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A Model

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Zusammenfassung / Abstract

In the existing literature, fiscal policy in times of budget crises is considered above all from an empirical point of view. Until now, no model explaining the processes and forces at work has been developed. This article closes this gap. The model presented is based on the theory of political business cycles and the market discipline hypothesis. Unemployment, the voters' preference for a sustainable deficit policy and the probability of a sovereign default are the determinants influencing the deficit. As a result the deficit falls high if fiscal policy is effective in reducing unemployment, if voter prefer deficits rather than balanced budgets, if financial markets do not react to lasting deficits and if the natural rate of unemployment is high.

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1. Introduction

No topic has been as prevailing in the media the last years as the lasting debt crisis in the Eurozone. Because of the immense threats and costs it entails economists also play a prominent role in these discussions. An innumerable amount of papers has been issued. But most articles concerning the debt crisis and the budget consolidation in the crisis countries treat them from an empirical point of view. None of these articles presents a consistent theoretical model which could help explaining the processes and forces at work. This article shall close this gap.

Based on the theory of political business cycles and the budget discipline hypothesis, a model is constructed containing the elementary determinants which have to be considered from a political point of view. The government's optimization calculus has to take the effects of its deficit policy on unemployment, the voters' preference for or against deficits and the threat of a default into account. As a consequence, the public primary deficit's height negatively depends on the voters' preference for a sustainable debt policy, financial market's sensitivity to deficits and the damage a default entails. It positively depends on the effectiveness of fiscal policy in reducing unemployment and the height of the natural rate of unemployment. An important policy measure which can be derived from the model is to keep disciplining mechanisms like the markets' interest rate intact or otherwise to install a political mechanism which sanctions high deficits resolutely.

2. A Model of Budget Consolidation

a. Basics

The model rests on two pillars: the theory of political business cycles and the market discipline hypothesis. The theory of political business cycles was established with the article of Nordhaus (1975). In this model, government tries to control the variables unemployment and inflation in a manner that augments its reelection probability. At the eve of an election, it starts an expansionary monetary policy to take the working people by surprise, which leads to a decrease in unemployment. With inflation expectations

adapting after a delay, this leads to rising unemployment after the election. To get inflation under control again, government starts a deflationary monetary policy. But the more the next election approaches the more government shifts to an expansionary monetary policy again to lower unemployment. As a result, the unemployment curve has the form of a saw blade, just as the inflation curve but in the opposed direction. One crucial condition for this mechanism to work is not only that voters do not foresee the rising inflation but also have a short memory and quickly forget about government's deflationary policy directly after the election.[2]

Nordhaus' theory was also adapted to government's fiscal policy (Frey and Schneider 1978). According to this variation, government starts an expansionary fiscal policy at the eve of an election (preferably with deficits instead of tax raises) to lower unemployment (Brender and Drazen 2005; Alt and Lassen 2006; Jong-A-Pin and de Haan 2012). But again, one crucial condition is that voters do not fully catch the deficit instrument and underlie fiscal illusion at least to a certain degree (Buchanan and Wagner 1977: 127ff.; Buchanan and Wagner 1978: 137ff.; Pommerehne and Schneider 1978: 381).

The market discipline hypothesis – the second pillar of the model presented here - was first analyzed by Bishop et al. (1989), Frenkel and Goldstein (1991) and Lane (1993). It consists of two halves: For the first half it is argued that financial markets react to government's unsustainable debt policy by raising interest rates according to the rising risk of a default. Government's reaction to the risen interest rates in turn is handled in the second half. If government reacts to the higher interest rates by correcting its deficit, policy financial markets' indeed have a disciplining effect.

The first half has been confirmed empirically to a large extent (Alesina et al. 1992; Capeci 1994; Bayoumi et al. 1995; Laubach 2003; Ardagna et al. 2007; Bulut 2012). Yet, the empirical literature concerning the second half is limited and also contradictory. On the one side, Heinemann and Winschel (2001), Bulut (2012) and Afflatet (2015) confirm financial markets' disciplining effect. On the other side, Kula (2004) does not.

[2] Hibbs (1977) adapted Nordhaus opportunistic model to parties' ideological preferences. According to this ideological business cycle, left governments prefer the combination of higher inflation and lower unemployment while right governments prefer it the other way round. After a government change a change in economic policy should be observable accordingly.

b. Assumptions

i. Election Function

In the model we assume that citizens vote retrospectively according to the theory of economic voting: They attribute economic results to government's policy (Lewis-Beck and Paldam 2000). The election function is based on a loss function which contains four components: unemployment (u), the deficit (b), the possibility of a default (A) and a normally distributed shock variable:

$$L_t = -u_t^2 - \theta b_t - pA + \varepsilon_t, 0 \leq \theta \leq 1, \varepsilon \sim N(0, \sigma^2)$$

A factor θ which reflects the voters' relative preference against deficits is added. A default does not occur in every case. Thus, the loss from a default is multiplied with its probability.

The government's loss function reflects the voters' loss under the government ruling. For the opposition the same loss function is employed but the loss from the opposition's policy must be considered as hypothetical. The sum of votes the government receives (V_t^G) corresponds to the sum of voting decisions (Φ) of the citizens (i) who weigh the loss they have received from the government's policy against their estimation of a hypothetical loss under the opposing party.

$$V_t^G = \sum_{i=0}^{n} \Phi^i \left(L_t, \hat{L}_t\right)$$

If the loss they have received under the government's policy does not exceed the loss they would have expected from the opposition's policy, they vote for the incumbent party, otherwise they vote for the opposition:

$$\phi_t^i = \begin{cases} 1 \; if \; \dfrac{L_t^i}{\hat{L}_t^i} \leq 1 \\ -1 \; if \; \dfrac{L_t^i}{\hat{L}_t^i} > 1 \end{cases}$$

If elections are held at the end of every period, government tries to deliver a better economic performance as the voters would have expected from the opposition. Government thereby continuously tries to minimize the voters' loss function. As the government's parameters are set at the beginning of every period, government must refer to the voters' expected loss.

$$E[V_t] = -u_t^2 - \theta b_t - pA$$

The second component, the deficit, can be divided in two parts: the primary deficit (s) and the interest payments to the creditors (id). The interest variable reflects past fiscal policies. Thereby it cannot be influenced any more by the incumbent government.

$$b = s + id$$
$$=> E[V_t] = -u_t^2 - \theta(s_t + i_t d_t) - pA$$
$$= -u_t^2 - \theta s_t - \theta i_t d_t - pA$$

It has been shown empirically very well that the unemployment situation plays a crucial role in elections (Paldam and Nannestad 2000a and b). For the deficit, the situation is different: In the empirical literature it has not entirely been clarified whether deficits do hurt the incumbent government (Afflatet 2013). There also seem to be differences between electoral groups (Stalder 2007).

However, there is no doubt that a default entails heavy consequences for government's popularity. In this case, the primary deficit must be reduced to zero immediately, investments drop dramatically as does economic growth and the unemployment rate rises sharply.

ii. Financial markets' function

A sovereign default typically occurs when government *decides* not to meet its liabilities any more (Reinhart and Rogoff 2010: 103ff.). After all, public revenues could be redirected at any time from other purposes to pay interests instead. Taxes could be raised as well until the maximum of the Laffer curve is reached. But in case of a default, government arrives at the conclusion that the consequences of the creditor's deception are less severe than further burdening voters.

Albeit there is no clearly defined threshold for a default (e. g. a certain debt quota) it can be taken for sure that the budget's burden especially with interest payments plays a decisive role. During the ongoing Euro crisis the notion of "deadly interest rate" has been put forward (Flossbach 2010; Scherff 2011). This notion suggests that financial markets can substantially add to government's liabilities by claiming higher interest rates.

To gain a qualified impression about the health of public finances, the sustainability condition can be selected as criterion. The public deficit policy is not sustainable if the debt quota rises in the long-run (Blanchard et al. 1990). From a mathematical point of

view this can be the consequence of a high debt interest rate (i), a low economic growth rate (g) or a high primary deficit:

$$\frac{\delta d_t}{\delta t_t} = (i_t - g_t)d_t + s_t > 0$$

In the model, the probability of a default rises exponentially with the height of the interest rate development (e). This shows the point that interest payment substantially contribute to the decision about a default:

$$p = {e_t}^2$$

As government can compensate a rising burden in interest payments (the growth rate being taken as constant) with a lower primary deficit, financial markets take the primary deficit's height as decision criterion for the interest premium. The probability of a default thereby depends indirectly on the height of the primary deficit:

$$e_t = \zeta s_t, 0 \leq \zeta$$
$$=> p = {e_t}^2 = \zeta^2 s_t^2$$

Again, a factor ζ is added. It reflects how sensitively financial markets react to rising primary deficits. This way, a situation in which government is only lightly indebted and a temporarily augmented deficit has no further consequences on government's financial standing can be modeled.

If the financial markets' function is built into the election function, the following results is obtained:

$$E[V_t] = -u_t^2 - \theta s_t - \theta i_t d_t - \zeta^2 s_t^2 A$$

iii. Macroeconomic Function

For the economy we assume that government can influence the unemployment rate in the short-run over the primary deficit. As Downs (1968) suggested with his budget optimization calculus, a higher deficit enlarges public consumption and thereby reduces unemployment, e. g. over the allocation of public contracts or the hiring of additional public servants. The unemployment rate then drops under the natural rate of unemployment ($\bar{u}$) with a factor β indicating the effectiveness of fiscal policy in reducing unemployment[3]:

$$u_t = \bar{u} - \beta s_t, 0 \leq \beta \leq 1$$

[3] This factor is similar to the Keynesian multiplier. This way it can also be modeled if and to which extent voters react to rising deficits with higher saving quotas (Ricardo 1962; Barro 1989).

Because the additional public spending does not have to be covered by additional revenues in the short-run, government loses no votes through additional taxing while fully enjoying the additional votes which result from the additional spending (Downs 1968).

c. Government's Calculus

In the voting function the loss due to rising deficits only rises linearly whereas the loss due to a rising unemployment rate rises exponentially. Government thereby has a strong incentive to raise deficits at the eve of an election to lower unemployment and to obtain additional votes. But this mechanism only works if voters do not reject higher deficits and as long as rising deficits do not cause rising interest rates.

To identify the optimal height of the primary deficit – the only variable government can influence directly in the short-run – a Lagrange function is formulated. The election function shall be maximized under the side condition of the macroeconomic function:

$$L = -u_t^2 - \theta s_t - \theta i_t d_t - \zeta^2 s_t^2 A + \lambda(\bar{u} - \beta s_t - u_t)$$

The equation is differentiated with respect to the unemployment rate:

$$\frac{\delta L}{\delta u} = -2u_t - \lambda = 0$$

$$=> \lambda = -2u_t$$

The derivation with respect to the primary deficit leads to the equation for the unemployment rate:

$$\frac{\delta L}{\delta s} = -\theta - 2\zeta^2 s_t A - \lambda\beta = 0$$

$$=> u_t = \frac{\theta + 2\zeta^2 s_t A}{2\beta}$$

The derivation with respect to λ leads to the optimal height of the primary deficit:

$$\frac{\delta L}{\delta \lambda} = \bar{u} - \beta s_t - u_t = 0$$

$$=> \bar{u} - \beta s_t - \frac{\theta + 2\zeta^2 sA}{2\beta} = 0$$

$$=> s = \frac{\beta\bar{u} - \frac{\theta}{2}}{\beta^2 + \zeta^2 A}$$

Thus, the height of the primary deficit negatively depends on:

- the importance voters accord to the primary deficit as voting decision (θ),

- financial markets' sensitivity on deficits (ζ) and
- the political damage from a default.

Otherwise, it is higher if fiscal policy is effective in reducing unemployment and if the natural rate of unemployment ($\bar{u}$) falls high.

Three extreme cases can be deducted from this result:

1. Voters do not take the deficit into account when taking their voting decision ($\theta = 0$):

$$\lim_{\theta \to 0} s = \frac{\beta \bar{u}}{\beta^2 + \zeta^2 A}$$

   In this case, the height of the primary deficit depends on the natural rate of unemployment, the factor β and financial markets' sensitivity to the public deficit policy. If the damage from a default is big (high A) or if financial markets are very sensitive to high deficits (high ζ), deficits fall smaller accordingly.

2. A rising primary deficit does not lead to a higher probability of a default ($\zeta = 0$):

$$\lim_{\zeta \to 0} s = \frac{\beta \bar{u} - \frac{\theta}{2}}{\beta^2}$$

   In this case, the choice about the deficit's height only depends on the effectiveness of fiscal policy and the voters' preference about deficits. The less voters care about the deficit the higher it falls. Though, even in the extreme case of $\theta = 1$, the influence of the unemployment rate on the voting decision is still overwhelming. The deficit will thereby probably fall high and it will fall even higher if fiscal policy is effective in reducing unemployment (remember: $0 \leq \theta \leq 1$).[4]

3. The deficit has little effect on the unemployment rate ($\beta = 0$):

$$\lim_{\beta \to 0} s = \frac{-\frac{\theta}{2}}{\zeta^2 A}$$

   In this case, the deficit falls small (it is even negative!) because the potential damage from a default is enormous.

[4] An option which leads to a disproportionate vote loss from a certain deficit height onwards could be added. In reality it is hardly imaginable that voters accept any lasting height of the deficit (except perhaps in crises with very high unemployment rates).

3. Policy Implications

Which policy measures can be drawn from the model? The Eurozone's Debt crisis seems a good example to shortly discuss them.

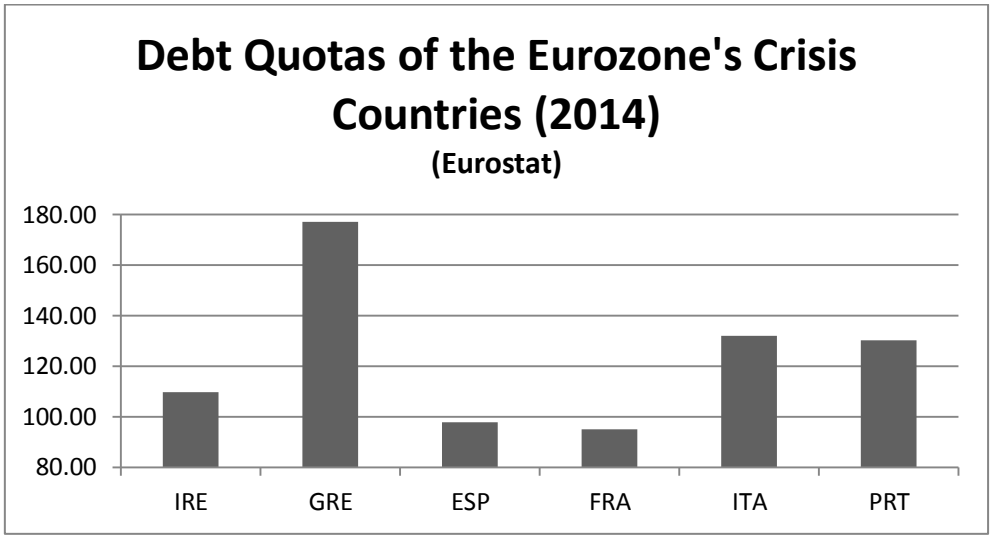

Figure 1

The Eurozone's crisis countries are heavily indebted (Figure 1) and their deficits remain high (Figure 2). Therefore, debt and deficit reduction (at least in the long-run) should be one of the main goals of these countries' governments. Otherwise, even heavier inter-generational distributional conflicts could appear in the following years due to the demographic change.[5]

[5] This becomes especially obvious if not only the explicit indebtedness (as presented above) is taken into account but also the implicit indebtedness. Implicit indebtedness is calculated based on future liabilities and foreseeable expenditures less the future public income. Calculations based on this method show even higher (with the exception of Italy) "sustainability gaps" than actually presented debt quotas (Moog and Raffelhüschen 2011).

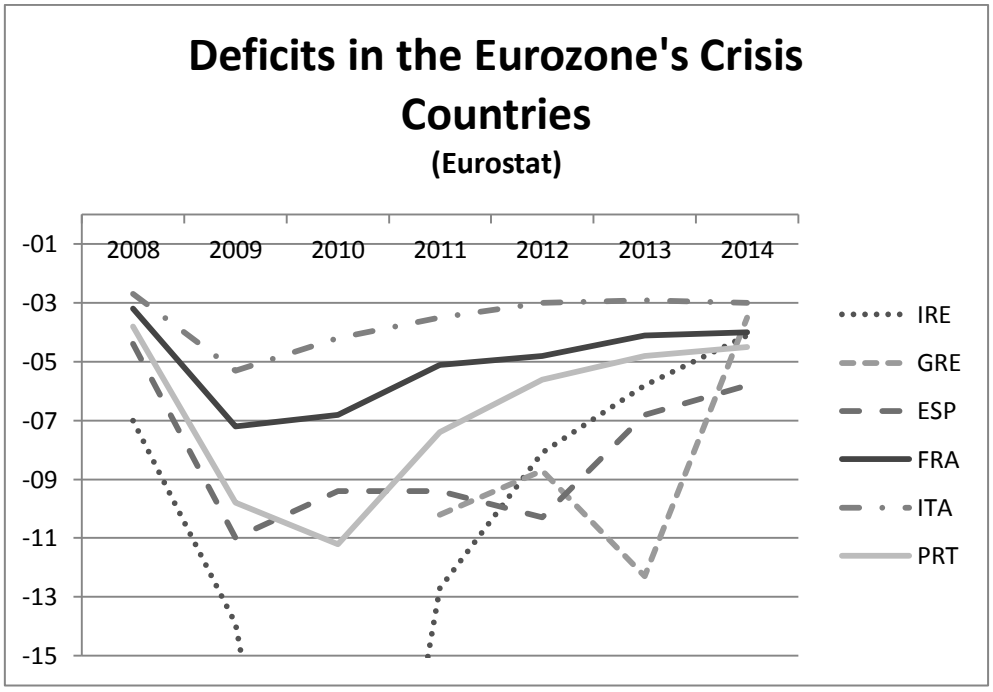

Figure 2[6]

As a consequence, the key question is: How can governments be stimulated to reduce their deficits? Three[7] possibilities open up:

1. Reduce the natural rate of unemployment: The height of the deficit negatively depends on the height of the natural rate of unemployment because government has to raise the deficit in order to reduce the loss function. If the natural rate of unemployment is low, there is no reason to raise the deficit because the loss is already at an optimum.

   But the unemployment rates of the crisis countries are far from being low. On the contrary, they remain on high levels (Figure 3)Figure 2. The fundamental problem of all crisis countries becomes obvious here: They have lost their price competitiveness (Sinn 2012). But to regain price competitiveness will require years of very low wage increases. Distributional conflicts could also occur if labor markets are reformed and privileges limited or abolished (e. g. lower minimum wages or a loosened job protection). Governments will very probably try to avoid this way of structural reforms.

[6] Note that the y-axis has been cut in order to maintain clarity.

[7] Of course there is also the hypothetical possibility to raise the costs of a default. But it is hardly imaginable that anyone would raise the costs of a default just to keep deficit policy sustainable. After all, a default is always a very serious event – even without enlarged costs.

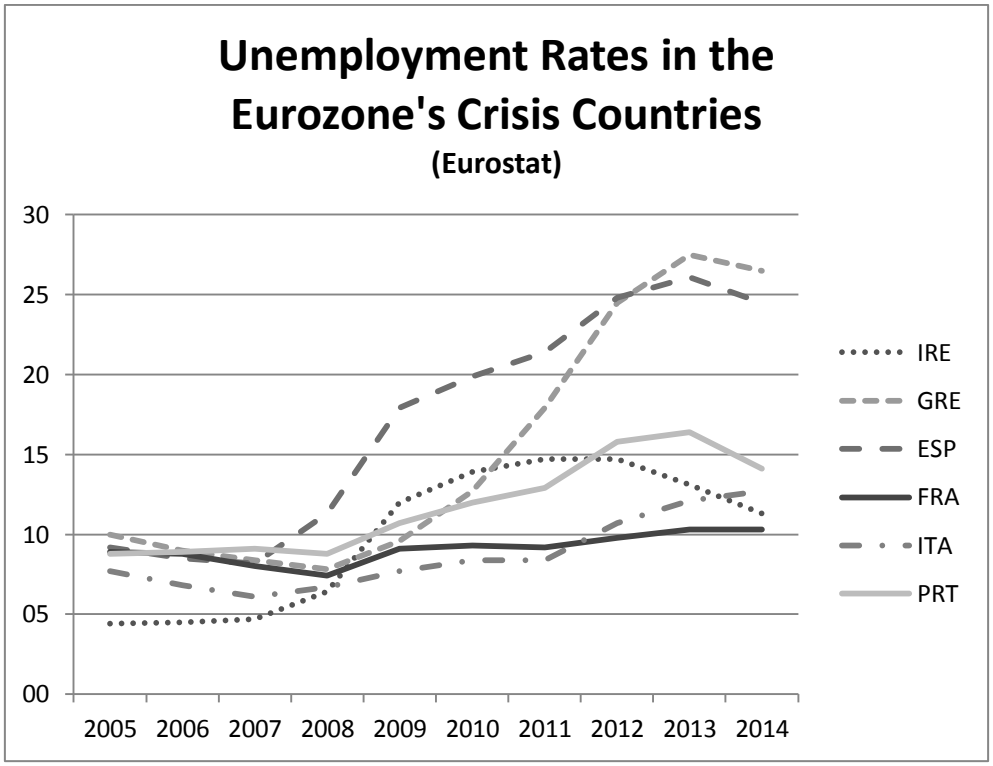

Figure 3

2. Raise voters' sensitiveness to deficits: If voters punish government for excessive borrowing, it will certainly stop such a policy immediately. But empirical research shows that voters do not reward governments for consolidation efforts (Alesina et al. 1998; Alesina et al. 2010; Afflatet 2013). Experience even suggests that the contrary is true: Governments committing themselves to drastic consolidation measures must fear to be voted out of office. Voters seem to prefer that government spends money in order to try to lower the high unemployment rates.
3. Raise financial markets' sensitivity to high deficits: Financial markets' sensitivity was already given at the beginning of the crisis. The rising bond yields prove this point (Figure 4).

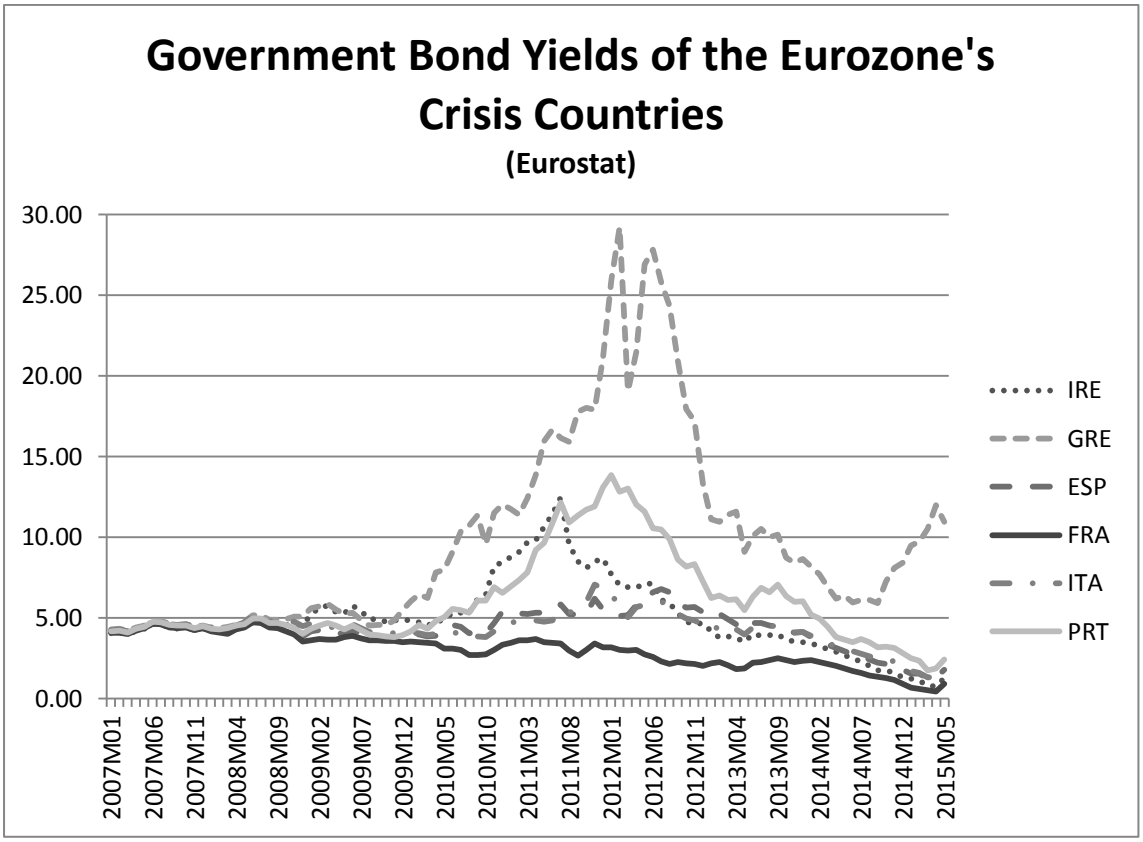

Figure 4

But with the European Central Bank (ECB) ready to intervene on financial markets to purchase government bonds, this mechanism has been shut down. Thus, the risk of a default which certainly has a disciplining effect has substantially been lowered. Two ways out of this situation can be suggested: Either the ECB steps back from its announcement or other disciplining mechanisms are installed instead. The first possibility would have a lasting damaging effect on the ECB's reputation. No matter how its policy is judged, it is hardly a desirable outcome that such an important institution cripples itself in such a way. The second possibility, to install another disciplining mechanism, could consist in introducing a new Stability Pact with real immediate sanctions without any exceptions or political loopholes. If governments were punished immediately when running excessive deficits, this would certainly have a strong effect on their fiscal policy.

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