
Fiscal austerity and monetary easing: which one is to be praised for ending the euro area crisis?

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Abstract

In this paper I have used a framework for the analysis of public debt stability that dates back to Domar, and I have extended it in order to consider, together with the role played by the interest rate, the rate of GDP growth and domestic fiscal policy, also monetary solidarity. A special role has been reserved in the analysis to the effects of agents' heterogeneous expectations and uncertainty. I have also considered the effects of fiscal austerity and monetary solidarity on GDP growth and interest rates, and I have concluded that the euro area crisis came to an end thanks to the latter (the former having made things even worse, if anything). Within the same framework, I have been able to discuss also some of the other proposals, including federal solidarity, that have been advanced in the literature in order to avoid or to address future euro area crises.

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1. Introduction

The euro area crisis has renewed some old controversies about the expansionary or contractionary effects of fiscal policies and induced further discussions on the role of lender of last resort for the private sector to be played by a central bank.

This paper introduces a framework for the analysis of public debt stability that refers to the approach proposed initially by Domar, and extends it in order to consider, together with the role of fiscal policy, interest rate and of GDP growth in stabilizing public debt, also the role played by monetary solidarity (that obtains when the central bank is allowed to act as lender of last resort) and by uncertainty (as reflected by agents' heterogeneous expectations) relative to the variables mentioned above and determining the public debt sustainability equation.

Within that framework it has been possible to analyze the euro area crisis and the effects on its solution played by fiscal austerity as opposed to monetary solidarity.

The model also allows to encompass and analyze most of other proposals, including federal solidarity, that have been made in order to avoid or to address future crises.

The paper is structured as follows. Par. 2 presents the model used for the analysis. Par. 3 presents some evidence on fiscal policy and GDP growth in some euro area countries. Par. 4 discusses fiscal austerity and its effects on GDP growth and interest rates and introduces the 'multiplier effect' and the 'real wealth effect' on GDP growth and the 'uncertain sustainability effect' on interest rates. Par. 5 discusses the role played by the monetary and fiscal policy measures in overcoming the euro area crisis and some of the proposals that have been

advanced in order to avoid or to address future euro area crises, and Par. 6 proposes some concluding remarks.

2. The solvency condition for public debt

The continuous time variation of the public debt-to-GDP ratio ($\frac{db_t^P}{dt}$) in the hands of the private sector can be described, in general terms, as follows:¹

$$\frac{db_t^P}{dt} = -s - m - f + (i - g)b_t. \quad (1)$$

With the term $s_t = (t_t - d_t)$ I indicate the structural primary public surplus-to-GDP ratio at time t , given by the difference between government revenues, t_t , and non-interest government expenditure, d_t . Variable $m = \frac{db_t^M}{dt}$ is the time variation of the public debt-to-GDP ratio which is held by the central bank, expressing then central bank's monetary solidarity (namely a situation in which the central bank is willing to play the role of lender of last resort by injecting money in order to prevent the growth of public debt-to-GDP in the hands of the private sector) and f is the financing coming from a possible source of federal solidarity like the European Stability Mechanism (ESM)². With i I indicate the nominal interest rate on public debt and g is the GDP rate of growth, that for the time being are both assumed to be constant. b_t^P is the ratio between public debt and GDP that is in the hands of the private sector at time t , and b_t is the ratio between the overall public debt (the part which is in the hands

¹ The stability condition reported in equation (1) above can be derived easily by considering the dynamic equation of public debt:

$$\frac{dB_t^P}{dt} + \frac{dB_t^M}{dt} = -S_t - F_t + i_t(B_t^P + B_t^M),$$

where B_t^P is the public debt in the hands of the private sector, B_t^M is the public debt in the hands of the monetary authority, S_t is level of the primary surplus, F_t is the financing coming from a possible source of federal solidarity and i_t is the nominal interest rate to service the public debt (which is assumed to be the same, no matter who is holding it, namely no interest rate abatement is considered for the public debt which is held by the central bank). From the equation above, by dividing through by the nominal GDP, V_t , thereby considering the public debt-to-GDP ratio, it follows:

$$\frac{dB_t^P}{dt} + \frac{dB_t^M}{dt} = \left[\frac{dB_t^P}{dt} + \frac{dB_t^M}{dt} + g_t(b_t^P + b_t^M) \right] V_t, \text{ from which, equation (1) follows.}$$

Low case letters refer to the ratio of the respective capital letter with GDP, and g_t is the rate of growth of nominal GDP, namely $\frac{dV_t/dt}{V_t}$.

² Tamborini (2015) considers a variable that is similar to f , but which in his interpretation – implicitly based on the observation that EMU is not a federal union – usually represents a source of additional expenditure, like the one that could come, for example, from the need to rescue the banking system. Only when considering the role played by the ESM he considers the possibility that f may be positive ($x < 0$ in his model, see Footnote 18 in Tamborini, 2015).

of the private sector and the one in the hands of the central bank) and GDP at time t , so that the term $(i - g)b_t$ is the growth-adjusted service on the debt as a ratio of GDP. From what precedes, it follows that we are not assuming any favorable conditions for the public debt which is in the hands of the central bank, although especially in the case of stand-alone countries (not belonging to a monetary union) it might be reasonable to consider at least the case in which the service on the debt paid by the government to the central bank goes back to the government.³

For the public debt in the hands of the private sector to be stabilized (assuming then - as De Grauwe (2012) and De Grauwe and Ji (2013a) do - that the public debt which is in the hands of the monetary authority can always be monetized, if necessary), it must be that $\frac{db_t^P}{dt} = 0$. When that is the case, Equation (1) becomes, then:

$$s^* + m^* + f^* = (i - g)b^*, \quad (2)$$

where the symbol $*$ refers to the long term, steady state value of the variable on which it is applied. Any value of b^* , such that (2) is satisfied will imply a stabilization of the private debt in the hands of the private sector, so as to avoid a public debt crisis.⁴ Of course, if $g > i$, then the public debt-to-GDP ratio in the hands of the private sector would be decreasing, so that even a given primary public deficit-to-GDP ($s < 0$) might be fully compatible with a stable privately held public debt-to-GDP ratio. As it appears clearly from (2), the stability of the privately held public debt is under the control of both the fiscal and the monetary authority. The fiscal authority controls s and the monetary authority (that may not necessarily be domestic, as in the case of the euro area) controls (at least partially) the interest rate on public debt, i (that depends, however, not only on the reference rate chosen by the monetary authority, \bar{i} , but also, and above all, on the risk premium decided by the private sector), and m . The other source of

³ The baseline of the simple model that I am using to discuss the role of fiscal and monetary policies in the management and solution of the euro area crisis can be traced back to Domar (1944), Arestis and Sawyer (2008) and Heine and Detzer (2015). A similar model, although to address different questions, is also adopted by Della Posta (2017b) and Della Posta (2017c). Della Posta (2016) also analyzes the stability condition of public debt when analyzing the euro area crisis within a speculative attacks model.

⁴ It should also be noted, as observed by De Grauwe (2016), that a stabilized public debt-to-GDP is a necessary but not sufficient condition for avoiding the collapse of public debt. As a matter of fact, Collignon (2012) argues explicitly that a solvent but illiquid government, which is therefore incapable to have access to financial markets, may still be forced to default by a self-fulfilling speculative attack that pushes up the risk premium and the interest rate on its debt.

public debt financing, f , is not under the control of the domestic authorities either, since it depends on the federal setup.⁵

For the time being, let us ignore both m and f by assuming them as equal to zero. As for m , this was certainly the situation that preceded the celebrated ‘whatever it takes’ Draghi speech. We will remove those assumptions at a later stage to account on one hand for the role of the ECB as a lender of last resort (by acquiring the public debt not desired by the private sector anymore), and on the other hand to understand what the effects of the evolution of EMU towards a federal union might be. Let us consider, then:⁶

$$s^* = (t - g)b^* \quad (2')$$

The equation above says that what matters for public debt stability (still recalling that for the moment we are considering $m^* = f^* = 0$), is not just the size of the public debt-to-GDP ratio (on which the euro area crisis literature has focused its attention), but also the interest rate, the GDP growth and the possibility to run the primary surplus which is necessary in order to repay it.

Over the past decades the interest rate had received a quite significant attention. Pasinetti (1981, 1997), for example, as reported by Arestis and Sawyer (2008) referred to the concept of ‘fair interest rate’ meaning an interest rate that would allow the easy repayment of public debt by preserving the intertemporal distribution of income between borrowers and lenders.

Needless to say, when the interest rate decreases so as to reach its zero lower bound, the interest rate instrument of the central bank becomes powerless, and some additional tools have to be devised, as all central banks in the world have been doing in order to face the crisis hitting their respective countries by adopting the so-called non-conventional monetary policies.

A more general public debt-to-GDP stability condition, however, is the following:

$$s \geq s^* = (t - g)b^*. \quad (3)$$

Equation (3) suggests that in the absence of any constraints, a government would always be able to choose s in such a way that the stability of the ratio

⁵ The presence of a positive f in the public debt stability equation is quite controversial. As a matter of fact, even in an important federal country like the USA, the federal government is not allowed to provide the fiscal support to the single states. Thanks to an anonymous referee for pointing this aspect to my attention.

⁶ See also Buiter (1985) and Bohn (2008).

between public debt and GDP in the hands of the private sector is granted.⁷ Public debt will even decrease if $s > (t - g)b^*$. In that case, the reduction of b might also reduce t because of the possibly resulting lower default risk (Corsetti et al., 2013, De Grauwe and Ji, 2013a). Moreover, according to some authors, a sufficiently large primary surplus may also increase g , because the reduction of t would spread from the public to the private sector, thereby increasing investment (Corsetti et al., 2013), and the lower future expected taxes resulting from the lower b might stimulate the consumption of the private sector (Giavazzi and Pagano, 1990, 1996). Both moves, namely a lower t and a larger g , would make the right side of equation (3) flatter, thereby determining a higher critical level for the overall public debt level granting the stability of the public debt in the hands of the private sector.

3. Some evidence from the euro area crisis

In the Southern euro area crisis countries (Greece, Italy, Portugal and Spain), however, this is not what seems to have happened as a result of ‘fiscal austerity’: the restrictive fiscal policies adopted in those countries after the Greek shock⁸ (see Fig. 1), have been accompanied by a fall rather than an increase of GDP growth rates (Fig. 2).

Moreover, in spite of fiscal austerity, the public debt-to-GDP ratio in Southern euro area crisis countries kept increasing and stabilized only at a later stage, after the reassurance coming from the ECB that allowed a drop of the risk premium on the interest rates (Fig. 3). The case of Ireland, the only Northern euro area crisis country, is different and its analysis is omitted here.

The figures seem to suggest also that it is precisely in correspondence with the dramatic change in fiscal policy (that took place in EMU after the Greek shock) that GDP stopped recovering from the 2007-2008 global financial crisis. In turn, the fall in the rate of GDP growth determined, inevitably, an increase of the public debt-to-GDP ratio.⁹

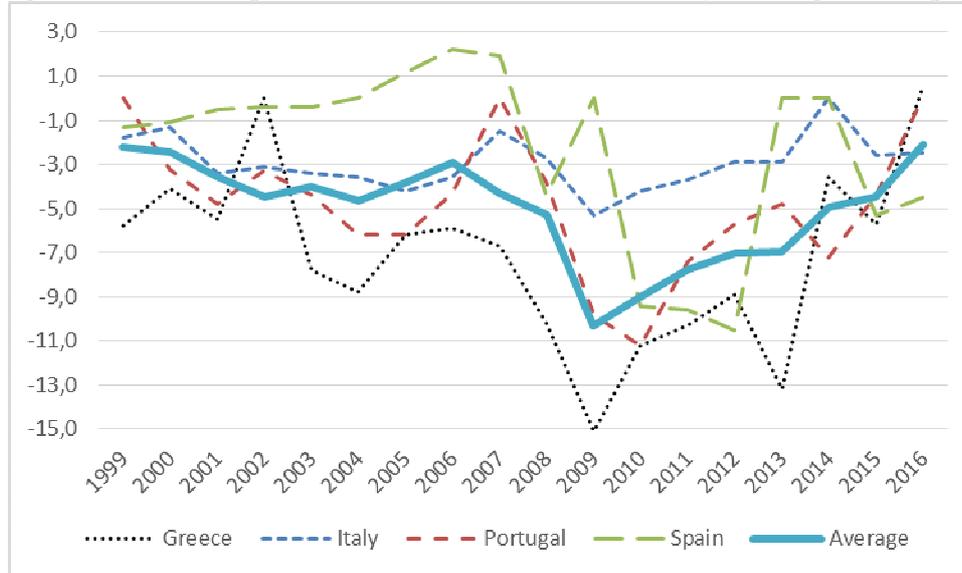
It might be argued, in fact, that it is precisely fiscal austerity, implemented in the middle of the global financial crisis, that made the euro area crisis possible: the euro area did not follow what the UK and the USA did during the crisis, namely to operate counter-cyclically in order to soften its negative impact on the economy and to create the conditions for the future recovery.

⁷ The role of the fiscal surplus in stabilizing public debt is also considered explicitly by Collignon (2012), who introduces a fiscal policy reaction function to public debt, as resulting from EMU fiscal rules.

⁸ At the end of 2009 the newly elected Greek Prime Minister revealed that his predecessor had been cheating, under-reporting the actual state of public finances.

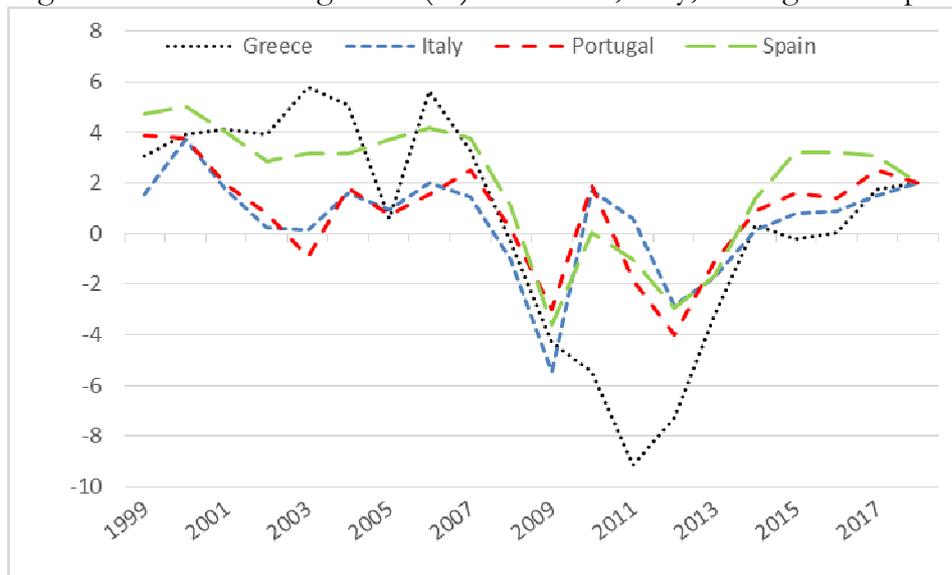
⁹ Della Posta (2017a) argues that the Greek shock seemed to offer no alternative to the imposition of fiscal austerity, without considering the fact that the global financial crisis was still biting and that an expansionary response was still needed.

Figure 1. Fiscal surplus-to-GDP (%) for Greece, Italy, Portugal and Spain



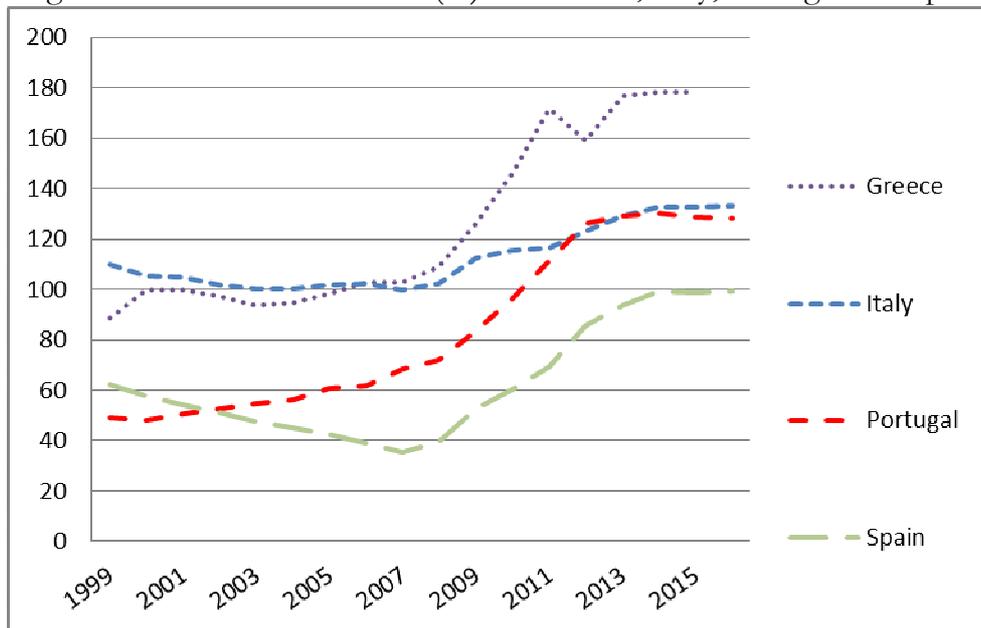
Source: Eurostat

Figure 2. GDP rate of growth (%) of Greece, Italy, Portugal and Spain



Source: World Economic Outlook, IMF.

Figure 3. Public debt-to-GDP (%) for Greece, Italy, Portugal and Spain



Source: World Economic Outlook, IMF

4. Fiscal austerity and its effects on GDP growth and on interest rates

In referring to the euro area crisis, let us discuss below the effects of fiscal austerity both on GDP growth and on interest rates.

4.1. Fiscal austerity and its effects on GDP growth: the ‘multiplier effect’ and the ‘real wealth effect’

As we have observed in section 3 above, fiscal austerity determined an increase, rather than a decrease of the public debt-to-GDP ratio, because of its influence on GDP growth (that became negative, contrary to what suggested by Corsetti *et al.* (2013) and by Giavazzi and Pagano (1990, 1996)), and because of its effect on r (that increased).

GDP growth may become negative after a fiscal contraction for at least two reasons.

The first one is that fiscal austerity depresses the economy through the standard Keynesian multiplier, which is characterized by a value greater than 1 (Krugman, 2010, Blanchard and Leigh, 2013). This can be called the ‘multiplier effect’.

The second goes back to the idea of the so-called ‘functional finance’ (Lerner, 1943 and 1948). Several more recent authors also refer to it, including

Arestis and Sawyer (2008), who in turn quote Eisner and Hwang (1993), and Ackley (1951).¹⁰

The main point of ‘functional finance’ is that public debt increases the real wealth of private agents, thereby stimulating their consumption and investment. Ackley (1951) defined it as the ‘Lerner effect’, but I would rather call it the ‘real wealth effect’. It implies that a deficit would be ‘self-limiting’ in the sense that by stimulating national income and full employment, it would stabilize the public debt-to-GDP ratio. It is immediate to see the resemblance of this conclusion with the specular one deriving from the idea of a ‘self-defeating austerity’ as Krugman (2010) defined it.

What it suggests is that public debt may provide a positive wealth effect on both consumption and investment, so that the opposite occurs when reducing it, thereby depressing the economy.

Both the ‘multiplier’ and the ‘real wealth effect’ can be represented by an equation in which the (negative) sensibility of the GDP rate of growth to the primary surplus, is assumed to depend on parameter α :

$$g = \bar{g} - \alpha s, \quad (4)$$

Both objections, then, lead to conclude that a fiscal contraction may not be the right way to follow in order to solve a crisis situation.

The conclusion of the negative effects of fiscal austerity on public debt stability is in line with the point raised by Lohman (1992), Obstfeld (1994), and Drazen and Masson (1994) in the different context of monetary policy and exchange rates, and having to do with the lack of credibility resulting from implementing non-credible monetary policies. In this case, it is the restrictive fiscal policy that is non-credible, precisely because of the negative effects it produces. No credibility can be gained by policymakers (and therefore no interest rates reduction can be enjoyed) when running such non-credible policies (see also Della Posta, 2017c).

4.2. Fiscal austerity and its effects on the interest rates: the ‘uncertain sustainability effect’

Fiscal austerity may impact negatively not only the GDP rate of growth, as argued above, but also the interest rate, increasing it. This is the point discussed by Tamborini (2015), who considers the possibility that the primary budget surplus (still as a ratio of GDP), s^* , which is required in order to stabilize the public debt-to-GDP ratio, b^* (for any given value of t and g) may go beyond the possibilities of the domestic economy. In other words, it is possible that the

¹⁰ Bradford De Long also reports the original Lerner’s contribution on functional finance in his home page: <http://www.bradford-delong.com/2013/04/abba-lerner-1943-functional-finance.html#comments>.

government's primary expenditure cannot be reduced below a given floor and/or that government revenues cannot be increased above a given ceiling, so that the primary surplus-to-GDP ratio that a government can run meets an upper limit, that I indicate with \bar{s} .

In order to have a *sustainable* public debt-to-GDP ratio, then, the following *sustainability* equation needs to be satisfied:¹¹

$$(i - g)b^* = s^* \leq s \leq \bar{s}. \quad (5)$$

By considering a primary surplus feasibility limit $\bar{s} = \bar{s}_g$, then, we introduce the issue of sustainability, as identified clearly by the IMF with “a situation in which a borrower is expected to be able to continue servicing its debts without an unrealistically large future correction to the balance of income and expenditure” IMF, 2002, p. 4).

The interpretation of \bar{s}_g and of the distribution of beliefs about its true value are crucial for the discussion of the results that we will obtain and for drawing some possible policy prescriptions.

The main point made by Tamborini (2015) is that the larger is the primary surplus which is required for debt stabilization, the more agents' heterogeneity of expectations decreases, so that a larger fraction of market participants will share the belief that the primary surplus required for stability has reached already the maximum level that a country can reasonably stand. In turn, such a widespread belief increases the risk premium on public debt and the interest rate to service it. As Tamborini (2015) shows, this implies that the closer the primary surplus gets to the expected upper limit, the more the interest rate will increase, so as to provide an explanation for the interest rate convex non-linearity identified by De Grauwe and Ji, 2013a).¹² The effect highlighted by Tamborini (2015) will be called the ‘uncertain sustainability effect’.

A possibly even more intuitive conclusion, however, can be obtained by referring directly to agents' heterogeneous beliefs about the upper fiscal feasibility constraint, \bar{s}_g . Such an heterogeneity can be interpreted as a proxy of the degree of market uncertainty about \bar{s}_g ¹³ and in order to introduce it, let us consider a simplified expression for the interest rate. The latter can be represented as composed by a benchmark risk-free interest rate (that can be thought also as the reference interest rate fixed by the central bank), \bar{i} , and a risk premium component, $RP(s^*, \bar{s}_g, \rho)$, as in the equation below:

¹¹ Notice that while Equation (2) refers to a *solvency* condition, Equation (4) refers to a *sustainability* condition.

¹² Della Posta (2017c) describes Tamborini (2015) in full detail.

¹³ Thanks to an anonymous referee for suggesting to follow this line of investigation, which is in the spirit of Alchian (1950) and Davidson (1972).

$$i = \bar{i} + RP(s^*, \bar{s}_g, \rho). \quad (6)$$

Contrary to what De Grauwe and Ji, 2013a and, implicitly, also Corsetti *et al.*, 2013 do, the risk premium is not assumed to depend just on the size of the public debt-to-GDP ratio, but rather on the public debt sustainability equation. In particular on the primary surplus required for public debt stability, s^* , on the maximum level that the primary surplus is expected to be allowed to reach, \bar{s}_g , and on the degree of uncertainty of its feasibility and effectiveness, namely on its credibility. I define such uncertainty/expectational heterogeneity with ρ , where $0 \leq \rho \leq 1$. As a matter of fact, a high b is not necessarily less sustainable than a lower one, since the latter might be accompanied by a much more uncertain public debt sustainability equation.¹⁴ Equation (6), then, defines what I would call an ‘uncertain sustainability effect’.

4.3. The debt stability condition when considering jointly the ‘multiplier’ and the ‘real wealth effects’ of fiscal policy on g and the ‘uncertain sustainability effect’ on i

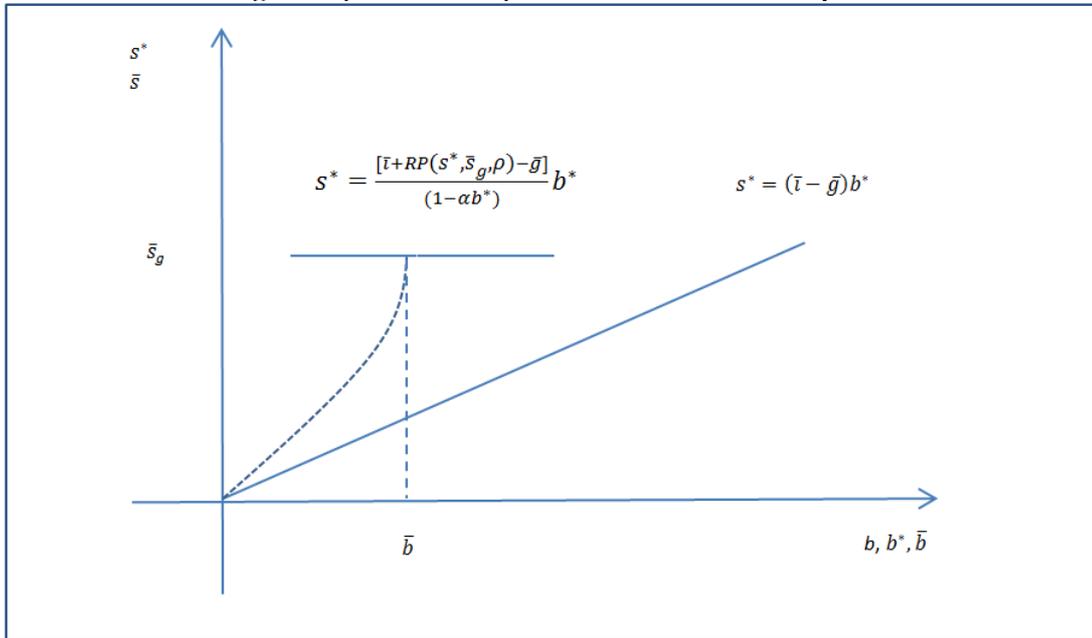
By considering the ‘multiplier effect’ and the ‘real wealth effect’ on g , and the ‘uncertain sustainability effect’ on i described above, namely by substituting in Equation (2) the value of g from Equation (4) and of i from Equation (6) we have:

$$s^* = \frac{(\bar{i} + RP(s^*, \bar{s}_g, \rho) - \bar{g})}{[1 - \alpha b^*]} b^* \quad (7)$$

Equation (7), represented in Figure (4) for a feasible primary surplus level whose value is \bar{s}_g , is clearly non-linear and the explanation for that result is quite intuitive: a larger b^* implies the need of a larger s^* in order to make the former sustainable, which in turn increases RP and i because of the higher uncertainty of the feasibility of s^* , thereby further increasing b^* , which requires a larger s^* and so on.

¹⁴ It should be observed that heterogeneity of expectations and uncertainty might characterize not only \bar{s} , as Tamborini (2015) assumes, but also all the other variables determining public debt sustainability.

Figure 4: The ‘multiplier’, the ‘real wealth’ and the ‘uncertain sustainability effect’ of a budget surplus on the public debt sustainability function.



Let us consider more closely the situation in which the probability of public debt default depends also on the degree of uncertainty as to its sustainability (for example because of the uncertainty of the availability of fiscal financing, still recalling that for the time being we have left aside other ways to guarantee public debt sustainability). We can plausibly assume that the higher is the degree of uncertainty, the higher is the heterogeneity of market expectations, in which case there is neither a large or prevailing fraction of market participants who think that the situation is bad, nor a large or prevailing fraction that thinks it is good. We might reasonably conclude, then, that a situation of high uncertainty will be reflected in what we can define as an ‘average’ risk premium, which is neither too high, nor too low (but nothing will change in qualitative terms if we assumed that in the presence of high uncertainty, extremely risk averse market participants will charge a very high risk premium, since what matters is the effect of a reduction of that uncertainty when things become clearer in either direction).

Let us consider, then, the case in which the probability of default varies because of a lower uncertainty as to public debt sustainability. In particular, $RP(s^*, \bar{s}_g, \rho)$ will decrease if the degree of uncertainty relative to public debt sustainability decreases thanks to the common knowledge that the conditions assuring the sustainability of public debt are now satisfied. This means that also the heterogeneity of market expectations decreases dramatically and consensus gathers around the expectation of a stable public debt.

The opposite will happen with a highly uncertain public debt sustainability, for example because the upper feasibility constraint lacks credibility. Of course, in this case the probability of debt default increases and the risk premium increases with it.

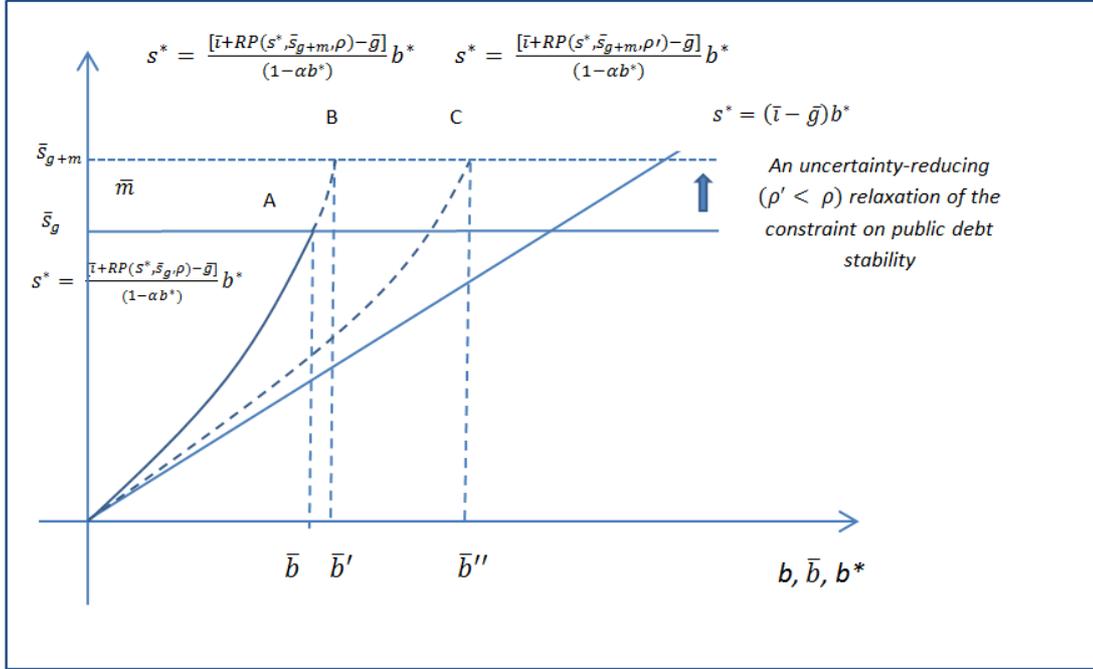
What precedes suggests, then, that it is possible to decompose in two parts the effects of a positive change in the public debt sustainability condition, like for example a relaxation of the constraint on the growth of public debt resulting from the (additional) availability of fiscal financing or, as we will discuss below, of monetary solidarity.

The first effect is the ‘direct’ one resulting just, for example, from a larger availability of resources that allow repaying the debt with an unchanged state of expectations. In the case of additional availability of monetary financing (that we can start reintroducing into the analysis and that we can represent with \bar{m}), for example, the upward shift of the constraint from \bar{s}_g to \bar{s}_{g+m} allows to move from point A (corresponding to the sustainable level of the public debt-to-GDP ratio, \bar{b}) to point B (corresponding to the sustainable level of the public debt-to-GDP ratio, \bar{b}'), as shown in Figure 5.

The second effect results from the reduction of market heterogeneity and uncertainty, which drops from the level ρ to the lower level ρ' (implying a higher credibility of public debt sustainability) and determines a reduction of the risk premium and of the interest rate. Such variations imply a flattening of the public debt sustainability path, and an even higher level of sustainable public debt \bar{b}'' , corresponding to point C, still as shown in Figure 5.

Of course, a different conclusion will be obtained in the case in which the relaxation of the public debt sustainability constraint is not believed by market participants, namely if the availability of some additional financing facilities is highly uncertain. In that case, the risk premium will increase and this would induce a steepening of the public debt sustainability path that should be drawn to the left of the one leading to B in Figure 5. We will discuss this case in analyzing the consequences of a shock hitting the public debt sustainability equation.

Figure 5: Relaxing the constraint on public debt increases public debt sustainability and adds a further benefit deriving from the reduction of uncertainty about its sustainability.



4.4. A confidence crisis resulting from an additive shock on the public debt sustainability equation

Let us consider the case in which public debt is sustainable, namely $b = b^*$, being below the maximum feasible level, \bar{b} (corresponding to point A in Figure 6). $s^* = \frac{[\bar{t} + RP(s^*, \bar{s}_g, \rho) - \bar{g}]}{(1 - \alpha b^*)} b^*$

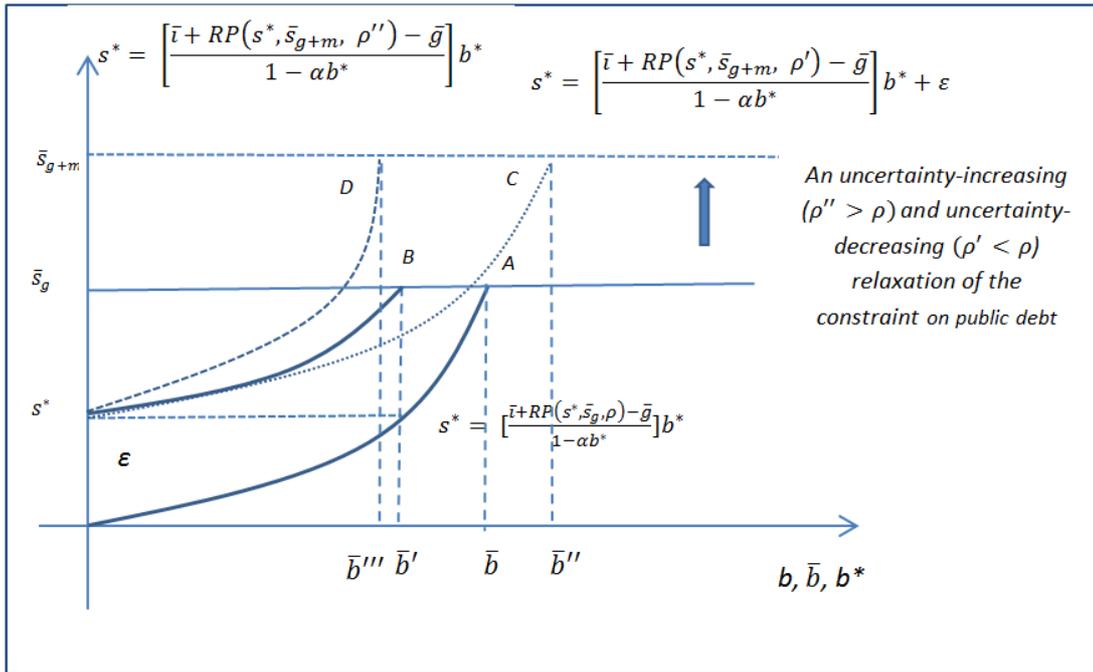
Any additive shock ε hitting the public debt stability equation (consider, just for example, the sudden and unexpected need for the government to cover the debts of the banking sector) may induce a confidence crisis if its size exceeds the difference between the maximum level of primary surplus that is available for public debt stabilization, \bar{s}_g , and the primary surplus guaranteeing public debt stability in the absence of the shock, s^* , namely if $\varepsilon > \bar{s}_g - s^*$. Alternatively, we can conclude that the shock will cause a confidence crisis if:

$$s^{*'} = s^* + \varepsilon = (\bar{t} - \bar{g})b^* + \varepsilon > \bar{s}_g \quad (8)$$

If that is the case, the maximum sustainable public debt-to-GDP level becomes $\bar{b}' < \bar{b}$, corresponding to point B. Even if ε exceeds the difference between \bar{s}_g and s^* , however, therefore taking the latter above the former, it would still be possible to avoid a crisis if additional financing resources, for

example thanks to monetary solidarity, were available. In that case, \bar{s}_g moves up to \bar{s}_{g+m} , bringing the sustainable level of public debt to a level that depends on the degree of uncertainty and credibility of \bar{s}_{g+m} . If those additional resources are believed by economic agents the risk premium and then the interest rate drop and the new path will be, for example, the one taking to point C in correspondence of which $b = \bar{b}''$. If, instead, they are highly uncertain, the expectational effect moves the risk premium in the opposite direction, so as to identify a critical level of sustainable public debt which is even lower than \bar{b}' . This would occur when agents' beliefs find the announced upper feasibility constraint highly uncertain. This is the case in which the public debt stability path leads to D, in correspondence with $\bar{b}''' < \bar{b}'$.

Figure 6. An additive shock hitting the public debt stability equation and causing a confidence crisis, and the two opposite cases of both an uncertainty-increasing ($\rho'' > \rho$) and uncertainty-decreasing ($\rho' < \rho$) relaxation of the public debt stability constraint.



5. A discussion of the role played by the monetary and fiscal policy measures in overcoming the euro area crisis

5.1. Fiscal austerity vs. monetary easing: an evaluation

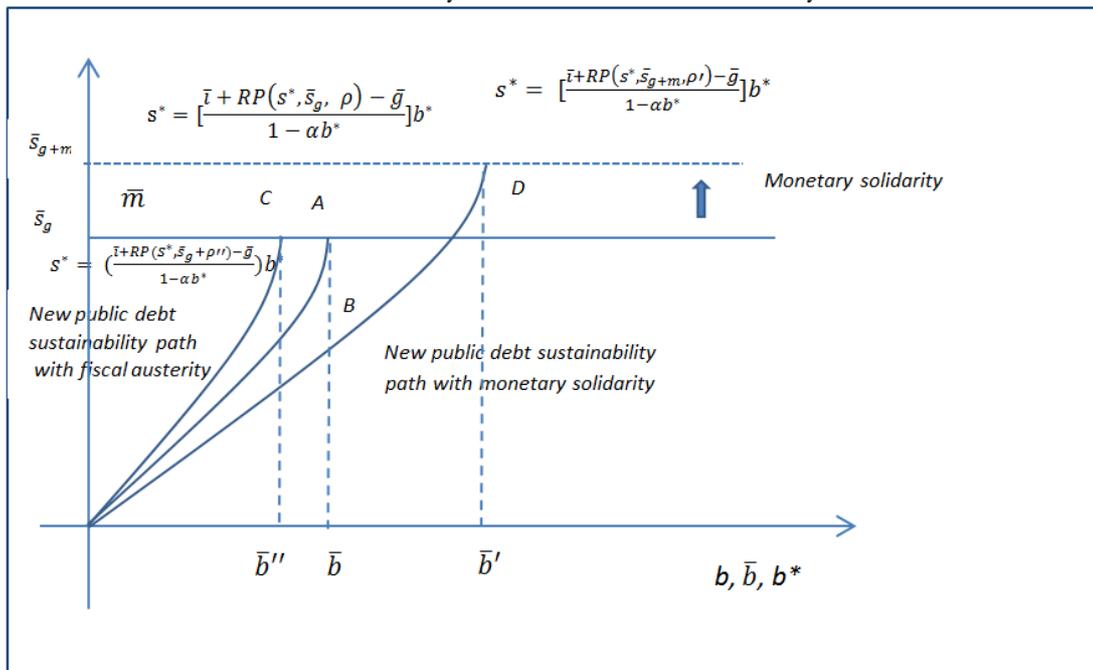
We are now in a position to discuss the effects of the fiscal and the monetary policies adopted during the euro area crisis and to identify those that have helped overcoming it, together with the other proposals that have been

advanced in the literature to avoid future crises or to address them more effectively.

The policies of fiscal austerity that increased s in order to reduce b also increased the fear to be approaching the surplus feasibility limit \bar{s}_g . They induced, then, a steepening of the public debt-to-GDP sustainability equation thereby increasing, rather than reducing, public debt instability.

Figure 7 shows that the maximum feasible steady state public debt decreases from \bar{b} to \bar{b}'' , with the difference between i and g going up, so as to induce the move to the maximum sustainability point (in which $s^* = \bar{s}_g$) from point A to point C .

Figure 7: A graphical representation of the effects on the public debt sustainability function of fiscal austerity



As it is generally recognized in the literature, a solution to the crisis came instead with the ‘whatever it takes’ Draghi speech. As far as I am aware of, the effects of reaffirming the ECB role of the lender of last resort have not found a simple formal representation, something that I am proposing explicitly below, also referring to the approach followed by Della Posta (2017b).

In order to represent the role of monetary policy in this model, let us bring back an additional possible source of stabilization of the privately held public debt, namely monetary solidarity. Doing this allows us to have an ‘enlarged’ public debt-to-GDP stability condition:

$$\bar{s}_g + \bar{m} \geq s + m = s' \geq (i - g)b^* \tag{9}$$

As Figure 7 shows clearly, the availability of a positive \bar{m} enlarges the budget constraint and stabilizes the public debt-to-GDP ratio even if the domestic fiscal authorities were subject to a ‘fiscal fatigue’, not allowing to increase the primary surplus above \bar{s}_g . The celebrated ‘whatever it takes’ Draghi speech (together with the accompanying evidence represented by the introduction of the unlimited Outright Market Transactions – OMT – program), clarified, then, that the value of \bar{s}_g was much higher than before, thanks to a positive \bar{m} . It is easy to see from Figure 7 that when the feasibility constraint moves from \bar{s}_g to $\bar{s}_{g+m} = \bar{s}_g + \bar{m}$, the maximum sustainable level of the public debt-to-GDP ratio increases from \bar{b} to \bar{b}' , corresponding to point *D*, thanks to the joint operation of both the ‘direct’ and the expectational effect described above. They reduce the risk premium and then the interest rate, that will jump downwards from the level corresponding to point *A* to the level corresponding to point *B*, as shown in Figure 7.

The differences in the values taken by \bar{s}_g and \bar{m} , then, may well explain why countries not belonging to the euro area (like, for example, the UK) and characterized by the same or even higher public debt-to-GDP ratio than Spain, were not hit by the crisis. This is the point made by De Grauwe (2012) who distinguish between ‘stand-alone’ countries, namely those countries whose public debt is guaranteed by their respective national central bank, and euro area countries, who could not rely on the presence of a lender of last resort for the government. This institutional fragility also explains the self-fulfilling nature of the euro area crisis (Della Posta, 2017b).

As predicted by what has been discussed above, the OMT program had a double positive effect: it enlarged the feasibility constraint that the private sector expected to be faced by euro area governments (through a larger \bar{m}) and, by reducing the degree of uncertainty, it reduced the risk premium on the interest rate. Moreover, by reducing the excess of supply of privately held government bonds, it increased their price, thereby reducing the interest rate on them (so, as to reduce directly i). All of those positive effects improved the solvency condition for b .

Such operation has been severely criticized by the Bundesbank and in general by the German public opinion. German critiques refer to the fact that, at least in principle, central bank intervention increases the risk of a future higher inflation rate, which is a hidden way to tax public debt away. Had this view been shared by the markets, so as to incorporate in the interest rate an appropriate risk premium to cover the risk of an inflation tax, the possible trajectory for the sustainable path of the public debt-to-GDP ratio should have been such as to cancel any stabilizing effect. Needless to say, the market response to the ECB intervention has been completely the opposite, by reducing dramatically the interest rate spread on public debt bonds of euro area crisis countries.

It is worth observing, however, the different reaction that financial markets reserved to the Security Market Programme (SMP), launched under the Trichet

presidency of the ECB, in May 2010 and characterized by a limited availability of funds: no stability effect emerged from a relaxation of the budget constraint that was expected to be limited and insufficient, and accompanied therefore by a low degree of credibility.

5.2. A discussion and a graphical interpretation of some proposals to avoid or to address a future euro area crisis

5.2.1. Federal solidarity

The additional presence of federal solidarity (for example through fiscal transfers within the euro area or through the availability of funds collected on the market through the ESM, or from funds that are pooled at the euro area level, for example as a result of an asymmetric fiscal policy coordination - see Corsetti *et al.*, 2014) would move the maximum sustainable level of the public debt-to-GDP ratio further up to $\bar{s}_{g+m+f} = \bar{s}_g + \bar{m} + \bar{f}$ (see Figure 8). In such a case, when the domestic fiscal effort has reached its feasibility limit \bar{s}_g and monetary policy cannot intervene beyond \bar{m} , the awareness of the availability of fiscal solidarity of size \bar{f} would immediately determine a drop of the interest rate from the one corresponding to point *C* to the one corresponding to point *D*. The mere expectation that fiscal solidarity will be available reduces the risk premium on the interest rate.

Of course, even federal solidarity may not necessarily produce a positive result if it were accompanied by a high level of uncertainty: if that is the case, while the ‘direct effect’ of an enlarged constraint would tend to reduce the risk premium and the interest rate to service the debt, the effect on expectations would produce an opposite result so that the net effect on the interest rate might well be null or even negative.

The observation made above suggests that the issue of federal solidarity is quite complex. The first, obvious, objection is that it would risk to provide the wrong incentives to national governments. The expectation of a federal intervention might induce the policy-makers of the countries belonging to the federation to run a too expansionary fiscal policy. This is the reason why no such a role is present in the USA, for example, where no state can receive financial assistance from the federal government.¹⁵

If a federal intervention has to be considered, then, it will have to be subject to a severe conditionality, precisely in order to make it incentive-compatible and to avoid the risk of fiscal profligacy.

And even if the intervention was considered as possible, how credible will it be? Can bond holders be reassured by the promise of an intervention which

¹⁵ The federal government, however, can intervene directly to support a state which is hit by an idiosyncratic shock, as it has been the case in the USA during the car market crisis at the beginning of the 1980s and, more recently, with the natural disasters that have been hitting some states. Such interventions, then, may well avoid the creation of public debt in the first place.

may turn out to be time-inconsistent, being subject to harsh conditionality and to deviations from the commitment initially taken?

The opposite, however, may also apply. How credible is a union stating firmly that no intervention will be made to rescue a participating country? In the case of EMU, for example, its condition of fragility during the first years of its life, might have induced financial markets to anticipate the deployment by all member states of a protective umbrella in favor of any of them being subject to speculative attacks. This explains why during the initial ‘honeymoon’ years of EMU, interest rates did not register any significant spread in the risk premiums of member countries, in spite of their significantly different budgetary situations. In other words, financial markets were implicitly confident that in spite of the no-bail out threat contained in the Maastricht Treaty, participating countries would have intervened in order to avoid any bankruptcy of a participating country, since this might have threatened the existence of the euro area and therefore implied a larger loss on all member states: the no-bail out clause, then, might well have represented a classical case of non-subgame perfect equilibrium.

This would explain also why, in October 2010, the markets reacted so strongly to the joint declaration made in Deauville by the German Chancellor Angela Merkel and the French President Nicolas Sarkozy. In their *communiqué* they invoked a small treaty change aimed at considering an adequate participation of the private sector (the so-called *bail in*) in case of future crises. The effect of such a declaration was exactly the opposite of the one resulting from the guarantee provided by federal solidarity: it reduced suddenly and dramatically the expected public debt feasibility constraint, so that it was inevitable for the interest rates to increase (in Figure 9, this could be represented by an inverse move, going from the path leading to point *E* to the path leading to point *C*). As a matter of fact, many analysts and observers suggest that the euro area crisis only started with that ‘scaring’ declaration (see also Della Posta, 2017a).

It can be further argued, then, that the reassurance coming explicitly from the ECB in July 2012, operated as a substitute for the implicit federal guarantee that had been broken with the Deauville declaration made in October 2010 and that had determined a dramatic worsening of the euro area crisis.¹⁶

This might also suggest, then, that the presence of federal solidarity might make unnecessary or redundant monetary solidarity.

5.2.2. Public debt ‘haircut’

One possibility in the management and resolution of the euro area crisis, partially realized in practice - and whose further implementation is proposed,

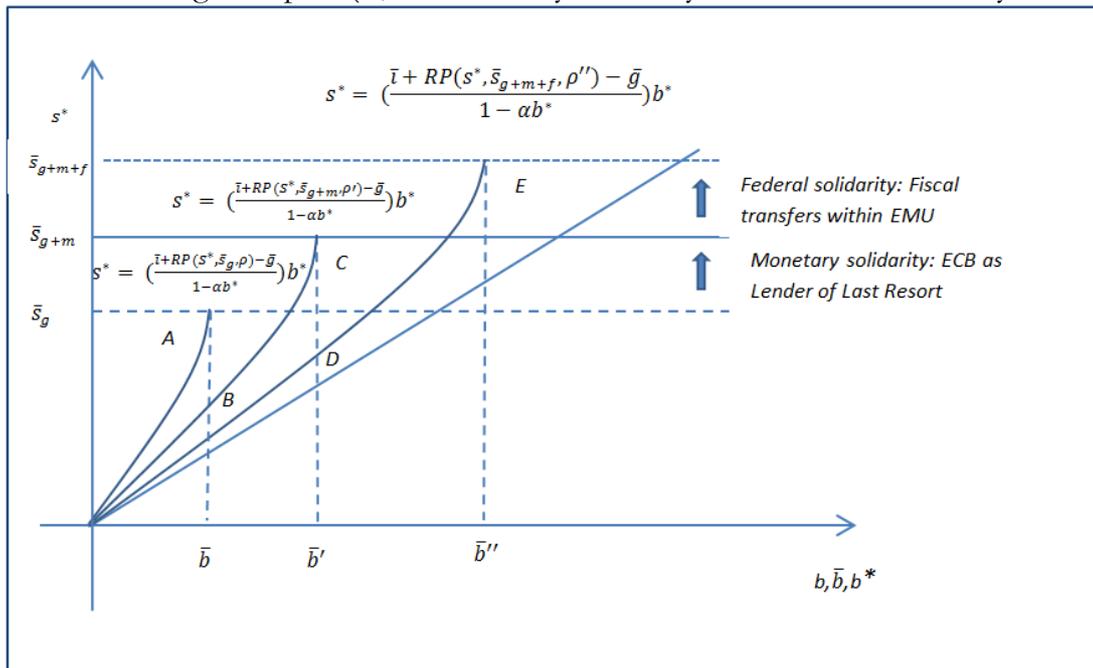
¹⁶ Further research is needed to study the different implications of monetary as opposed to federal solidarity. One question, for example, would be to better understand the difference (especially in terms of incentive-compatibility) between the insurance provided by a central bank operating as a lender of last resort and the same insurance provided by a federal authority standing ready to guarantee public debt stability (the guarantee may well be indirect, by guaranteeing the funds that are collected in the market to provide the liquidity which is necessary to stabilize the public debt, as it is the case for the ESM in the euro area).

although in different technical ways, by Buchheit *et al.* (2013), Corsetti *et al.* (2015), Pâris and Wyplosz (2014) and Eichengreen and Wyplosz (2016) - is the concession of a *debt reduction or a so-called 'haircut'*, so as to make public debt sustainable. In Figure 9 it is shown, for example, that by reducing \bar{b} to \bar{b}' this allows to gain some fiscal space, given by the difference between \bar{s}_g and s_H , therefore moving from point A to point B. This solution (that over the centuries has been quite often applied in practice), has the merit of allowing a fresh and credible 'new start' for the country which is under pressure.

Once more, it finds a main objection, however, in the role played by incentives: in the view of those who argue against it, a debt redemption would spare the 'right' punishment on those who lived beyond their means, and would only create the conditions for a future growth of debt, thereby igniting a negative spiral.

The weak point of this position is its credibility, considering that debt default is still a viable last resort option.

Figure 8: Different critical levels for \bar{b} , depending on the feasibility constraint for the budget surplus (\bar{s}), on monetary solidarity and on fiscal solidarity.

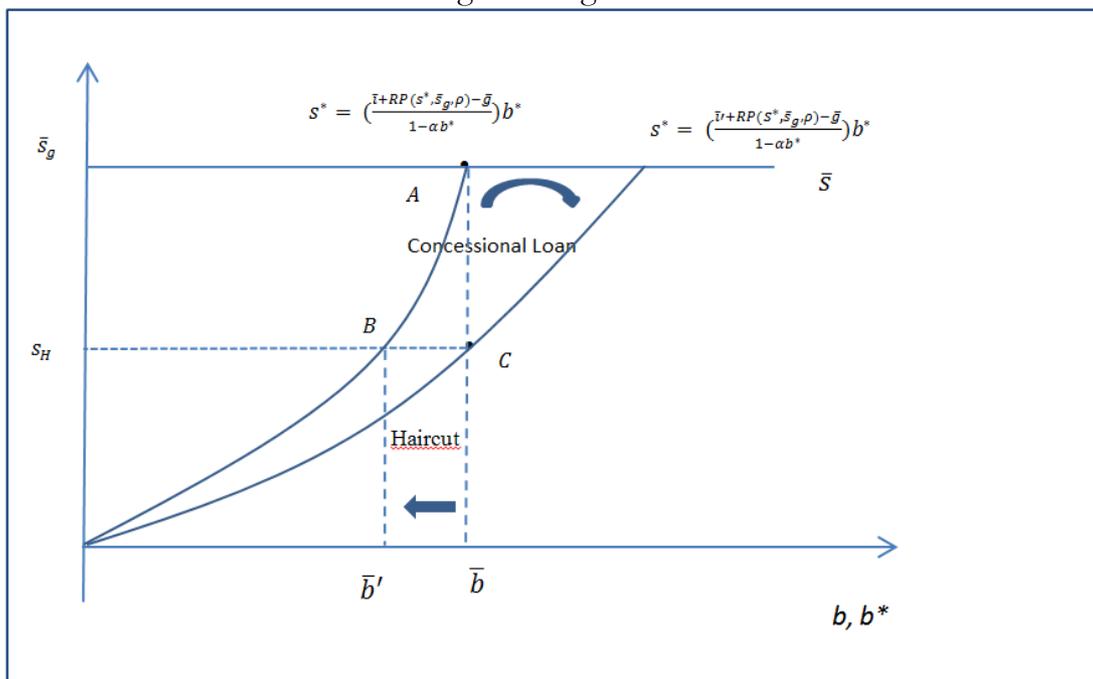


5.2.3. Concessional loan

A different possible solution would be a *concessional loan* (as also suggested by Cooper, 2012), that would reduce the market interest rate and would therefore push the solvency primary surplus down, below the upper primary surplus feasibility constraint. This measure might produce the same fiscal space effect of the haircut (although it would imply moving from point A to point C, rather than B, in Figure 9), but would preserve the idea that countries should be held fully

responsible and should not be forgiven for their past misbehavior, so that only a postponement of the payment will be agreed. Of course, replacing a private loan characterized by a market driven interest rate with a public and institutional one may be effective only if the interest rate charged on the latter is lower than the former, so as to reduce the stringency of the solvency primary deficit.

Figure 9: Being at A, it is possible to obtain some more fiscal space through an outright haircut/partial default that reduces \bar{b} to \bar{b}' and \bar{s}_g to s_H , therefore moving to B. Fiscal space, going from \bar{s}_g to s_H , can be obtained also through a concessional loan that reduces the interest rate on the debt, thereby moving to C while leaving unchanged the overall \bar{b} .



5.2.4. Interest rate cap and loan conditionality

A further way to make public debt sustainable is to impose an *administrative cap on the interest rate* that would flatten the public debt service equation. The problem is that this might be accompanied by a *loan conditionality* (implying a higher primary surplus) that might more than offset the concessional part, so as to push again the solvency primary surplus towards its upper feasibility limit (Tamborini, 2015). This can be represented by considering the federal requirement of an extra fiscal surplus $f < 0$, to be satisfied in order to enjoy the concessional loan benefiting of a lower interest rate, so that:

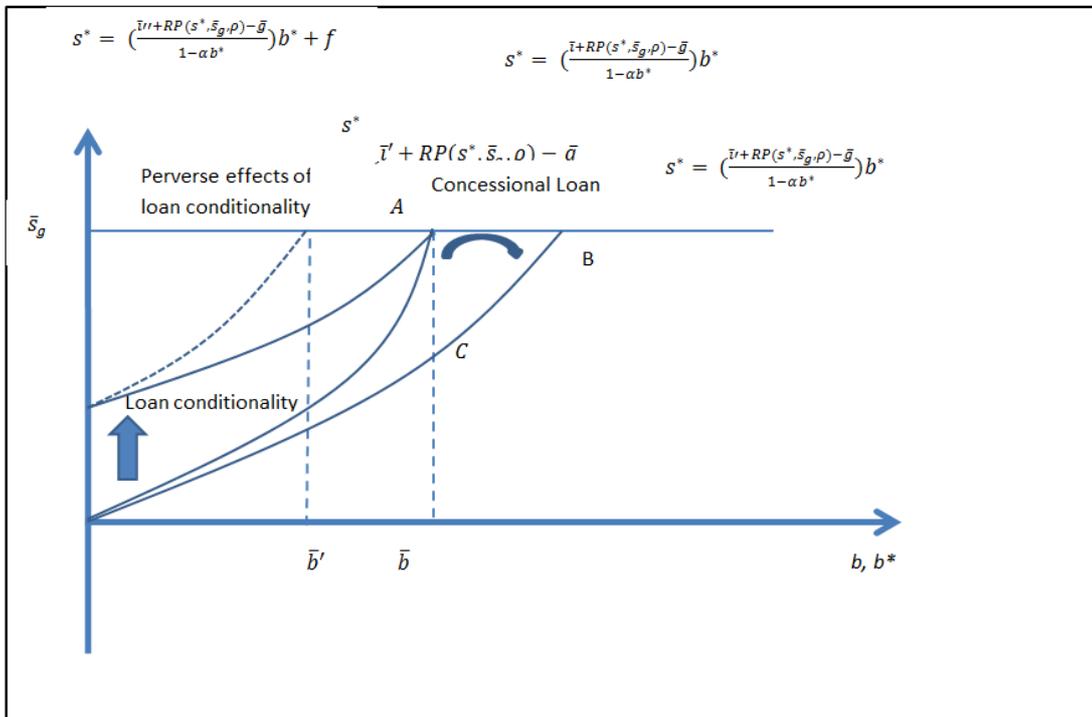
$$s^{t*} = f + (t' - g)b^* \quad (10)$$

Needless to say, if this is the case, a perverse private sector’s interest rate reaction may occur taking the interest rate to the level $\bar{r}' > \bar{r}$, and the risk premium may well increase as a result of the non-credibility of the required fiscal effort, thereby making the situation even worse, with a lower sustainability level of the public debt-to-GDP ratio (\bar{b}' rather than \bar{b} , see Figure 10).

5.2.5. GDP growth through fiscal stimulus or through the external channel

If the ‘multiplier effect’ applies, *GDP growth* might also be a solution (see Della Posta, 2017c for a deeper analysis of the role played by GDP growth in the euro area crisis). As mentioned above, this is the way that has been followed in many similar situations in the past. Increasing GDP growth may require a domestic stimulus on the aggregate demand coming from fiscal policy, but also – as the conventional wisdom suggests - the introduction of structural reforms on the supply side. In the euro area the second option has been followed, while constraining fiscal policy according to the indications of the *fiscal compact*.

Figure 10: Being at *A*, it is possible to obtain some more fiscal space through a concessional loan that reduces the interest rate on the debt, thereby moving to *C* while leaving unchanged the overall \bar{b} . The conditionality part, however, may be such as to push the solvency primary surplus up to \bar{s}_g again for the same level or even to induce a perverse interest rate reaction in case of a non-credible required fiscal effort



It is certainly understandable that expanding fiscal policy in the middle of a crisis that is considered as driven by a fiscal divergence (as the Greek shock seemed to prove) might not appear as a reasonable solution. It could be

questioned, however, whether a *long term* response on the *supply side* may be appropriate when the shock hitting the economy in the *short term* is relative to the *demand side*. Moreover, the response given to the still biting global financial crisis by other countries, including the USA fiscal stimulus with the \$ 700 billion Troubled Asset Relief Program, speaks by itself.

As recalled by Della Posta (2017c), historical examples also suggest that growth, rather than fiscal austerity, helped redressing fiscal balances: European countries after WW2, or the USA under the Clinton administration after the deficit produced by Reagan are some of the cases at hand.¹⁷ Moreover, as reported by Collignon (2012), Bohn (1995, 2008) shows that in the US, over the last 200 years, the public debt-to-GDP ratio has been kept on a non-explosive path thanks to the average GDP growth being larger than the average interest rate on it. This is also in line with what argued by Domar, as reported by Arestis and Sawyer (2008) and quoted also by Della Posta (2017c): “the problem of the debt burden [is] essentially a problem of achieving a growing national income” (Domar, 1944, p. 822).¹⁸

Of course, the *external channel*, thanks to a depreciation of the euro vis-à-vis the main competing currencies might also be a different possibility. This is, however, a policy of the ‘beggar-thy-neighbor’ type, which may produce quite relevant controversies that may create more problems than those that would be trying to solve. This is always the case, but particularly so in an environment in which there are already some clear signs of potential war currencies at the world level.

Alternatively, as suggested by Eichengreen (2012), Germany should play the role of engine of Europe, something that, however, given her high propensity to export, she does not seem to consider doing (while the USA have been the engine of the world in the past, thereby accepting to experience large current account deficits).

Both a fiscal expansion and increased net exports can be represented by a lower slope of the debt sustainability equation resulting this time from a higher g , rather than from a lower i .

5.2.6. Abandoning the euro

A further solution might also be possible, coupled with one or more of the others listed above, namely abandoning the euro. This would be represented by the removal of any cap on \bar{m} , that would grow towards infinity, as De Grauwe (2012) implicitly argues being the case for stand-alone countries.

I do not discuss this solution here, assuming that the economic and political costs that would follow from its abandonment would be much larger than the

¹⁷ Amartya Sen, Lectio Magistralis held at the Faculty of Economics of the University of Florence on 12 May 2012.

¹⁸ A different view, however, is proposed by Reinhart *et al.* (2015), who argue instead that the main role in favoring the public debt-to-GDP reduction has been played by low, and quite often even negative – real interest rates.

problems that it would be thought to solve. Moreover, quite the opposite can be concluded from the analysis that I have conducted in this paper: making EMU a 'standard' monetary union complemented by a monetary authority acting as a lender of last resort and by the fiscal solidarity of the countries belonging to it would reassure the markets and remove the possibility of speculative attacks in the first place.

Needless to say, this is not at all an easy task, but it is difficult to envisage any better alternative.

6. Concluding remarks

In this article I have discussed the part taken by fiscal and monetary policies in allowing to overcome the euro area crisis. I have discussed also some of the proposals that have been advanced in the literature in order to avoid that similar crises may occur in the future.

In doing so, I have used the framework of an old model proposed initially by Domar, and adapted to represent the institutional setup of the euro area and its possible future evolution. I have focused especially on the effects of fiscal austerity and on those of monetary solidarity (that obtains when the central bank is allowed to act as lender of last resort) and I have concluded that the end of the crisis has been due to the latter.

In the analysis I have stressed the part that the availability of additional financial resources plays in reducing market uncertainty and, as a result, in reducing the interest rate on public debt.

Other proposals for solving the crisis and avoiding future ones have been discussed.

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