

Sustainable debt ratios: How would 'stabilized values' look like?

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Abstract

Following Burger (2012)'s approach of calculating stabilized debt to GDP ratios this paper computes these levels for five selected Eurozone economies. Such a debt ratio indicates to which level the economy would converge to, based on its past country-specific behavior in combination with the fiscal response mechanism. The outcome shows that for most of the selected economies the current (to some extent crisis-induced) debt to GDP ratios are above the stabilized ones. This development requires fiscal counter-steering. Such a policy is also recommendable for the other two economies, i.e. Italy and the Netherlands, since their debt ratios reveal an increasing tendency.

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1 Introduction

Europe has been hit by the economic and debt crisis at full tilt and the entire impact on the economic, social and political situation is not yet in sight. But the recent conditions are ominous: for four years now the political leaders from all over Europe have been hurrying from one crisis summit to another, billions of Euros have been mobilized for funds and fiscal and financial assistance (EFSM, EFSF, ESM) combined with a commitment to strict austerity programs. Budget deficits are frequently beyond the 3% reference level (according to the Maastricht Treaty), debt ratios are rising (in some cases even at an alarming pace) and several countries have been forced to apply for financial support from the lenders mainly represented by European Commission, ECB and IMF. Currently, these programs cover 130 bil. € for Greece,¹ 78 bil. € for Portugal and 85 bil. € for Ireland. Plus, this summer other countries made a (preventative) claim, among them Spain in order to assist its banking sector.

Of course, times of crisis are exceptional. And these circumstances are not comparable to 'usual' conditions. And certainly they are influenced by the general economic trend. However, among the most interesting questions within this context is: What would 'getting back to normal' look like? Meaning, all these austerity measures and recovery programs aim at restoring a sustainable fiscal and budget situation. Hence, how exactly does this level, here especially focusing on the debt ratio, look like? What is the common or usual stabilized debt ratio? Is it the same for all 27 European economies? Hardly likely. Thus, what determines the appropriate state? Evidently, country specific characteristics matter. These should be based on past fiscal behavior. Moreover, a sustainability measure should be included. This part requires an agreement on a common sustainability determination.

A promising approach to consider these aspects has been introduced by Burger (2012). He suggests to combine the requirements for a stabilization of the budget with Bohn (1998)'s fiscal response mechanism to indicate sustainability. Accordingly, the regression coefficients are used to compute the stabilized debt ratio. This, obviously, is then derived from past fiscal behavior. Here, that approach is applied to five selected European

¹ Actually this is even the second program. A first one of 110 bil. € was immediately prepared in spring 2010 when Greece suddenly got into severe financial trouble.

economies, namely France, Germany, Italy, the Netherlands and Portugal. While France, Germany and the Netherlands represent the central and more solid European countries, Italy and Portugal are included to show the effect for troubled economies. Both of them are sometimes referred to as part of the so-called PIIGS states, the group of economies with severe fiscal situations. The rest of this paper is structured as follows: section two briefly presents the theoretical aspects of the approach, section three shows the empirical calculations and section four summarizes the main findings.

2 Theoretical background

The central economic idea that every agent should balance its budget, meaning expenditures must be covered by revenues, implies for the public sector that the government should collect (actually: at least) as much taxes, T , as it spends to fulfil its responsibilities. Once running deficits, DEF , is allowed it may give out bonds, B , to meet its expenditures, which are composed of primary spending for goods and services, G , and interest payments on already outstanding debt, rB . Thus, the following equation describes the government's budget:²

$$\underbrace{T_t + DEF_t}_{\text{revenues}} = \underbrace{G_t + rB_{t-1}}_{\text{expenditures}} \quad (1)$$

for a certain period t .³ Since the DEF expresses the funding gap (shortfall of taxes compared to public expenditures) it corresponds to the difference in debt stock or shift in bonds $B_t - B_{t-1} = \Delta B_t = DEF_t$ within one period. Reorganization of (1) gives the common textbook notation:

$$DEF_t = G_t - T_t + rB_{t-1} \quad (2)$$

which consists of the primary deficit, $G - T$, and the administration's interest payments. To be able to compare different countries it is more appropriate to utilize relative values.

² Cf. for instance Blanchard (2000, Chpt. 27.1) for the subsequent equations. The notation refers to discrete and real variables here. Similar approaches may also be found in or Neck and Sturm (2008, Chpt. 1.5) and Burger (2003) for instance.

³ Usually this relates to end of the (fiscal) year data, for example with December 31st being the reference date.

Commonly in the budget context, ratios to GDP, Y , are used:⁴

$$\frac{G_t - T_t}{Y_t} + (r - \gamma) \frac{B_{t-1}}{Y_{t-1}} = \frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}}. \quad (3)$$

with γ for the real economic growth rate.

Thus, with the intention to calculate a constant or stabilized debt ratio, as suggested by Buiter (2004, Sec. 2c) and Burger (2012, pp. 936f.), Burger et al. (2011, Sec. III) and Burger and Marinkov (2012, Sec. 4.1) the right hand side of (3) becomes zero meaning:

$$\left(\frac{T_t - G_t}{Y_t} \right)_s = (r - \gamma) \frac{B_{t-1}}{Y_{t-1}}. \quad (4)$$

For debtor economies, applying to most economies world wide, with a positive interest rate - growth rate gap, the government must achieve primary surpluses relative to GDP in order to keep the debt ratio constant and stabilized. This is the required response for stabilization, denoted by s .

Regarding fiscal sustainability, a formative contribution by Bohn (1998) introduced a response mechanism that refers to the government's fiscal acting: if the administration enhances its primary surplus in face of an increasing public debt ratio, such a reaction indicates fiscal sustainability. That behavior can be described by, cf. Greiner et al. (2007):

$$\left(\frac{T_t - G_t}{Y_t} \right)_e = a_0 + c_1 \frac{B_{t-1}}{Y_{t-1}} \quad (5)$$

with a_0, c_1 being constant parameters of which c_1 captures the reaction of the primary surplus ratio to changes in debt ratio and a_0 contains all other influences on the primary surplus ratio, cf. Greiner et al. (2005). This describes the empirical access and reflects authentic responses, marked by e . Similarities to (4) are recognizable since the influential variables are the primary surplus and the debt ratio.

Burger (2012), Burger et al. (2011, Sec. III) and Burger and Marinkov (2012, Sec. 4.1) elaborate further on this aspect and develop a link between (4) and (5). Burger and coauthors suggest computing the stabilized debt ratio with regard to Bohn's fiscal response mechanism introduced above. Assuming here that the primary surplus takes values that

⁴ Cf. for instance Neck and Sturm (2008, Chpt. 1.5). Here, the calculations make use of the common approximations, cf. Blanchard (2000, Chpt. 27.1, Appendix 2).

stabilize the debt ratio so that $b_t = b^* = \text{const.}$ allows to write, see also Fincke (2012, Chpt. 3.3):

$$ps^* = a_0 + c_1 b^* \quad (6)$$

with ps denoting the primary surplus ratio. The stars indicate the stabilized values. Transferring this reasoning to (4) gives:

$$ps^* = \theta b^* \quad (7)$$

with $\theta = (r - \gamma)$. And, therefore, the latter two equations can be used to determine the stabilized debt ratio according to a combination of (6) and (7):

$$b^* = \frac{a_0}{\theta - c_1}. \quad (8)$$

Thus, b^* is determined by the individual economy's past fiscal behavior (a_0, c_1 coefficients) and its interest rate growth rate gap θ . Moreover, for sustainability a stronger response is required than for stabilization, resulting in a negative denominator.⁵ The intercept a_0 regulates whether the debt ratio level stabilizes at a positive or negative value, cf. Burger (2012, p. 937).

Therefore, b^* gives a notion of how a country-specific stabilized sustainable debt ratio could look like and in which level 'getting back to normal' could result. How such a debt ratio would empirically look like is calculated in the next section for selected EMU countries based on estimations published in Fincke and Greiner (2012).

3 Empirics

In order to apply Burger's concept introduced above to the five EMU economies, this chapters makes use of data and coefficients from an earlier estimation by Fincke and Greiner (2012). To implement Bohn (1998)'s fiscal response mechanism the technique resorts to the non-parametric regression of penalized splines. For an introduction see for instance Ruppert et al. (2003), Greiner (2009) or Greiner and Fincke (2009, Appendix A). Here, the average reaction coefficients c_1 have been adopted to indicate the government's

⁵ For both parameters, $\theta > 0$ and $c_1 > 0$, is assumed. This refers to dynamic efficient economies, see for instance Greiner et al. (2005, p. 5).

response to increasing debt ratios. Equation (9) presents the model design:

$$s_t^i = c_1^i b_{t-1}^i + \mathbf{Z}_t^i \mathbf{a}^i + \epsilon_t^i, \quad (9)$$

for each individual economy $i = 1 \dots 5$ with different control variables in \mathbf{Z} .⁶ The data has been taken from OECD (2010) and International Monetary Fund (2010). For the calculation of θ , i.e. the interest rate growth rate gap, averages over the whole time period have been computed respectively - except for Italy and Portugal. Since for those two particular cases the early 1970s data pose some problems, the averages over the last 30 years have been employed, $\overline{(1979 - 2009)}$. Table 1 summarizes the relevant information.

	$\theta = (\bar{r} - \bar{\gamma})$	c_1	$\theta - c_1$	a_0	$b^* = \frac{a_0}{(\theta - c_1)}$
France (1971-2008)	0.0085	0.187	-0.1785	-0.103	57.7 %
Germany (1971-2009)	0.0162	0.366	-0.3498	-0.136	38.9 %
Italy (1972-2009)	0.0149	0.066	-0.0511	-0.071	138.9 %
The Netherlands (1971-2009)	0.0076	0.058	-0.0504	-0.048	95.2 %
Portugal (1977-2009)	0.0112	0.192	-0.1808	-0.105	58.1 %

Cf. Fincke and Greiner (2012, Appendix A) for the estimation results.

Table 1: Stabilized debt ratios for the selected EMU countries.

The numbers in the third column show that for all five economies the estimated reaction coefficients exceeds the interest rate growth rate gap, which indicates sustainability. Moreover, since all the intercepts are negative, the stabilized debt ratios are positive, which holds for debtor economies. In combination with the debt ratio illustrations in figure 1 country specific information can be extrapolated.

⁶ These include the intercept a_0 , a business cycle variable and, in contrast to Fincke (2012), a more specified public expenditure variable Soc , which accounts for social security surplus in the public system, cf. Fincke and Greiner (2012).

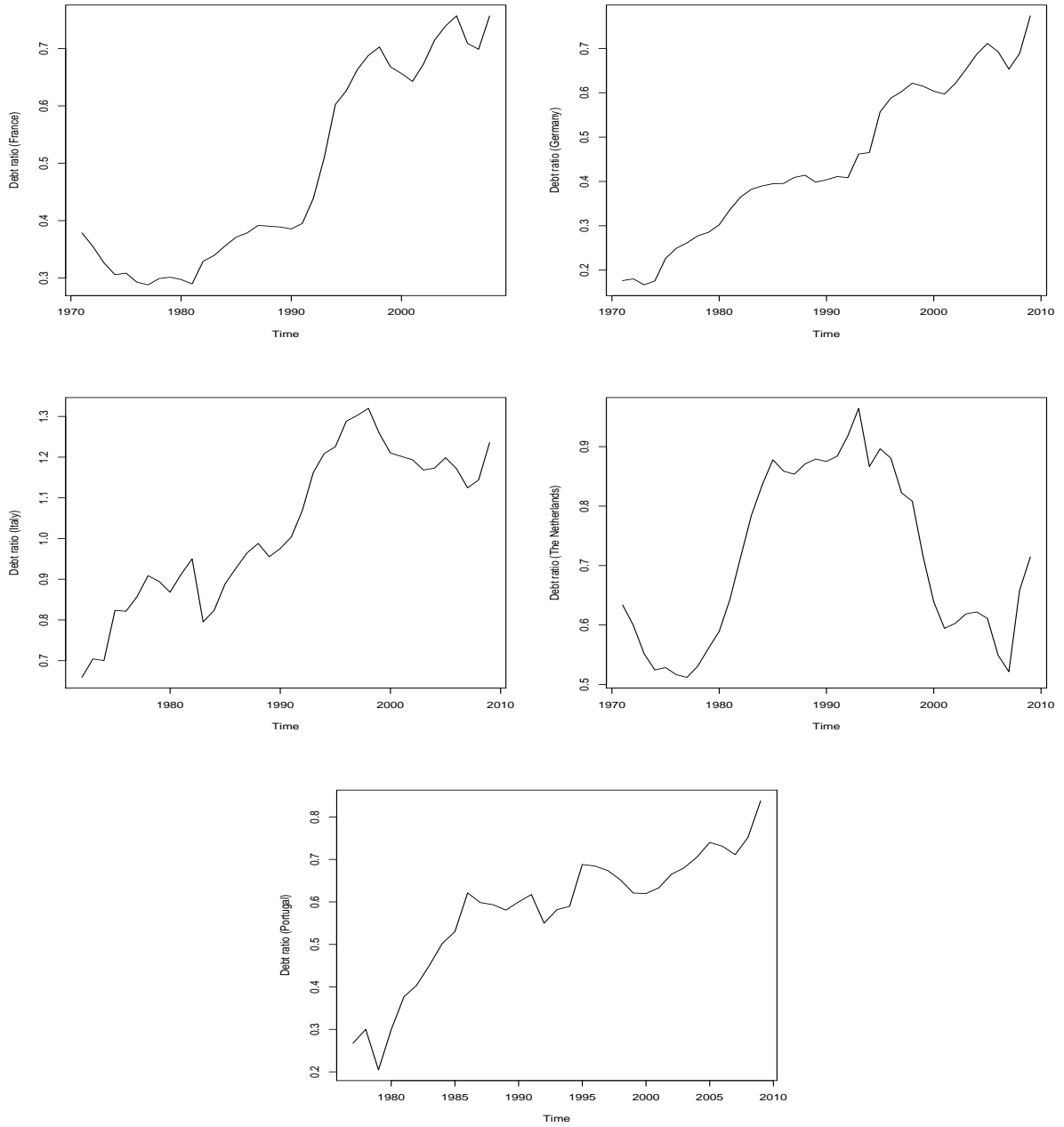


Figure 1: Debt ratios of the selected economies, cf. OECD (2010) for the data.

For France and Portugal the value calculated for the stabilized debt ratio is close to the 60 % reference level that is specified in the Maastricht Treaty for EMU member economies. Moreover, according to figure 1 for Portugal that niveau roughly corresponds to the debt ratio in the years from 1985 to 1995, with a view to an EU participation (1986) and an advancing European integration (EMU / Euro preparation) proceeding. For Germany with 39 % the number is a little lower, which, however, is in accordance with approximately the debt ratio average from the middle of the 1980s prior to the 'Reunification'.⁷ Italy, with traditionally higher debt ratios than most European economies, indicates also a high stabilized debt ratio level. As depicted in graphic 1, this is not too unusual, as Italy's debt ratio shows an almost steadily increasing development on a higher level (it already starts at about 70% in the 1970s). In addition, the high stabilized level is influenced by a comparatively low reaction coefficient. This also holds true for the Netherlands with a stabilized debt ratio of 95%. It appears to be high for a central European economy, but as figure 1 shows, the Dutch fiscal position has been shaped by high debt ratios during the 1990s, some even exceeding 90%, which were successfully reduced until the crisis hit the economy recently. Thus, even if these latter numbers (Italian and Dutch) should be clarified and analyzed further by additional research, their general tendency does not seem to be implausible.

	France	Germany	Italy	The Netherlands	Portugal
2011	100.1	87.2	119.7	75.2	117.6

Table 2: Current debt ratios for the selected EMU countries, cf. OECD (2012) for the data.

In comparison with the current debt ratios presented in table 2 the economies should enforce a turn in trend and reduction in order to achieve the stabilized debt ratios calculated above. This particularly applies to France and Germany as the two largest Eurozone economies, and demands counter steering in debt policy. After applying for financial support in April 2011 Portugal has to fulfill strict austerity measures. The program also pays attention to the debt ratio. Eventhough not as urgent as for France, Germany and

⁷ Moreover, such low numbers are not too unusual, as for instance Burger (2012, p. 941) computes a level of 45.6% for the UK.

Portugal such a policy is also recommendable for Italy and the Netherlands since the increasing tendency of their debt ratios signals a need for action.

These calculations do not come without problems. For instance, actually the coefficients are random variables. Thus, strictly speaking the calculated b^* values, as point estimates, should be complemented by distributional information.

In summary, it is possible to calculate stabilized debt ratios according to the country's past fiscal behaviour according to Burger (2012)'s approach. Some of the numbers require additional research in order to clarify the level. However, the tendency for higher values of Italy and the Netherlands compared to France and Portugal and, finally, Germany seems to be suitable. In relation to the current debt ratios most of the economies should impose corrective actions soon such that they are able to achieve the stabilized debt ratios.

4 Summary

Based on the idea of Burger (2012) to calculate stabilized debt ratio this paper has computed these values for five EMU members, namely France, Germany, Italy, the Netherlands and Portugal. The general concept is derived from the government's budget and combined with Bohn (1998)'s sustainability contribution of a fiscal response mechanism. Burger has refined these approaches and suggested to use country specific characteristics (the interest rate/growth rate gap) and the fiscal reaction coefficient from the regression to determine the stabilized debt ratio levels. Here, the resulting numbers are about 60% for France and Portugal, approximately 40% for Germany - which corresponds to its debt ratio level before 'Reunification' - and 139% for Italy and 95% for the Netherlands. Even though the last two values are relatively high, their tendency might still be reasonable since both countries have suffered from high debt ratios in the past. Finally, in comparison with the current (crisis-induced or exacerbated) high debt ratios most of the countries need to implement corrective actions soon in order to reach the stabilized values. This is also advisable for Italy and the Netherlands since their debt ratios show an increasing trend recently. Thus, 'getting back to normal' in terms of stabilized sustainable debt ratios means for most (of these) countries a reduction of the current levels in order to

realize these values. An interesting question for further research would be which policies would be the most suitable for achieving this goal.

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