as an example, whatever the actual value of the fiscal multiplier, a rate of growth of government spending between 7.7% and 10.5% would satisfy both condition (1) and (5).

On the other hand, for countries with a negative primary-balance gap – i.e. countries with a low rate of growth of nominal gdp – it is not possible to identify such a range of viable rates of growth of public expenditure; accomplishing both tasks with $g_G > 0$ is in principle possible also in this case, but defining a set of viable rates of growth would require knowing the actual value of the multiplier, which we do not. The best we can do is analysing the possible consequences that alternative policies might have if the estimated fiscal multiplier, β^e, is wrong.

If $\beta^e < \tilde{\beta}_0$, then debt stabilisation must be attempted reducing government spending by at least $\tilde{g}_G$. As we said above, in Italy this would mean reducing expenditure by at least 8.7%, which is quite a strong effort considering that in 2013 public expenditure was reduced by less than 1%. In Spain, this value is about 20%, and in Greece about 48%. Clearly enough, cutting expenditure by such an extent is not viable, especially in the context of the current crisis. If the task is considered

reasonable, the actual expenditure cut is chosen according to the estimated multiplier.

If $\tilde{\beta} > \beta^e > \beta$, in the following period debt-to-gdp would decrease, though at the cost of further reducing gdp groth and thus deepening the stagnation/recession; moreover, $\tilde{\beta}$ would increase: if the rate of growth of spending were not in the primary-balance gap sustainability area, then the system is likely to enter into a vicious circle, with the necessity of continuous cuts of public expenditure and thus reductions of gdp. To avoid this, expenditure should be cut by at least $\tilde{g}_G^{(1)}$ – this would mean at least 9.2% for Italy, 20.8% for Spain, and 51.3% for Greece.

If on the contrary $\beta^e < \beta$, then fiscal restriction would result into an increase of the debt-to-gdp ratio: recession would be worsened *without* achieving debt stabilisation. Moreover, the primary-balance gap would likely remain negative, thus making the system enter the above mentioned vicious circle.

If $\beta^e > \tilde{\beta}_0$, then debt stabilisation has to be attempted by an *increase* in government spending. Whether or not this policy is able to achieve debt stabilisation depends on the actual value of the multiplier.

If $\beta^e < \beta$, the fiscal expansion would be more than enough to stabilise debt-to-gdp. In the following period debt-to-gdp would be lower, with the counter-cyclical policy also sustaining gdp growth. Moreover, if $g_G(\beta^e)$ were in the primary-balance gap sustainability area, in the following period the country would find itself in the more favourable position depicted in Figure 1b. However, even if it were not, the country would take advantage of fiscal expansion sustaining recovery. The only risk is associated to an increase of $\tilde{\beta}$ above the actual multiplier.

If $\beta^e > \beta > \tilde{\beta}_0$, the associated fiscal expansion would be smaller than the one required for debt stabilisation. The debt-to-gdp ratio would therefore increase, making the critical multiplier to decrease. This would lead the country to achieve a better position, though at the cost of a temporary increase in debt-to-gdp: with a lower $\tilde{\beta}$, the expansion required to reach debt and primary-balance gap sustainability would be lower too, and in the meanwhile the fiscal expansion would sustain recovery.

In conclusion, whatever the fiscal multiplier, the best choice would be that of increasing expenditure to a lesser extent than required for debt stabilisation when $\beta > \tilde{\beta}$.[11] Such a choice would of course make debt-to-gdp increase in the immediately following period, but precisely this temporary increase in debt-to-gdp ratio that would reduce $\tilde{\beta}$. With a recession going on, in fact, the country is in such a fragile position that an immediate decrease of debt-to-gdp, and the consequent increase of the critical level of the multiplier, would translate into the necessity of achieving debt stabilisation with impossibly high restriction efforts. Of course the same result, i.e. a decrease of $\tilde{\beta}$, could be achieved by reducing expenditure by sightly more than $\tilde{g}_G$. However, in this case the reduction would take place at the cost not only of increasing debt-to-gdp ratio, but also of deepening recession.

[Table 3 here]

To further corroborate this conclusion, let us do a final counterfactual exercise. In particular, let us consider five countries (Portugal, Ireland, Italy, Spain and Greece) and analyse the effect of (i) an increase and (ii) a reduction of government spending by 5% in two different scenarios: a "low" scenario, in which $\beta < \tilde{\beta} = 0.04$, and a "high" scenario, in which $\beta > \tilde{\beta} = 1$. As can be seen, in both cases (i) and (ii) this manoeuvre increases debt-to-gdp ratio, with a slightly greater increase associated to fiscal expansion in the low scenario, and *vice versa* in the high scenario. The same holds for the primary-balance gap, which decreases in both cases (i) and (ii). The variation is greater as a consequence of a fiscal restriction in some cases, of a fiscal expansion in others; the primary-balance gap is univocally smaller in the high scenario in case (i), in the low scenario in case (ii). Moreover, in both cases (i) and (ii) $\tilde{\beta}$ decreases, with minor differences among the two cases and the two scenarios.

The implications of such exercise are straightforward. While adopting a fiscal restriction rather than an expansion does not bring about significant differences in the final outcome as to what concerns

[11] This would also be the most viable choice, since the increase in government spending required for debt stabilisation, even in the case of low, though higher than critical, actual multiplier are in some cases (e.g. Greece) impossibly high.

debt-to-gdp, primary-balance gap, and $\tilde{\beta}$, it does make a huge different for nominal gdp growth, and thus recovery.[12]

If this is the case, why should small multipliers call for austerity? Given that our estimates cannot be accurate, and with European peripheral countries in the aftermath of a long-lasting recession, debt stabilisation is out of reach both by reducing and by increasing government spending. The most effective strategy would therefore be that of sustaining recovery via an expansionary policy which would produce on public budget exactly the same consequences as a restriction, but with much more positive consequences on economic activity.

Before concluding, a few final considerations are in place.

First of all, the whole counterfactual exercise has been carried out assuming the interest rate on consolidated debt constant at the 2013 level. However, it is quite obvious that the interest rate is changing, and that this very fact is bound to change the result of any fiscal policy. It is often stated that interest rates change according to the response of "financial markets" to the credibility of consolidation efforts. However, this conclusion is flawed by the premises on which it is built: starting from the conviction that fiscal restrictions do reduce debt-to-gdp ratios in the "medium run", even if their initial outcome is an increase of debt-to-gdp, forward-looking markets do also know that this is only a short run effect, and thus interest rates decrease allowing for consolidation to be effective. This reasoning can be questioned on the basis of the theoretical background from which it stems. The fact that fiscal restrictions reduce debt-to-gdp ratios in the long run is simply taken for granted, often starting from the idea that a reduction in public expenditure makes private investment to increase; the ensuing increase in the stock of capital makes its marginal productivity, i.e. the interest rate on capital, do decrease. The author strongly disagrees with this approach, for many different reasons whose analysis is out of the scope of the present contribution.

It is a matter of fact that nowadays it is a taboo to state that the interest rate can, and actually *should*, be taken as a policy variable, i.e. that the ECB, turning to the European situation, should act

[12] It can also be seen that the country which would benefit – or damaged in the case of a restriction – the most by these fiscal policies would be Greece, having a very low initial critical value of the multiplier, while Ireland would experience the smaller effects.

as a lender of last resort – or even worse, that national states should claim back monetary sovereignty. However, this a most important issue. First, because in this way the level of the interest rate would be known, and thus could be incorporated into accounting exercises of the kind of those performed above. Second, because lower interest rates imply reducing the "snow-ball effect", i.e. the part of the effort which must be devoted to the payment of interests on consolidated debt. Secondly, the fiscal multiplier itself is not exogenous: it depends on *how* public expenditure is reduced/increased. In other words, a careful sectoral study of the structure of each economic system is necessary in order to build up an industrial policy aiming at maximising the multiplicative effect of government spending.

Finally, it is worth devoting a few words to the issue of privatisations. Privatisations are often proposed as a way of cutting down the stock of accumulated debt, and thus of reducing debt-to-gdp ratios once and for all. The exercise carried out here should have clarified that this is not so. In fact, cutting down the stock of debt would not change the structural characteristics of the economic system: in a stagnating economy, a reduction in the stock of debt would inevitably be followed by new increases. Not only: such a reduction of the stock of debt would have the immediate effect of increasing the critical level of the multiplier, in so doing making debt-to-gdp grow *faster* than before.

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Figure 1. Sustainability area, rate of growth of public expenditure as a function of fiscal multiplier. $a \equiv D_0(g_0 - i) + tY_0(1 + g_0) - G_0, \tilde{g}_G \equiv a/G_0$

(a) $a < 0$ (b) $a > 0$

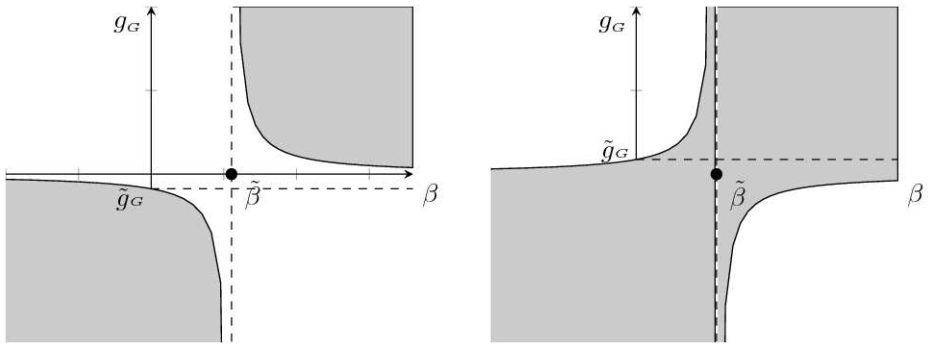

Figure 2. The primary-balance gap sustainability area

(a) $C > 0$, lower bound of the primary-balance gap sustainability area

(b) $C < 0$, upper and lower bound of the primary-balance gap sustainability area

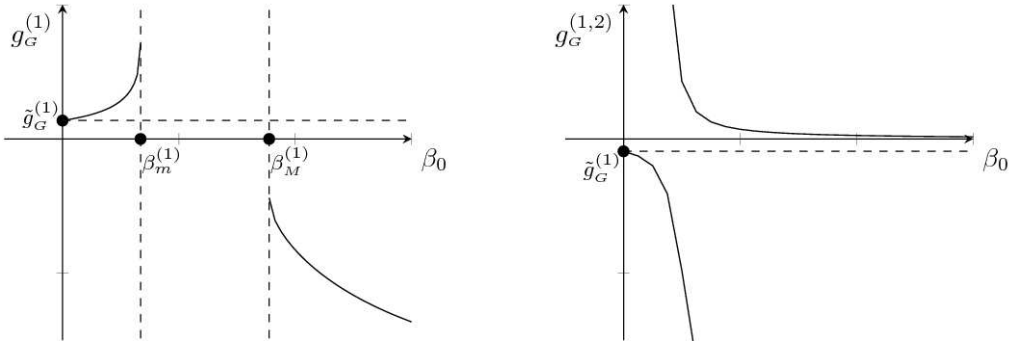

Table 1: Critical values of the multiplier computed according to (4) as compared EC's estimates (2011-2012). Critical value of the multiplier and g_G needed for debt-to-gdp ratio stabilisation and to switch from $a < 0$ to $a > 0$ (or keep $a > 0$) (2013). SCP targets for 2014-2016

Country	2011		2012										$\beta = 0.5$			$\beta = 1$			$\beta = 1.5$			SCP targets		
	$\widetilde{m}$	$\tilde{\beta}$	$\widetilde{m}$	$\tilde{\beta}$	a	C	$\tilde{g}_G$	$\tilde{g}_G^{(1)}$	$\tilde{\beta}$	bal	δ	g	g_G^*	$g_G^{(1)}$	$g_G^{(2)}$	g_G^*	$g_G^{(1)}$	$g_G^{(2)}$	g_G^*	$g_G^{(1)}$	$g_G^{(2)}$	2014	2015	2016
AUT	0.8	0.8	0.8	0.8	(+)	(+)	1.0	3.5	0.8	-2.5	74.8	2.5	2.7	--	--	-4.3	-151.5	-4.7	-1.2	-222.3	-2.2	-1.5	-0.6	0.0
BEL	0.7	0.7	0.7	0.7	(+)	(+)	0.7	2.9	0.7	-2.9	100.4	2.2	2.9	--	--	-1.3	-206.4	-2.8	-0.5	-274.1	-1.4	-2.0	-0.5	0.4
DEU	0.7	0.8	0.7	0.8	(+)	(+)	7.7	10.5	0.8	0.0	79.6	2.7	20.3	--	--	-31.7	-148.2	-16.8	-8.9	-236.8	-7.0	0.2	0.2	0.4
EST	2.8	2.2	2.5	2.0	(+)	(+)	6.8	13.7	2.1	-0.4	10.0	6.2	9.0	28.4	240.9	13.2	--	--	24.6	--	--	--	--	--
HUN	0.8	0.7	0.8	0.8	(+)	(+)	2.8	6.4	0.8	-3.1	80.7	3.6	7.7	--	--	-10.0	-163.4	-8.7	-3.0	-242.2	-3.9	-2.7	-2.2	-1.3
LTU	1.5	1.4	1.4	1.4	(+)	(+)	2.3	7.8	1.4	-3.0	39.9	5.4	3.7	18.8	247.3	8.5	--	--	-26.8	-115.3	-13.4	-1.5	-0.5	0.5
LUX	1.6	1.6	1.6	1.5	(+)	(+)	6.4	12.5	1.5	-0.9	24.5	5.6	9.7	37.3	150.2	19.9	--	--	-419.5	-90.3	-20.7	-0.6	-1.3	-1.3
LVA	1.4	1.3	1.4	1.3	(+)	(+)	8.0	14.1	1.3	-1.4	42.5	5.6	13.0	41.2	194.0	35.0	--	--	-50.4	-120.2	-22.2	-0.9	-0.9	-0.9
MLT	0.9	0.9	0.9	0.9	(+)	(+)	2.5	6.7	0.9	-3.4	72.6	4.1	5.8	--	--	-18.3	-132.1	-12.3	-3.5	-220.5	-4.9	-2.1	-1.6	-0.8
ROM	1.5	1.5	1.5	1.4	(+)	(+)	6.1	13.0	1.4	-2.5	38.5	6.5	9.5	34.5	215.6	22.0	--	--	-70.5	-106.7	-23.2	-2.0	-1.8	-1.8
SWE	1.0	1.1	1.0	1.1	(+)	(+)	2.2	4.8	1.1	-1.1	41.3	2.5	4.2	23.4	80.2	31.8	-79.0	-11.9	-5.7	-151.5	-4.1	-0.9	0.2	1.2
BGR	2.0	2.0	1.9	1.9	(-)	(+)	-0.4	3.0	1.8	-2.0	19.4	3.4	-0.5	5.7	289.7	-0.9	--	--	-2.2	-64.3	-8.6	-1.3	-1.0	-0.8
DNK	0.9	1.0	0.9	1.0	(-)	(+)	-0.3	1.3	1.0	-1.9	44.3	1.7	-0.7	6.7	70.9	58.8	-101.7	-2.3	0.7	-163.6	-1.0	-1.7	-2.8	-2.0
CYP	0.8	0.9	0.8	0.8	(-)	(-)	-50.2	-53.9	0.6	-8.3	116.1	-8.2	-227.0	-146.0	188.6	89.9	-265.7	51.9	37.5	-327.3	28.1	--	--	--
CZE	1.3	1.2	1.2	1.2	(-)	(-)	-6.7	-6.5	1.12	-2.9	49.0	0.2	-12.1	-17.0	189.1	-63.7	-92.0	17.4	19.5	-163.3	6.6	-2.9	-2.8	-2.8
ESP	0.9	0.9	0.8	0.8	(-)	(-)	-20.1	-20.8	0.8	-6.8	94.8	-0.9	-59.6	-72.1	146.7	61.7	-205.8	25.7	20.3	-277.7	12.7	-5.5	-4.1	-2.7
FIN	0.9	1.0	0.9	0.9	(-)	(-)	-1.6	0.0	0.9	-2.6	58.4	1.6	-3.7	-0.1	51.5	11.8	-127.8	0.0	2.3	-187.5	0.0	-1.3	-0.9	-0.7
FRA	0.7	0.7	0.7	0.7	(-)	(-)	-3.3	-1.7	0.7	-4.2	93.5	1.7	-12.4	-28.1	22.5	7.2	-191.9	1.7	2.8	-252.7	0.8	-2.9	-2.0	-1.2
GBR	0.8	0.8	0.7	0.8	(-)	(-)	-7.1	-4.7	0.7	-6.4	94.3	2.6	-22.0	-30.6	70.9	20.3	-193.7	5.6	6.9	-266.9	2.7	-6.0	-5.2	-3.5
GRC	0.5	0.5	0.5	0.5	(-)	(-)	-48.6	-51.3	0.5	-13.6	176.2	-5.6	465.5	-214.0	95.7	40.2	-348.2	29.5	21.0	-402.4	17.0	--	--	--
IRL	0.7	0.7	0.6	0.7	(-)	(-)	-15.5	-14.7	0.6	-7.2	124.4	1.1	-76.1	-86.1	93.0	26.2	-280.3	14.3	11.2	-364.4	7.3	-4.4	-2.2	-1.7
ITA	0.6	0.6	0.6	0.6	(-)	(-)	-8.7	-9.2	0.6	-2.8	133.0	-0.5	-92.6	-97.8	43.0	10.8	-290.3	7.2	5.1	-363.1	3.9	-1.8	-1.5	-0.9
NLD	0.8	0.9	0.8	0.8	(-)	(-)	-5.5	-4.9	0.8	-3.3	74.9	0.6	-14.0	-23.8	87.5	25.2	-154.1	6.8	6.6	-220.9	3.1	-3.0	-2.0	-1.9
POL	1.1	1.1	1.1	1.1	(-)	(-)	-7.4	-5.3	1.1	-4.8	58.2	2.3	-14.1	-15.0	187.1	-144.0	-105.4	13.3	17.5	-185.1	5.1	-3.3	-2.7	-1.6
PRT	0.7	0.7	0.6	0.6	(-)	(-)	-13.0	-12.9	0.6	-5.9	127.8	0.1	-89.5	-95.7	62.0	18.1	-275.2	10.8	8.3	-347.1	5.7	-4.0	-2.5	-1.2
SVK	1.3	1.3	1.2	1.2	(-)	(-)	-3.1	-0.9	1.2	-3.0	54.3	2.4	-5.6	-2.2	230.6	-24.7	-72.0	3.5	10.1	-168.4	1.0	-2.6	-2.0	-1.3
SVN	1.1	1.1	1.0	1.0	(-)	(-)	-15.4	-16.2	0.9	-5.8	63.2	-1.0	-33.2	-46.5	156.0	205.4	-140.2	25.8	25.1	-201.1	12.0	-2.6	-2.1	-1.4

Source: Own computations based on AMECO. SCP targets come from European Commission, Directorate-General for Economic and Financial Affairs (2013). Estimates for $\widetilde{m}$ 2011 and 2012 come from Boussard, Castro, and Salto (2012) and Berti, Castro, and Salto (2013), respectively.

Notes: $\widetilde{m}$: Boussard, Castro, and Salto (2012)'s critical multiplier; $\tilde{\beta}$: Critical multiplier computed according to expression (2); a: Primary balance gap; $\tilde{g}_G$: debt-stabilising level of g_G when $\beta = 0$ (in %); $\tilde{g}_G^{(1)}$: lower bound of primary-balance gap sustainability area when $\beta \to 0$ (in %); *bal*: General government primary balance as a percentage of gdp; δ: debt-to-gdp ratio (in %); g: Actual rate of growth of nominal gdp (in %); g_G^*: debt-stabilising level of g_G (in %); $g_G^{(1)}$: lower bound of primary-balance gap sustainability area (in %); $g_G^{(2)}$: upper bound of primary balance gap sustainability area (in %).

Table 2: Main macroeconomic variables following SCP for 2014-2016: low-, average, and high-multiplier scenarios

	$\beta = 0.5$											
Country	2014				2015				2016			
	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g
PRT	133.3	0.57	-5.8	-1.2	139.3	0.55	-6.6	-2.6	146.6	0.53	-7.9	-4.2
IRL	129.5	0.61	-8.9	-0.6	134.7	0.59	-9.3	-2.2	140.7	0.57	-5.3	-3.1
ITA	136.9	0.54	-4.4	-1.5	141.6	0.53	-3.4	-2.3	147.6	0.51	-5.4	-3.5
ESP	102.4	0.71	-6.1	-2.1	110.4	0.67	-8.1	-3.7	119.8	0.63	-10.2	-5.7
FRA	95.1	0.68	-1.1	1.4	96.0	0.67	-0.6	1.2	96.1	0.67	-0.5	1.1
GBR	97.6	0.72	1.7	3.0	99.8	0.71	1.0	3.2	100.5	0.71	-1.4	2.9
DEU	76.8	0.82	2.8	3.3	73.5	0.85	4.4	4.2	69.5	0.88	5.0	5.3
NLD	77.4	0.80	-0.2	0.5	79.4	0.79	-2.2	0.0	81.4	0.78	-0.4	-0.1
AUT	74.4	0.81	0.5	2.6	73.0	0.82	1.0	2.8	70.6	0.83	2.2	3.4
	$\beta = 1$											
Country	2014				2015				2016			
	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g
PRT	136.6	0.56	-8.4	-3.6	153.7	0.51	-14.3	-9.7	193.2	0.42	-25.3	-19.9
IRL	133.1	0.60	-11.8	-3.4	148.7	0.54	-16.8	-9.2	177.4	0.47	-19.7	-15.4
ITA	139.7	0.53	-6.6	-3.6	153.0	0.50	-9.6	-7.8	184.4	0.43	-20.2	-16.6
ESP	104.6	0.70	-8.5	-4.4	120.7	0.63	-15.1	-10.3	153.5	0.52	-25.9	-20.0
FRA	95.8	0.67	-1.8	0.7	98.4	0.66	-2.5	-0.7	102.9	0.64	-5.0	-3.3
GBR	97.0	0.73	2.4	3.7	97.6	0.72	2.9	4.9	96.1	0.73	1.2	5.4
DEU	76.0	0.83	3.9	4.3	70.3	0.87	8.2	7.8	61.5	0.94	13.8	13.7
NLD	77.5	0.80	-0.3	0.4	80.5	0.78	-3.5	-1.3	84.7	0.76	-3.2	-2.7
AUT	74.2	0.81	0.8	2.9	72.1	0.82	2.0	3.9	67.7	0.85	5.4	6.4
	$\beta = 1.5$											
Country	2014				2015				2016			
	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g	δ	$\tilde{\beta}$	g_G	g
PRT	146.1	0.53	-15.2	-10.1	245.4	0.35	-47.0	-39.9	-954.9	-0.11	-153.8	-125.7
IRL	140.8	0.57	-17.5	-8.8	197.2	0.43	-37.2	-27.8	542.3	0.17	-80.3	-63.5
ITA	148.9	0.51	-13.2	-9.6	248.6	0.34	-45.7	-39.7	-461.2	-0.24	-191.9	-153.8
ESP	110.0	0.68	-13.7	-9.3	165.2	0.49	-38.0	-31.7	1248.6	0.08	-103.2	-86.7
FRA	98.7	0.66	-5.0	-2.4	128.3	0.55	-24.4	-21.9	-554.6	-0.20	-131.0	-123.1
GBR	95.4	0.73	4.3	5.5	89.8	0.77	11.1	12.7	72.8	0.88	26.1	29.6
DEU	74.3	0.84	6.6	6.8	61.4	0.94	21.6	20.6	37.9	1.21	62.1	60.3
NLD	77.8	0.80	-0.7	0.1	84.4	0.76	-8.0	-5.6	109.9	0.64	-23.1	-21.8
AUT	73.6	0.81	1.7	3.8	67.9	0.85	7.8	9.4	51.0	0.99	33.1	33.2

Source: Own computations based on AMECO.

Notes: β: Fiscal multiplier; δ: Debt-to-gdp ratio, (%); $\tilde{\beta}$: Critical multiplier; g_G: Rate of growth of government spending, (%); g: Rate of growth of gdp, (%).

Table 3:

Panel (A): critical multiplier, debt-to-gdp ratio and primary balance gap, 2013

	Spain	Greece	Ireland	Italy	Portugal
$\tilde{\beta}_{13}$	0.75	0.45	0.63	0.55	0.58
δ_{13}	94.78	176.22	124.35	132.99	127.80
a_{13}	−84.31	−48.02	−9.68	−62.46	−9.60

Panel (B): counterfactual exercise, effects of a 5% increase/decrease in government spending

$g_G = 5\%$

		$\beta = 0.40$				$\beta = 1.00$			
Country	ΔG	$\tilde{\beta}_{14}$	δ_{14}	g_{14}	a_{14}	$\tilde{\beta}_{14}$	δ_{14}	g_{14}	a_{14}
ESP	20.99	0.71	104.01	0.86	−84.76	0.71	102.28	2.14	−61.44
GRC	4.94	0.40	204.07	1.19	−29.61	0.41	199.91	2.92	−20.73
IRL	3.12	0.60	130.76	0.78	−12.91	0.61	128.94	1.92	−9.04
ITA	35.70	0.54	137.61	0.96	−55.87	0.55	135.10	2.36	−4.33
PRT	3.70	0.56	134.25	0.93	−10.66	0.57	131.92	2.30	−5.62

$g_G = -5\%$

		$\beta = 0.40$				$\beta = 1.00$			
Country	ΔG	$\tilde{\beta}_{14}$	δ_{14}	g_{14}	a_{14}	$\tilde{\beta}_{14}$	δ_{14}	g_{14}	a_{14}
ESP	−20.99	0.71	102.20	−0.80	−71.39	0.71	103.98	−2.01	−93.44
GRC	−4.94	0.40	204.04	−1.10	−31.12	0.40	208.44	−2.80	−39.69
IRL	−3.12	0.61	129.49	−0.71	−11.45	0.60	131.36	−1.80	−15.11
ITA	−35.70	0.54	136.42	−0.88	−48.77	0.53	139.02	−2.24	−97.92
PRT	−3.70	0.57	132.94	−0.86	−9.56	0.56	135.36	−2.17	−14.36

Source: Own computations based on AMECO

Notes: β actual multiplier; ΔG: additional government spending (net of interest), billions euros; $\tilde{\beta}_{yr}$: critical value of the multiplier in year yr; δ_{yr}: Debt-to-gdp ratio in year yr, (%); g_{yr}: rate of growth of nominal gdp in year yr, (%); a_{yr}: primary-balance gap in year yr, billions euros