

I. ARTICLES

Carmen Díaz-Roldán *, *Alberto Montero-Soler* **

**FISCAL POLICY IN THE EUROPEAN MONETARY
UNION: HOW CAN FISCAL DISCIPLINE
BE ACHIEVED? *****

From the beginning, the success of the European Economic and Monetary Union (EMU) seems to rely on the benefits of the single currency, the higher degree of integration of financial markets, and also on the sound public finances guaranteed by the set of fiscal rules provided by the EMU. When signing the Stability and Growth Pact, Member States committed themselves to reach a medium-term budgetary position close to balance. The aim of this paper is to investigate how fiscal discipline would be achieved. In particular, we will analyse the interaction among those EMU members showing a relatively high level of public debt and those that follow a strict fiscal discipline; paying special attention to the case of the new Member States.

Keywords: fiscal discipline, stabilization, monetary unions.

INTRODUCTION

Monetary policy rules have attracted considerable interest from policymakers and researchers during the last few years. Following Taylor (1993), most of the contributions have tried to assess how Taylor-type rules can explain the behaviour of central banks (see Clarida, Galí and Gertler, 1998, 2000, Gerlach and Schnabel, 2000, and Díaz-Roldán and Montero-Soler, 2004, among others). Do fiscal policy authorities follow any kind of fiscal policy rules? As Taylor addressed, fiscal policy rules are also an important element of macroeconomic policy analysis, and, moreover, the automatic stabilizers or the budget-balancing strategies can be interpreted as policy rules that could be studied under the same approach as the monetary rules. Most of the contributions have tried to study how monetary policy rules

* Universidad de Castilla-La Mancha

** Universidad de Málaga

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can explain the behaviour of central banks. But the available literature has hardly tried to study if fiscal policy authorities follow any kind of rule in a similar way. As for monetary rules, the usefulness of fiscal rules is related to the credibility of stable and announced rules. And following Taylor, literature on time-consistency demonstrated that the advantage of rules over discretion is like the advantage of a cooperative over a noncooperative solution in the game theory.

From the beginning, the success of the European Economic and Monetary Union (EMU) seems to rely on the benefits of the single currency, the higher degree of integration of financial markets, and also on the sound public finances guaranteed by the set of fiscal rules provided by the EMU. When signing the Stability and Growth Pact (SGP), Member States committed themselves to reach a medium-term budgetary position close to balance. In fact, the Maastricht Treaty stresses as basic that the Member States of the EMU should avoid excessive deficits; and the reference values for deficit-to-GDP and debt-to-GDP ratios have worked in practice as an explicit fiscal rule. But, in practice, the policy orientation of the SGP has not been fully satisfied. This has opened a debate about the utility and effectiveness of fiscal rules in the EMU, and on their complementarity with discretionary fiscal policy measures and automatic stabilisers to deal with short-run fluctuations.

On the one hand, there is a wide range of studies focusing on automatic stabilizers and insurance mechanisms (see Bajo-Rubio and Díaz-Roldán, 2001, for an overview). On the other hand, the implications of fiscal policy for stabilization have also been discussed, although none of the studies have explicitly considered the need of fiscal rules. Ballabriga and Martínez-Mongay (2003) estimate monetary and fiscal rules for the euro zone, concluding that monetary policy rules are not enough to guarantee price stability, and that they should be accompanied by an explicit public deficit objective. Debrun *et al.* (2008) study the relationship between fiscal discipline and fiscal rules in the EU-25, and they found that fiscal rules lead to more stable budget policies and less pro-cyclical fiscal policies. More recently, Brzozowski and Siwińska-Gorzela (2010) analysed the impact of fiscal rules on fiscal policy volatility. From their results they conclude that rules based on deficit control are more destabilizing than those based on imposing a limit to public debt.

The aim of this paper is to investigate how fiscal discipline would be achieved. In particular, we will analyse the interaction among those EMU members showing a relatively high level of public debt and those that follow a strict fiscal discipline; paying special attention to the case of the New

Member States (NMS). To take into account policy interactions, we will use the game theory approach. To that end we will develop a macroeconomic model describing a monetary union where only fiscal authorities act independently. After solving the model, we will study the convenience of fiscal policy coordination when using an explicit fiscal policy rule. Finally, we will perform an empirical application to evaluate our results.

The paper is organized as follows. The model and the theoretical results derived from the model are presented in section 2. The empirical application is performed in section 3. Section 4 concludes.

1. THE MODEL

The model is based on Díaz-Roldán and Montero-Soler (2009). We will consider a “small” monetary union formed by two symmetric countries, where nominal exchange rate disappears among countries. Variables are defined as logarithmic deviations from their equilibrium levels. The variables of the monetary union are the weighted sum of the member countries’ variables. The aggregate demand and the aggregate supply functions for each country are as follows:

$$y_1 = -a\Delta p_1 - b\Delta p_2 - cy_2 + hg_1 + v_1 \quad (1)$$

$$y_2 = -a\Delta p_2 - b\Delta p_1 - cy_1 + hg_2 + v_2 \quad (2)$$

$$y_1 = t\Delta p_1 - s_1 \quad (3)$$

$$y_2 = t\Delta p_2 - s_2 \quad (4)$$

Equations (1) and (2) represent the aggregate demand function for each member country of the monetary union, where y_1, y_2 are outputs, $\Delta p_1, \Delta p_2$, inflation rates, g_1, g_2 the budget deficits, i.e. the fiscal policy instrument, and v_1, v_2 capture any kind of expansionary demand shock. We have assumed that increases in the inflation rate and output of a country lead to a decrease in the output of the other country; this is the so-called *beggar-thy-neighbour* effect, which occurs when countries are concerned by inflation targeting and output stabilization. Equations (3) and (4) represent the aggregate supply function for each member country of the monetary union, where s_1, s_2 capture any kind of contractive demand shock.

Solving (1) to (4), we obtain the reduced forms:

$$y_1 = A hg_1 + A v_1 - B hg_2 - B v_2 - C s_1 - D s_2 \quad (5)$$

$$y_2 = A hg_2 + A v_2 - B hg_1 - B v_1 - C s_2 - D s_1 \quad (6)$$

$$\Delta p_1 = A' hg_1 + A' v_1 + B' hg_2 + B' v_2 + C' s_1 + D' s_2 \quad (7)$$

$$Dp_2 = A'hg_2 + A'v_2 + B'hg_1 + B'v_1 + C's_2 + D's_1 \quad (8)$$

To take into account the role of fiscal rules, we will follow Ballabriga and Martínez-Mongay (2003). So, we will consider a fiscal rule which relates an explicit public deficit target (in terms of the GDP), g_i^o , with public debt deviations (in terms of the GDP) respect to its optimal level ($d_{i-1} - d^o$), and the output level y :

$$g_i^o = - [\delta(d_{i-1} - d_i^o) + \theta y_i] \quad i = 1, 2 \quad (9)$$

The public deficit adjusts according to the following path, where $0 \leq \rho \leq 1$:

$$g_i = (1 - \rho)g_i^o + \rho g_{i-1} \quad (10)$$

Adding together the variables that are given in period 1, we obtain the simplified fiscal rules for each member country of the union:

$$g_1 = k_1 - \lambda y_1 \quad (11)$$

$$g_2 = k_2 - \lambda y_2 \quad (12)$$

Notice that if $(d_{i-1} - d_i^o) > 0$, then $k_i < 0$, indicating a country with a relatively high level of debt. The opposite holds for $k_i > 0$, indicating a country with a relatively low level of debt.

We will assume that fiscal authorities will try to minimize their loss function constrained by the economic framework (given by the reduced form of the macroeconomic model), and the explicit fiscal rule. Their objectives are to minimize output variations with stabilization purposes, and to minimize public deficit variations, in order to achieve fiscal discipline. Regarding inflation, since our model describes a monetary union, we assume full delegation of prices control to the monetary authority; therefore, public deficit is the only policy instrument available.

In this framework, our aim is to try to study how fiscal discipline can be achieved taking into account policy interactions. The set of policy makers decisions are the following: (i) Independent decision and no fiscal rule in any country, (ii) Coordinated decision and no fiscal rule in any country, (iii) Independent decision and fiscal rule in both countries, (iv) Coordinated decision and fiscal rule in both countries, and (v) Coordinated decision and fiscal rule only in one country. We will focus our analysis on case (v), because (i) to (iv) results are trivial. In the case of no country adopting fiscal rules (or the adoption of fiscal rules in both countries), cooperation would not be the best solution when the shocks have asymmetric effects on the output. When facing shocks leading to different effects (expansive in one country and contractive in the other), the best policy response would be

using different fiscal policies (contractive and expansive, respectively) to offset different effects of the shocks. When both countries adopt a fiscal rule, the results differ from the case with no fiscal rules only in the size of the coefficients: graphically it is just a change of scale.

Then, according to case (v), the optimization problem is the following, where we assume that country 1 follows a fiscal rule:

$$\min_{g_1, g_2} \ell = \left[\frac{1}{2} L_1 + \frac{1}{2} L_2 \right]$$

$$\text{s.t. } y_1 = A h g_1 + A v_1 - B h g_2 - B v_2 - C s_1 - D s_2$$

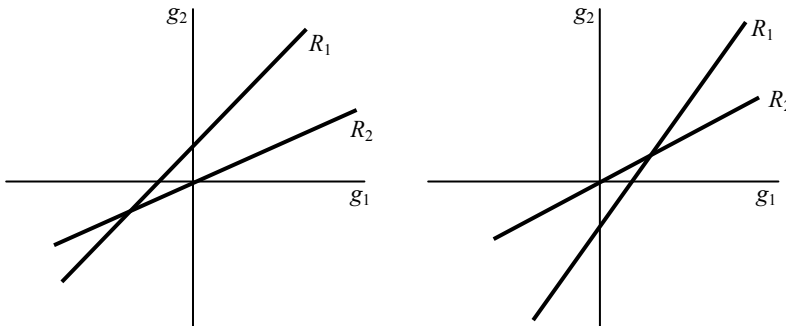
$$y_2 = A h g_2 + A v_2 - B h g_1 - B v_1 - C s_2 - D s_1$$

$$g_1 = k_1 - \lambda y_1$$

where $L_i = y_i^2 + \sigma g_i^2 \quad i = 1, 2$ is the loss function of the fiscal authority.

In order to describe the concern with deficit control, we assume $s > 1$.

Solving the problem, we obtain the reaction function of each country. Since the solutions are linear in the instruments, g_1 and g_2 , we can plot the reaction functions in the plane $g_1 - g_2$. Given the quadratic form of the loss function, any deviation (positive or negative) from the origin (0,0) will be a loss of utility. So, the optimal solution will be the one showing the minimal deviation.

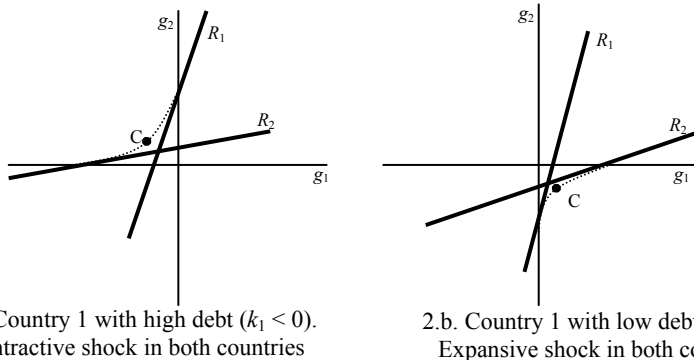


1.a. Country 1 with high debt ($k_1 < 0$).

1.b. Country 1 with low debt ($k_1 > 0$)

Figure 1: Reaction functions in absence of shocks and fiscal rule only in one country
 Source: own elaboration

In figure 1, the reaction functions in the absence of shocks are shown. We can see that the adoption of the fiscal rule (country 1 in the figure) leads to a deficit when the country has a high debt ($k_1 < 0$), or a surplus when the country has a low debt ($k_1 > 0$).



2.a. Country 1 with high debt ($k_1 < 0$).
Contractive shock in both countries

2.b. Country 1 with low debt ($k_1 > 0$).
Expansive shock in both countries

Figure 2. Cooperative vs. no cooperative decision and fiscal rule only in one country
Source: own elaboration

Figure 2 shows the reaction functions of fiscal authorities when both countries are hit by a common disturbance, and only one country (country 1) adopts the fiscal rule. We can see that the optimal solution is no cooperation: the cooperative solution C is more far from the origin than the non-cooperative one, given by the intersection of the reaction functions.

When comparing the non-cooperative and the cooperative solutions, we have shown in figure 1 that if there are no shocks, the adoption of a fiscal rule leads to a deficit when the country has a relatively high debt. In that sense, the rule can be interpreted as an insurance to deal with an eventual shock. On the one hand, the countries interested in adopting a rule would be those with a debt level higher than the objective; but, on the other hand, the surplus deficit required by the fiscal rule could reduce the scope of stabilization. In the next section, we will perform an empirical application to illustrate our theoretical results.

2. THE EMPIRICAL APPLICATION

As we mentioned in the introduction, in practice there is a debate about the utility and effectiveness of fiscal rules and on their complementarities with discretionary fiscal policy measures and automatic stabilizers to deal with short-run fluctuations. Particularly, in the EMU, the Maastricht Treaty stressed as basic that the Member States of the EMU should avoid excessive deficits; and the reference values for deficit-to-GDP and debt-to-GDP ratios have worked in practice as an explicit fiscal rule. But the success of any kind of policy remains an empirical question.

Table 1
Government deficit (-)/surplus (+) and debt in the new Member States (% of GDP)

	2006	2007	2008	2009
BULGARIA				
Deficit/surplus	1.9	1.1	1.7	-4.7
Debt	21.6	17.2	13.7	14.7
CZECH REPUBLIC				
Deficit/surplus	-2.6	-0.7	-2.7	-5.8
Debt	29.4	29.0	30.0	35.3
ESTONIA				
Deficit/surplus	2.4	2.5	-2.8	-1.7
Debt	4.4	3.7	4.6	7.2
CYPRUS				
Deficit/surplus	-1.2	3.4	0.9	-6.0
Debt	64.6	58.3	48.3	58.0
LATVIA				
Deficit/surplus	-0.5	-0.3	-4.2	-10.2
Debt	10.7	9.0	19.7	36.7
LITHUANIA				
Deficit/surplus	-0.4	-1.0	-3.3	-9.2
Debt	18.0	16.9	15.6	29.5
HUNGARY				
Deficit/surplus	-9.3	-5.0	-3.7	-4.4
Debt	65.7	66.1	72.3	78.4
MALTA				
Deficit/surplus	-2.7	-2.3	-4.8	-3.8
Debt	63.4	61.7	63.1	68.6
POLAND				
Deficit/surplus	-3.6	-1.9	-3.7	-7.2
Debt	47.7	45.0	47.1	50.9
ROMANIA				
Deficit/surplus	-2.2	-2.6	-5.7	-8.6
Debt	12.4	12.6	13.4	23.9
SLOVENIA				
Deficit/surplus	-1.3	0.0	-1.8	-5.8
Debt	26.7	23.4	22.5	35.4
SLOVAKIA				
Deficit/surplus	-3.2	-1.8	-2.1	-7.9
Debt	30.5	29.6	27.8	35.4

Source: Eurostat

In 2009 the government deficit and the government debt of EU-27 was 6.8 and 74.0 respectively (both in percentage of the GDP)¹. These figures are above the 3 and 60 limits required by the Maastricht Treaty. Moreover, the

¹ Source: Eurostat

recent financial crisis is not a good environment, and contributes to create difficulties when deciding how to finance the public deficit. In such a context, the scope of fiscal policies in a monetary union seems to be reduced. This problem may be more important for some of the NMS. In table 1 we can see the government deficit and debt in those countries. In terms of our theoretical model, Cyprus, Hungary and Malta show debt figures above 60%, while the figures for Poland are getting closer to the limit. Regarding the deficit ratio, those countries also show figures above 3%. Although the rest of the countries also exhibit relatively high deficits, they have no large figures for the debt. According to the theoretical findings of section 2, what could be the policy recommendations for the NMS?

In order to make an empirical application of our theoretical findings, we will make the following assumptions. The shocks suffered by the countries are identical in size (normalized to 1); in other words, they are perfectly symmetric in size. The shocks may differ in the sign: expansive (+) or contractive (-); so they are perfectly asymmetric in their effects. Next, we will give numerical values to the parameters of the reduced form according to the following criteria: In the fiscal rule, the response of the public deficit to changes in output will be neutral ($l = 0.5$) to underline the relevance of the debt level: higher than the target ($k = -0.9$) or lower ($k = 0.9$). For comparability reasons we assign the value 1 to the aggregate supply slope ($t = 1$), and in the loss function we assume that fiscal authorities are more concerned about fiscal discipline, than about stability ($\sigma = 1.3$)².

Table 2

Cooperative vs. no cooperative decision and fiscal rule only in one country				
Figure 2.a. Country 1 with high debt $k_1 < 0$ shocks: $v_1 < 0 + v_2 < 0$				
	deficit	output	inflation	losses
NO COOPERATIVE	$g_1 = -1.28$	$y_1 = -1.4103$	$Dp_1 = -1.7317$	2.0594
	$g_2 = 0.22$	$y_2 = -0.2565$	$Dp_2 = -1.0372$	0.0643
COOPERATIVE	$g_1 = -1.48$	$y_1 = -1.5381$	$Dp_1 = -1.8504$	2.6688
	$g_2 = 0.25$	$y_2 = -0.2074$	$Dp_2 = -1.0494$	
Figure 2.b. Country 1 with low debt $k_1 > 0$ shocks: $v_1 > 0 + v_2 > 0$				
	deficit	output	inflation	losses
NO COOPERATIVE	$g_1 = 1.28$	$y_1 = 1.4103$	$Dp_1 = 1.7317$	2.0594
	$g_2 = -0.22$	$y_2 = 0.2565$	$Dp_2 = 1.0372$	0.0643
COOPERATIVE	$g_1 = 1.48$	$y_1 = 1.5963$	$Dp_1 = 1.7922$	2.9562
	$g_2 = -0.63$	$y_2 = -0.0267$	$Dp_2 = 0.8152$	

Source: own elaboration

² The rest of the values are taken from Díaz-Roldán and Montero-Soler (2009). $a = 0.3622$, $b = 0.2047$, $c = 0.1338$, $h = 0.7874$, $A = 0.7824$, $B = 0.1944$, $C = 0.2436$, $D = 0.0897$, $s = 1.3$.

We have computed the values for the case of a common contractive shock ($v_1 < 0 + v_2 < 0$), leading to contractive effects on output ($y_1 = -1.4103$, $y_2 = -0.2565$), but different in size. Since we are concerned with stabilization (no changes in output) the nature of the shock (demand or supply side) is irrelevant.

If we look at the figures of table 1 and the computed values in table 2, Cyprus, Hungary, Malta and even Poland would be an example of countries with a relatively high debt $k_1 < 0$, in terms of our model. From that, we can conclude that the best fiscal policy response would be not cooperating if they adopt a fiscal rule and the whole union has suffered a common shock (losses are larger for the cooperative solution).

In the previous section, for the case of only one country adopting the rule, we found that cooperation was not the best solution when the shocks have symmetric effects on the output (although different in size). From that, we can conclude the importance of the symmetric or asymmetric nature of the shocks. Bajo-Rubio and Díaz-Roldán (2005) found that in the Czech Republic, Hungary, Slovakia, Slovenia and Poland there is a higher predominance of symmetric over asymmetric shocks. Finally, the Baltic countries (particularly Latvia), Bulgaria and Romania, show a lower predominance of symmetric over asymmetric shocks.

3. SUMMARY AND CONCLUSIONS

In this paper, we have studied the implications of several fiscal policy decisions in monetary unions: non-cooperative, cooperative and the adoption of fiscal rules. We have found that for the case of either no country adopting fiscal rules or all countries adopting fiscal rules, cooperation is not the best solution when the shocks have asymmetric effects on the output. But for the case of only one country adopting the rule, cooperation is not the best solution when the shocks have symmetric effects on output. In other words, cooperation is not useful when the countries have to use different fiscal policies to deal with shocks. And this depends on the symmetric or asymmetric nature of the shocks.

Our results could be interesting for the NMS when deciding about the policy strategies to achieve both the fiscal discipline required by the EMU, and the stabilization goal. On the one hand, the countries interested in adopting a rule would be those with a debt level higher than the objective; although, on the other hand, the fiscal rule could reduce the scope for stabilization.

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