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# GOOD AND BAD EQUILIBRIA
## WHAT CAN FISCAL (AND OTHER) POLICIES DO?

**Pier Carlo Padoan, Urban Sila and Paul van den Noord**[1]
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Fiscal consolidation will go too far if it pushes the economy towards a "bad equilibrium" with high and growing fiscal deficits and debt, high risk premia on sovereign debt, slumping economic activity and plummeting confidence. In this paper we examine the possible conditions under which fiscal consolidation would backfire in this sense. For this purpose we develop a stylised stock-flow model of public debt and growth, which we subsequently calibrate empirically on a sample of OECD countries. We find that, if the sovereign risk premium is initially high, fiscal consolidation will help a country to escape from a "bad equilibrium", not push it toward it, even if the direct negative demand impact of fiscal consolidation is large. In that case the stabilising impact of structural reform and financial backstops will also be larger than under normal market conditions.

*Keywords:* Fiscal policy, Sovereign debt, Multiple equilibria.

Fiscal consolidation is ongoing in many countries, including in several euro area member states. There are increasing calls to ease the pace of consolidation on the grounds that fiscal "austerity" in bad times, rather than strengthening debt sustainability by lowering risk premia, could be self-defeating as its negative impact on growth (both actual and potential) would more than offset credibility benefits. It could be argued that such a dilemma as to whether and in which circumstances markets prefer discipline or stimulus

1. The views expressed in this article are those of the authors and do not necessarily reflect those of the OECD and its members. The authors are indebted to participants at the EUROFRAME conference and an anonymous referee for valuable comments.



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should be resolved empirically. However this dilemma cannot be addressed effectively without expanding the discussion and looking more carefully at growth in a high debt environment, such as the one that many advanced countries face today (and will face for some time to come). In such an environment the role of debt in depressing growth (and affecting risk assessment) must be taken into consideration, as well as the role that structural policy can play in boosting growth and contributing to debt sustainability.

Obviously, fiscal consolidation carries a negative direct demand effect in the short run. However, there may be offsets, and how strong the net effect on growth will be, and perhaps even its sign, is uncertain. There is a vast though not entirely conclusive literature on the subject, prompted by Giavazzi and Pagano (1990) who argued that fiscal consolidations can be expansionary, based on a number of case studies. According to Perotti (1999) the odds of an expansionary effect of fiscal consolidation increase with the extent of the initial fiscal predicament, possibly because the private sector realises that the situation is unsustainable. In a similar vein, Reinhart and Rogoff (2010) argue that when government debt rises above 90% of GDP, median growth falls by 1 percentage point. Consequently, cutting debt below that threshold would boost economic growth, at least in the medium to long run. Conversely, there is evidence to suggest that fiscal consolidation may have a possibly large negative impact on economic activity in the short run if the interest rate has hit the zero bound and hence monetary easing cannot be used as an offset (see e.g. Delong and Summers, 2012 and IMF, 2012).

Given the uncertainty of the size—if not the sign—of its impact, how should we identify the "right amount" of fiscal consolidation? One possible way is the following. Fiscal consolidation will go too far if, in a world where multiple equilibria are possible, it will push the economy into a "bad equilibrium" after it has been hit by an adverse shock. A bad equilibrium is characterized by the simultaneous occurrence, and adverse feedbacks between, high and growing fiscal deficits and debt, high risk premia on sovereign debt, slumping economic activity and plummeting confidence. Conversely, fiscal consolidation is an appropriate policy if it helps to break such a downward spiral, possibly in combination with

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financial firewalls to prevent contagion and structural reforms to boost growth or expectations thereof.

To analyse these relationships in a systematic way we develop a stylised stock-flow model of public debt and growth, which we subsequently calibrate empirically on a sample of OECD countries. A main finding is that fiscal consolidation generally helps countries to escape from a "bad equilibrium", as do structural reforms and financial backstops. This appears to be true even if the initial adverse growth impact of fiscal consolidation is comparatively large, assuming a country suffers from a high risk premium in bond markets. Moreover, in that case the stabilising impact of structural reform and financial backstops is also larger than under "normal" market conditions.

## 1. "Good" and "bad" equilibria

As a necessary first step we need to identify what a "bad equilibrium" is and what distinguishes it from a "good equilibrium". We define these concepts with the help of a stylized economic stock-flow model.[2] The model has three equations. The first equation describes a negative relationship between public debt and economic growth ($Y$ = output, $D$ = real government debt and an over-dot indicates the change in the variable)[3]. It is augmented with the impact on growth of financial conditions proxied by the real interest rate $r$, and the fiscal policy stance proxied by the primary deficit as a share of GDP $p$ , with the associated semi-elasticities represented by the parameters $f$ and $g$, respectively:

$$\frac{\dot{Y}}{Y} = a - b\frac{D}{Y} - fr + gp \qquad (1)$$

This equation is depicted in Figure 1 as the downward-sloping straight line *RR*. *RR* stands for Reinhart and Rogoff (2010) who were the first to posit this relationship and to have tested it empirically. This negative relationship can be explained *inter alia* by adverse expectations with regard to future taxation associated with high public debt. It may also capture the effect of sovereign stress

2. It is inspired by a model developed by Duesenberry (1958) to analyze the Great Depression.
3. To keep the model simple we abstract from inflation, hence real and nominal variables are identical.

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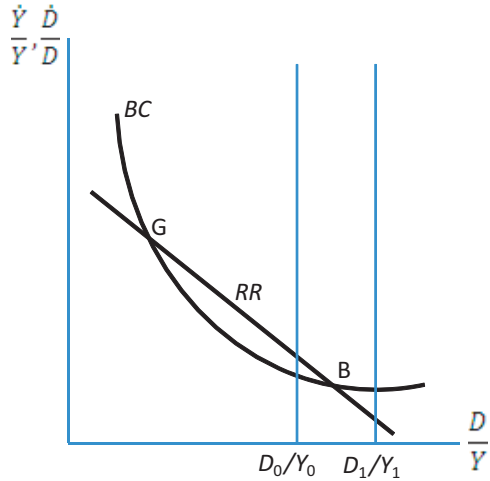
spilling over to banks which hold substantial amounts of sovereign debt on their balance sheets, in turn weighing negatively on the cost of financing for the private sector and on confidence and hence on growth. However, as we will argue below, this negative relationship between debt and growth exists only beyond a certain threshold. At lower levels of the ratio of debt to GDP the relationship may actually be flat or even positive. Finally, growth is positively affected by the exogenous impact of structural reforms, as documented in several issues of the OECD's series *Going for Growth* (see e.g. OECD, 2012), captured by parameter *a*.

**Figure 1. Good and bad equilibria**




*Note:* The horizontal axis measures the public debt to GDP ratio and the vertical axis the growth rates of public debt and output. *RR* is the relationship between growth and debt and *BC* the government's budget constraint. If the debt ratio is located right from the bad equilibrium *B*, it derails while output contracts at an accelerating pace. Left of *B* the debt ratio converges towards the good equilibrium *G*.

According to equation (1) a higher interest rate depresses growth and a larger fiscal deficit supports growth.[4] These are just

4. We include the level rather than the change of the primary public deficit in this growth equation. This is consistent with the "Robertsonian saving" hypothesis embedded in Duesenberry's (1958) model. This hypothesis postulates that the next period's output is determined by the preceding period's income less net saving ($S_n$), so $Y_{t+1} = k(Y - S_n)$, where $k$ is a constant. This implies that $\dot{Y}/Y = -kS_n/Y - (1 - k)$, so it is the *level* of net saving as a share of output that determines the next period's output growth rate. Net saving can be broken down into public net saving as a share of output, *i.e.* the fiscal position, and private net saving as a share of output, which in turn may be assumed to be a function of the public debt ratio and the real interest rate as is implicit in equation (1).

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the first-order effects of the interest rate and fiscal policy on growth. There are second order effects that run through the government's budget constraint, which is the second equation of the model and in fact an identity. It relates the primary deficit as a per cent of GDP $p$ to the real interest rate $r$ and real public debt $D$:

$$\dot{D} = rD + pY \tag{2a}$$

Dividing the two sides of the equation by $D$ yields:

$$\frac{\dot{D}}{D} = r + \frac{p}{D/Y} \tag{2b}$$

This is the hyperbolic relationship between real growth of debt and the debt ratio depicted as *BC* (as in budget constraint) in Figure 1.[5] As the debt ratio increases, the real growth of debt approaches asymptotically the real interest rate. The intersections of the two curves correspond to, respectively, the "good" equilibrium (*G*) and the "bad" equilibrium (*B*). If the debt ratio is located in the interval between the intersections *G* and *B* (indicated by $D_0/Y_0$), output growth will exceed the growth of debt, and hence the debt ratio is falling until the good equilibrium *G* is attained: the good equilibrium is stable. However, if the debt ratio is located right of the intersection point *B* (e.g. if the debt ratio equals $D_1/Y_1$), the growth of debt exceeds output growth. So the equilibrium *B* is unstable. Beyond *B* debt keeps growing while output growth keeps falling, hence the debt ratio is on an explosive path.

What is not shown in Figure 1 (for the sake of simplicity) is that if the debt ratio is on an explosive path the real interest rate is bound to increase: the *BC* schedule shifts outward, thus adding momentum to the debt explosion. To capture this effect we need to include an interest rate equation, which is the third equation of our stylised model. Specifically, we assume that the interest rate responds to the growth in the debt ratio and an (exogenous) factor $h$. So:

$$r = h + c\left(\frac{\dot{D}}{D} - \frac{\dot{Y}}{Y}\right) \tag{3}$$

5. For the sake of simplicity we omit in this specification the impact of other factors on changes in the stock of debt, such as revaluations, the purchase of sale of financial assets by the government, or default.

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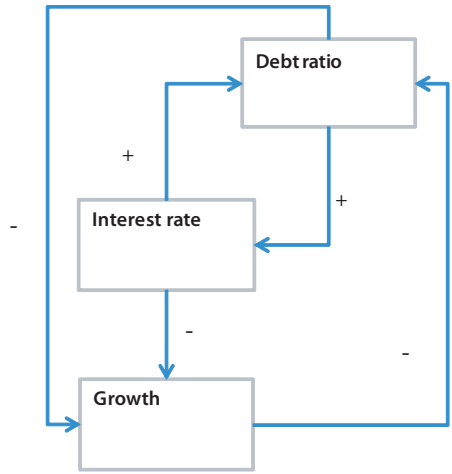
The rationale for including the growth rate of the debt ratio as an explanatory variable is that we see this as a possible gauge of unsustainable public finances. Specifically, we expect an accelerating debt ratio to raise the probability of default (for real or as perceived by the markets), *i.e.* the faster the increase in the debt ratio, the higher the risk premium. The parameter $h$ captures the impact of swings in market sentiment and contagion effects (in as much as these are unrelated to local debt dynamics) as well as financial backstops to offset such sentiment and contagion effects. As we shall see these factors seem to play an important role in the recent euro area dynamics. A reason why this occurs in the euro area (and not elsewhere) is that concerns about the sustainability of monetary union give rise to a euro "exit" or "break-up" risk premium in countries in fiscal distress.

In sum, our model gauges three potentially explosive feedback mechanisms: (i) between the debt ratio and growth (a high debt ratio depresses growth which boosts the debt ratio, etc.); (ii) between the debt ratio and the interest rate (a high interest rate pushes up debt which gives a higher interest rate, etc); and (iii) between growth and the interest rate (a higher interest rate depresses growth which pushes up the debt ratio and hence the interest rate, etc.). This is illustrated in Figure 2. The point to retain is that these feedbacks will be explosive if the initial debt ratio is "right of $B$" or converge (to the "good equilibrium" $G$) if it is located "left of $B$".

Figure 2. Feedback mechanisms in the model

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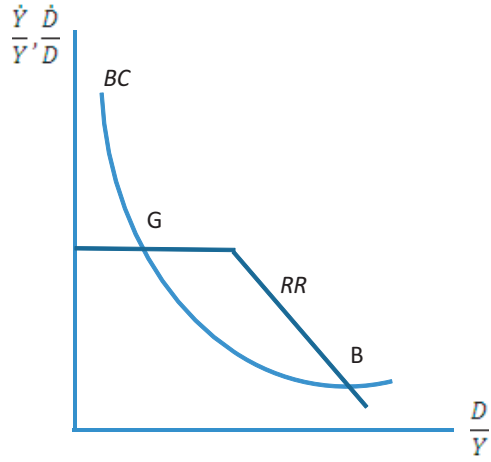
It is possible to derive formal expressions for the "good" and "bad" equilibrium debt positions *G* and *B*, but before we do so we need to address two (important) technical complications. The first complication is that the *RR* schedule may be "kinked", in the sense that only beyond a certain debt threshold there will be a significant adverse impact of debt on growth, as depicted in Figure 3. This is a standard finding in the empirical literature following Reinhart and Rogoff's seminal paper, with the debt threshold generally found to be close to 90% of GDP.[6] Indeed this is what we find in our own empirical work (see below).This does not change the basic features of the model, other than that the value of the parameter *b* in equation (1) is conditional on the level of the debt ratio.

**Figure 3. Debt threshold**




The second complication is that the hyperbolic relationship between debt growth and the debt ratio depicted in Figures 1 and 3 is only valid in this form if the primary balance is in deficit. If it is in surplus *p* takes a negative value and the shape of the *BC* schedule changes as depicted in Figure 4. The bad equilibrium preserves its basic features, that is right from the intersection *B* the debt ratio

6. See Cecchetti *et al.* (2011) and Checherita and Rother (2010). Some authors find two thresholds, with debt below the lower threshold favourable to growth and debt beyond the higher threshold harmful to growth; see Kumar and Woo (2010) and Elmeskov and Sutherland (2012) who report thresholds of 30 and 90% and 45 and 66%, respectively.

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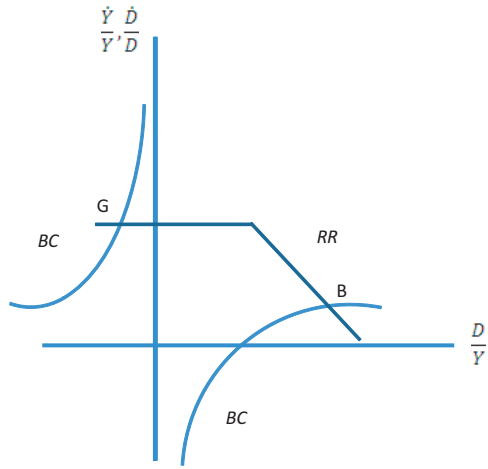
explodes, but the nature of the good equilibrium is somewhat different. Left of the intersection *B* the economy is still stable as output grows faster than debt. However, the good equilibrium *G* is now located in the second quadrant, *i.e.* corresponds to a positive asset position of the government. In the interval between the vertical axes and the good equilibrium *G*, assets grow faster than output and hence the asset-to-GDP ratio increases. It will do so until the good equilibrium *G* is reached.

Ignoring these complications for now, the steady-state debt ratio (when debt and output grow at the same rate) can be derived by equating the *BC* and *RR* equations (1) and (2b) and equating the growth rates of debt and output in the interest equation (3), which yields:

$$-b\left(\frac{D}{Y}\right)^2 + [a + gp - (1+f)h]\frac{D}{Y} - p = 0 \tag{4}$$

**Figure 4. Debt threshold and primary surplus**




This has two solutions:

$$\left(\frac{D}{Y}\right)^G = \frac{[a + gp - (1+f)h] - \sqrt{[a + gp - (1+f)h]^2 - 4bp}}{2b} \tag{5a}$$

$$\left(\frac{D}{Y}\right)^B = \frac{[a + gp - (1+f)h] - \sqrt{[a + gp - (1+f)h]^2 - 4bp}}{2b} \tag{5b}$$

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Equations (5a) and (5b) are the solutions for the good equilibrium *G* and the bad equilibrium *B*, respectively. It is interesting to note that the parameter *c*, the semi-elasticity of the real bond yield with respect to the growth in the debt ratio, drops out of the equation, which is simply a consequence of the economy assumed to be in a steady state and hence the debt ratio being constant. This implies that the adverse feedback loop from debt *via* the bond yield on growth does not operate via a change in the bad equilibrium itself but rather by influencing the pace of decline or improvement once the economy finds itself in the bad equilibrium.[7] That said, *exogenous* increases in the bond yield (an increase in *h*) will lower the bad equilibrium debt ratio (see below).

Importantly, the solutions (5a) and (5b) provide an indication as to where the economy will be heading if the actual debt to GDP ratio is located either left or right of the bad equilibrium *B*. As can be inferred from Figure 1, the higher is the bad equilibrium debt ratio, the smaller are the odds that the economy after being hit by an adverse shock to its debt ratio shifting it from $D_0/Y_0$ to $D_1/Y_1$ (for example due to a banking crisis) will be trapped in a tailspin of falling activity and rising interest rates. And the lower is the good equilibrium debt ratio, the longer will be the spell of accelerating growth if the debt ratio is hit by a favourable shock (e.g. a bail-out or orderly default). So, an increase in the bad equilibrium debt ratio (and a fall in the good equilibrium debt ratio) should be interpreted as contributing to more favourable growth and debt dynamics in the short and medium run.

For the solutions (5a) and (5b) to be feasible it is necessary that the term under the root sign is positive. At the limit it could be zero in which case only one solution exists, which has a "bad" right side (debt ratio and growth derail of the equilibrium) and a "good" left side (debt ratio and growth stabilise left of the equilibrium). Whether or not these solutions are feasible is an empirical question, which we will address below. But before we address that issue we will first examine how policy can help a country who is trapped in the bad equilibrium to recover.

7. If it is assumed that the interest rate depends on the level (as opposed to the growth rate) of the debt ratio, the equivalent of the parameter *c* would of course enter the solutions for the good and bad equilibria. However, our empirical work (see below) suggests that it is the growth rate of the debt ratio rather than its level that affects the yield spread.

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## 2. Policies to escape from the "bad equilibrium"

Within the logic of this model there are three policy levers available for countries to escape from the bad equilibrium: structural reform (affecting *a*), financial backstops to reduce the bond yield (affecting *h*), and fiscal policy (*p*). These policies should not be seen as alternatives, but rather as complements. This is the case because they can be mutually reinforcing, as will be demonstrated below. More fundamentally, though, this is also the case because we assume the economy's growth and fiscal fundamentals to be structurally weak. This weakness may have been masked for some time by risk under-pricing in financial markets and excessive leveraging in the private sector, but has become apparent as the economy is hit by a financial and sovereign debt crisis. Hence, this reversal of fortunes needs to be addressed by all three policy levers so as to deliver durable results.

### 2.1. Structural reform and financial backstops

As depicted in Figure 5, structural reform shifts the *RR* schedule outward. As a result, a country whose debt ratio $D_1/Y_1$ was on an explosive path initially, will find itself left from the (now shifted) bad equilibrium *B'* and see its debt ratio fall and growth resume towards the good equilibrium *G'*.

But obviously it takes time for structural reform to exert this virtuous effect on growth and debt, while time is severely lacking when a country is trapped in a bad equilibrium. Moreover, for structural reform to produce this virtuous effect confidence must be restored. Think for example of product market liberalisation that opens up new investment opportunities. Without confidence and the availability of affordable funding these opportunities for investment may be not taken up and so higher growth would not materialize. Without a financial backstop the interest rate could continue to grow, driven by adverse debt dynamics and or by systemic effects (more below). In other words the role of a financial backstop is to provide a "confidence bridge" to buy time, *i.e.* to allow for structural reforms to bear their fruits.

Financial backstops can help countries to escape from the bad equilibrium also through another channel: via the government budget constraint. This is depicted in Figure 6, illustrating how a

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fall in the interest rate shifts the *BC* schedule downward and thus again pushes the bad equilibrium to the right, triggering a convergence towards the (now shifted) good equilibrium *G'*. So, financial backstops are a double-edged sword: they boost growth directly as well as indirectly by containing the debt-interest snowball. Obviously this presupposes that the backstops are not "abused" by the government to give up on either structural reform or fiscal consolidation (to which we turn next). Moral hazard must be contained; otherwise the confidence bridge breaks down.

These findings can be easily formalised by computing the relevant policy multipliers from equation (5b):

$$\partial\left(\frac{D}{Y}\right)^{B}/\partial a = \left(\frac{D}{Y}\right)^{B}\frac{1}{\sqrt{[a+gp-(1+f)h]^2-4bp}} > 0 \qquad (6)$$

$$\partial\left(\frac{D}{Y}\right)^{B}/\partial h = -\left(\frac{D}{Y}\right)^{B}\frac{1+f}{\sqrt{[a+gp-(1+f)h]^2-4bp}} < 0 \qquad (7)$$

**Figure 5. The impact of structural reform and financial backstops through the output channel**

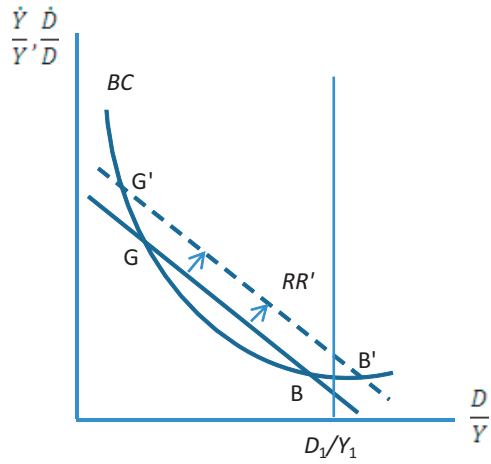


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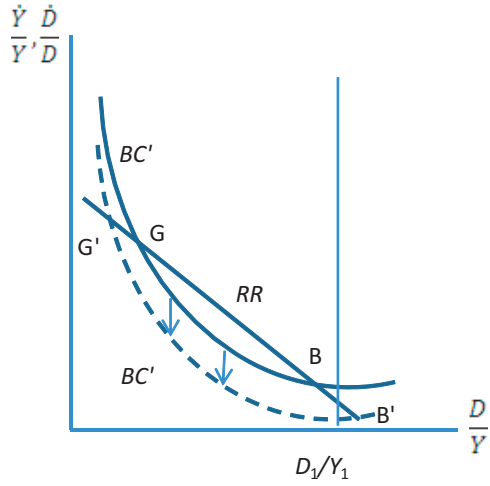
Figure 6. The impact of financial backstops through the government budget channel




These equations confirm the graphical analysis: structural reform and financial backstops help countries to escape from the bad equilibrium (as it "shifts to the right"). Importantly, these multipliers also confirm that these policies are mutually reinforcing: a rightward shift in the "bad equilibrium" triggered by structural reform raises the multiplier of financial backstops and *vice versa*.

### 2.2. Fiscal consolidation

In our stylised model fiscal consolidation works through two channels (output and the government budget constraint). This is similar to financial backstops, which work through the same channels, except that the effects of fiscal consolidation are in opposite directions, with the net effect ambiguous. Fiscal consolidation is represented by a sustained cut in the primary deficit $p$, which shifts the *BC* schedule down as depicted in Figure 7. However, as shown in Figure 8 it also implies a negative demand shock, shifting the *RR* schedule down. The former is potentially stabilising (the bad equilibrium shifts to the right) whereas the latter is potentially destabilising (the bad equilibrium shifts to the left). Where the bad

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equilibrium ends up is an empirical question: our theory cannot provide a prediction.

It is again possible to derive the relevant multiplier to measure the impact of changes in the primary deficit $p$ on the bad equilibrium, which reads:

$$\partial\left(\frac{D}{Y}\right)^{B}/\partial p = \left[g\left(\frac{D}{Y}\right)^{B}-1\right]\frac{1}{\sqrt{[a+gp-(1+f)h]^2-4bp}} \gtreqless 0 \quad (8)$$

Whether an increase in the primary deficit gives a lower bad equilibrium debt ratio (with the economy becoming more unstable) or the reverse is indeed ambiguous and depends on the initial level of the bad equilibrium debt and on the "Keynesian" fiscal demand multiplier $g$. When both are large, such that:

$$g\left(\frac{D}{Y}\right)^{B} > 1$$

fiscal expansion (an increase of $p$) will have a favourable impact on the bad equilibrium *i.e.* it will shift it to the right. This is a situation where the country has fiscal space available to effectively boost the economy out of the bad equilibrium through fiscal expansion. But if either of the two is small (the Keynesian fiscal impact on growth is small and the initial bad equilibrium debt level is small), such that:

$$g\left(\frac{D}{Y}\right)^{B} < 1$$

fiscal expansion will exacerbate the bad equilibrium trap. Fiscal consolidation is than the appropriate policy, possibly in combination with structural reform and financial backstops (since these increase the multiplier (8) and hence the effectiveness of fiscal consolidation).

To sum up, the effect of fiscal policy on the growth path of the economy is ambiguous and strongly depends on the initial conditions. It is therefore of crucial importance to empirically calibrate the model so as to able to assess the need for and effectiveness of fiscal consolidation when countries are trapped by the bad equilibrium. We turn to this in the next section.

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Figure 7. The impact of fiscal consolidation through the government budget channel

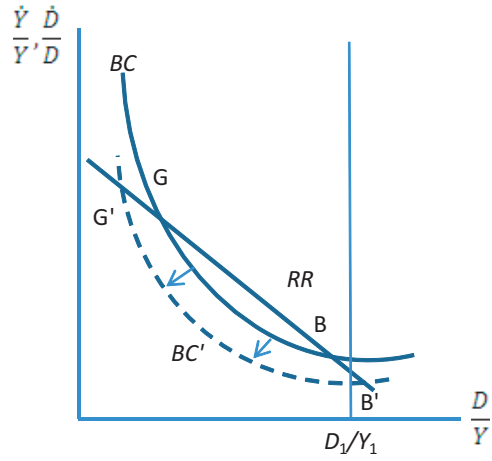
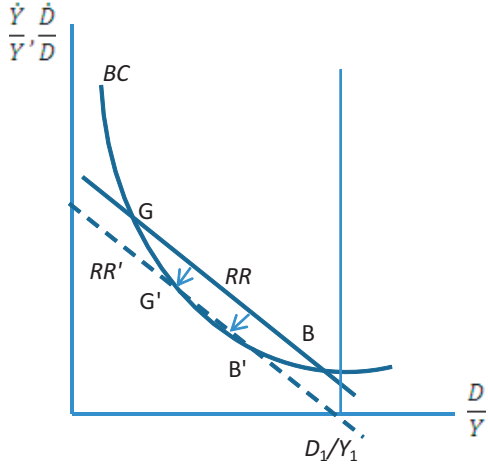



Figure 8. The impact of fiscal consolidation through the output channel




## 3. Empirical calibration

In a recent OECD working paper (Padoan *et al.* 2012) we report estimation results for the growth and interest rate equations (1) and (3), respectively, which we will use as the basis for our empirical calibration. The estimations are based on a sample of 28

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OECD countries and spans over up to 52 years, from 1960 to 2011, depending on data availability.[8] We purposefully used as broad a sample as possible, in order not to make results dependent on an arbitrarily chosen period or group of countries. We also used the GMM estimation technique and only included lagged right-hand side variables so as to minimise the risk of reverse causality.

Most parameter values can be directly inferred from the estimation results, with the exception of the terms $a$ and $h$ appearing in, respectively, the growth and interest rate equations. These comprise country-specific constant terms as well as the impact of a range of control variables on growth and the interest rate, and hence vary across countries and over time. [9]

In addition we need to modify the theoretical model to capture the threshold effect of public debt on growth that came out significant in the econometric results. Specifically, the relevant growth equation reads:

$$\frac{\dot{Y}}{Y} = a - b_1 \frac{D}{Y} - b_2 M\left(\frac{D}{Y} - T\right) - fr + gp \qquad (1b)$$

where $M$ is a dummy variable taking the value 1 if the debt ratio is above the threshold and zero otherwise and $b_2$ represents the growth impact of the debt ratio above the threshold, $T$. This equation can be re-written as:

$$\frac{\dot{Y}}{Y} = a' - (b_1 + b_2 M)\frac{D}{Y} - fr + gp \qquad (1c)$$

in which $a' = a + b_2 M \times T$. This gives us a properly adjusted estimate of the constant term in the equation.

The numerical parameters inferred from the estimation results, averaged for the whole sample in cases where these vary per

8. The countries included are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom and United States.

9. The growth equation includes controls for catch-up effects (gauged by the level of per capita GDP) and other structural factors such as skill endowments and population growth. The interest rate equation includes controls for the effect of monetary policy, inflation risk and the openness of the economy.

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country and/or over time, are reported in Table 1, including for the average primary deficit ($p$) which equals 0.3% of GDP.

**Table 1: Baseline parameters**

| | | | |
|---|---|---|---|
| $a'$ | 0.050 | $p$ | 0.003 |
| $b_1$ | -0.012 | $f$ | 0.195 |
| $b_2$ | 0.026 | $g$ | 0.087 |
| $c$ | 0.082 | $h$ | 0.027 |

*Source*: Padoan *et al.* (2012).

The debt threshold, *i.e.* the level of debt where the kink in the growth equation appears, is estimated at 87% of GDP, broadly consistent with findings by other researchers. The effect of government debt on growth below the threshold is positive ($b_1$ is negative), though not statistically significant. Above the threshold, on the other hand, the effect becomes more negative and statistically significant ($b_2$ is positive).

The effects of the primary deficit and the interest rate on growth are also in line with our priors, although the size of the fiscal demand multiplier ($g = 0.087$) may be considered at the low end of the spectrum of plausible results—we will turn to this later. It is important to stress that aside from the intercepts $a$ and $h$ all parameter values are uniform across countries and time and hence reflect the sample average relationships. We will turn to a sensitivity analysis in which this assumption is relaxed below.

The coefficient for variations in the debt ratio in the interest rate equation ($c = 0.082$), finally, indicates that for every 1 percentage-point slowdown in output growth or hike in debt growth the sovereign risk premium increases by slightly less than 10 basis points. This is again the sample average impact: it may be smaller or larger for individual countries and time episodes.

These parameter estimates allow us to identify the "good" and "bad' equilibrium debt levels and the multipliers developed in section 3 for the sample. The results are reported in Table 2. The sample average "bad equilibrium" debt ratio equals 106% of GDP, which implies that, on average, a country recording a debt ratio above 106% would see its debt ratio spiral out of control and its economy slump in the absence of offsetting policy action. Conver-

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sely, the "good equilibrium" to which the debt ratio tends if it is below the bad equilibrium threshold, turns out to be 75% of GDP. This means that if the debt ratio is in the 75%-106% interval it would, on average, be falling towards 75% (and conversely increasing towards 75% if it is below that level). It should be stressed again, however, that these numbers apply to the average of the sample as a whole and not necessarily to individual countries or sub-periods, and obviously are surrounded by uncertainty margins.

The multiplier analysis in Table 2 shows that, again for the sample as a whole, structural reform yielding an increase in economic growth of 0.1% per annum raises the bad equilibrium (*i.e.* moves out the point *B*) by 9 percentage points. This is a relevant result as it shows that the contribution that structural reforms bring to debt sustainability can be significant. Similarly, a sustained cut in the risk premium on the interest rate by 10 basis points increases the bad equilibrium debt ratio by 11 percentage points. An increase in the primary deficit as a share of GDP by 0.1 percentage point reduces the bad equilibrium debt ratio by 8 percentage points. This means that expansionary fiscal policy renders the economy, on average, more unstable as the sign of the relevant multiplier is negative. The upshot is that a country in bad equilibrium should pursue a restrictive fiscal policy.

**Table 2. "Good" and "Bad" equilibrium and multipliers under different assumptions**

In %

| | Good equilibrium | Bad equilibrium | Multipliers with respect to : | | |
|---|---|---|---|---|---|
| | | | *a* | *h* | *p* |
| **Baseline** | 75 | 106 | 9 | -11 | -8 |
| ***g* = 0.5** | 68 | 116 | 8 | -10 | -3 |
| ***g* = 1** | 60 | 129 | 8 | -10 | 2 |
| ***g* = 1, h = 0.033** | 60 | 74 | 12 | -14 | -4 |

*Note:* Multipliers measure the impact on the bad equilibrium debt ratio of 10 basis points (0.1 percentage point) changes of *a*, *h* or *p*.

Some authors have argued that in very depressed economies the fiscal demand multiplier *g* may be considerably larger than in

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normal times, of the order of 1 or even larger (see e.g. DeLong and Summers, 2012). Possible reasons invoked are that monetary policy offsets of fiscal stimulus are unlikely to be undertaken by the central bank and that private saving offsets are small as credit constrained households will spend a large share of current income on consumption.

Table 2 reports a sensitivity analysis for different assumptions with regard to this parameter. One striking finding is that the multipliers of structural reform and financial backstops hardly change. However, the sign of the fiscal policy multiplier switches when the parameter $g$ is 1. This is assuming that all other parameters of the system are unchanged. This is unlikely to be a reasonable assumption for euro area countries under market stress. Unlike other high-debt OECD countries in our sample (such as e.g. Japan) they do not dispose of a national lender of last resort and/or may be seen as vulnerable to exit from the monetary union, thus contributing to a hike in risk premiums beyond the "conventional" fundamentals (see for instance De Grauwe and Ji, 2012).

Against this backdrop we show in the last line of Table 2 the impact of an increase in $h$, the shock term in the interest rate equation, by half a per cent (50 basis points). The "bad equilibrium" debt ratio now falls well below 100% of GDP. The multiplier of fiscal policy becomes negative again, suggesting that fiscal consolidation now has a favourable effect on the stability of the economy. Perhaps even more strikingly, the multipliers on structural reform and financial backstops become larger.

## 4. Conclusions

If fiscal sustainability is at risk, fiscal action is inevitably directed towards consolidation. However, benefits of fiscal consolidation are largely medium to long term, as reducing debt levels breed stronger growth. There may also be favorable short-term effects to the extent that credible fiscal consolidation programs may boost market confidence which translates into lower sovereign risk premia. At the same time, in the short term their negative impact on demand may depress growth and hence could jeopardize debt sustainability. In practice, which of the two short-run effects of fiscal consolidation prevails is an empirical issue

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largely dependent on: *(i)* the size of the fiscal demand multiplier, and *(ii)* the size of the ratio of debt to GDP beyond which the economy enters the "bad equilibrium", itself a function of the stances of structural and financial policies (which is a possible way of defining fiscal space).

If the initial adverse growth impact of fiscal consolidation is large (the demand multiplier is one or bigger), fiscal consolidation may make it more difficult for a country to escape from the "bad equilibrium". On the other hand, countries in a monetary union who have suffered a reputational loss may experience very strong adverse confidence effects on sovereign risk premia. In that case fiscal consolidation may be stabilising rather than destabilising and, as well, the stabilising impact of structural reform and financial backstops gets stronger. The corollary is that, for countries that are under market stress and hence with limited fiscal space, there may be no alternative than to consolidate, notwithstanding an adverse impact on growth in the short run. In that case the role of structural reform alongside financial backstops to contain excessive sovereign risk premia becomes all the more important.

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