FISCAL POLICY RULES IN A MONETARY UNION: INCENTIVES AND MORAL HAZARD

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Abstract

This paper addresses the question of the efficacy of a fiscal rule such as the Stability and Growth Pact in Europe, and compares the latter to alternative rules. The model challenges the traditional comparative static analyses by proposing a filter for analysing such fiscal rules. The analysis sheds light on where the emphasis should be put on when establishing these rules. As countries are not handcuffed, they integrate the new constraints in their behaviors and may get incentives to infringe the regulation. The model does not conclude that deficit-ceiling rules are not worth implementing but that, whatever the established rules are, a moral hazard issue appears as far as governments adjust their behavior to the new rule. A key component of a fiscal rule is therefore the effective enforcement of the penalties associated. Presented 14th International Conference, San Antonio, Texas, May 2004.
INTRODUCTION

The current Franco-German experience of budget deficits reactivates the literature on the pros and cons of a European fiscal rule. Germany, France, Italy, and Britain, with a rather bad budgetary situation, constitute a powerful club arguing for reform of the Stability and Growth Pact (SGP). With their budget in order, small States (Austria, Ireland and The Netherlands) do not share this view.

One of the economic motivations of the European Union (EU) is to gain from the advantages of an Optimum Currency Area (OCA). Although it is debatable that the euro-zone constitutes an OCA (Eichengreen 1990), since the Treaty of Maastricht (1992) the EU has been trying to move towards a more integrated Europe. The first outcome is that countries belonging to the Economic and Monetary Union (EMU) have been more interdependent than countries only belonging to the EU. In the EMU, monetary policy is managed with the Euro-zone as an objective and not with a particular country’s economic situation as an objective. Budgetary policies are constrained by the SGP. The objective of this fiscal rule is to impede members of the Euroland to undermine the euro, push interest rates up and disturb financial markets. There is also the risk that one of the member countries of the Union may be on an unsustainable debt path. All these factors are a common concern for all members of the EMU, and of the EU as a whole. Hence the idea that it is of a common interest to control each other's budgetary behavior.

This common concern led to the fiscal rules included in the Maastricht Treaty (debt and deficit ceilings), and later to the Stability and Growth Pact with its 3% ceilings on each country’s budget deficit.

REVIEW OF THE LITERATURE

The analysis of fiscal policy in a monetary union has gained interest since the establishment of the EMU. In fact, with the exception of structural market rules, public spending and taxation (even if not entirely) remain the main policy instruments in the hands of national governments. It is therefore important to understand how countries should set their fiscal parameters, with their consequences on general macroeconomic performance.

As of 1989, the European Commission focused on the necessity of sound public finances as a condition to monetary integration: "Uncoordinated and divergent national fiscal policies would undermine monetary stability and generate imbalances in the real and financial sectors of the Community"(Delors 1989).

When the Maastricht Treaty was drafted, many observers believed that the European budgetary situation could undermine the credibility of the future
European Central Bank (Beetsma and Bovenberg 1995). If a country's fiscal situation becomes unsustainable, other countries might be forced to a bail out of the insolvent national government. Or the European Central Bank may be forced to monetize national debts, and in so doing may create additional inflation in the EU.

Several studies focus on these topics, many of which examine the effects of fiscal policy and budget deficits on structural variables such as unemployment and growth. A short and incomplete list of such studies includes Blanchard, Barro, or Bernheim (Blanchard 1985; Barro 1989; Bernheim 1989). Other researches deal with the question of the sustainability of the budget deficit. This group includes Nielsen, Bohn, Perotti, Strauch et al., or Mongelli (Nielsen 1992; Bohn 1995; Perotti, Strauch et al. 1998; Mongelli 1999). In 1999, Amador emphasized the role of fiscal policy and the behavior of the budget deficit and the public debt over time (Amador 1999). An important feature of this model was in the definition of the sources of uncertainty as stochastic processes. It also used stochastic optimization methods, as was the case in Turnovsky, where it is assumed that taxation endogenously adjusts fiscal imbalances (Turnovsky 1992; Turnovsky 1996).

The blatant breach of the SGP by two of the largest countries in Europe (France and Germany) has led to new proposals of fiscal rules. In 1997, Dur, Peletier and Swank did not agree with a binding debt rule, as often proposed, because of the likelihood of political maneuvers to bypass this rule (Dur, Peletier et al. 1997). They argue that a binding debt rule does not eliminate the distortions due to the strategic behavior of politicians. For these authors, strategic manipulations would shift from public debt to public investment. In an effort to eliminate any strategic behavior, they examined as an alternative the effects of a capital borrowing rule, which would allow each government to run a budget deficit equal to the amount of public investment.

Our aim here is to provide a theoretical framework for the analysis of any new fiscal rule through the centipede game developed by Rosenthal (1981).

THE MODEL

Over the years, the credibility of the Stability and Growth Pact has become debatable. Would a change in the 3% deficit number, or a move towards a structural deficit measure, improve the situation?

The game theoretical approach that we propose in this paper sheds some light on this question. Our backward induction equilibrium model demonstrates that this type of reform may be a necessary condition but not a sufficient one for the rule to be respected.
It is demonstrated that players will not play the Nash equilibrium. Applied

to the SGP, we show that whatever the rule, European countries may adapt their
behavior to the new regulatory environment and breach the new measure.

**THE GENERAL CASE**

The general centipede game is a finite move game in which two players
alternate in deciding whether to achieve a short run gain by terminating the game
(strategy $C$) or by letting the game continue (strategy $D$), and achieving long run
gains for both players.

Let $i = 0, ..., n$ denote the nodes of the game. At odd nodes it is player 1’s
turn, at even nodes player 2’s.

Let $(P_a^i, P_b^i)$ denote the payoff of player $a$ and $b$, respectively, when the
game is terminated at node $i$. $(P_a^{n+1}, P_b^{n+1})$ denote the payoffs when the game is
continued all the way to the end.

A general property of the centipede game is that a player risks a short run
loss when continuing the game, which is, however, more than offset if the game is
continued two steps further, that is:

$$
\begin{align*}
& P_a^{2i+3} > P_a^{2i+1} > P_a^{2i+2} \\
& P_b^{2i+2} > P_b^{2i} > P_b^{2i+1}
\end{align*}
$$

To simplify the notation we will assume that marginal gains $\varphi$ and
marginal losses $\lambda$ are constant and the same for both players:

$$
\begin{align*}
& \varphi = P_a^{2i+3} - P_a^{2i+2} = P_b^{2i+2} - P_b^{2i+1} \\
& \lambda = P_a^{2i+1} - P_a^{2i+2} = P_b^{2i} - P_b^{2i+1}
\end{align*}
$$

In the standard version of the centipede game with perfect and complete
information, and pure strategies, there exists a unique sub-game perfect
equilibrium, in which player $a$ chooses to terminate the game at first node.
Figure 1. The centipede game

Rosenthal demonstrates the backward induction equilibrium (Rosenthal 1981). While keeping pure strategies, Dulleck and Oechssler introduce imperfection information into Rosenthal’s game (Dulleck and Oechssler 1996). Let’s refine the model by introducing imperfect information as well as a control variable for the efficiency of the fiscal response in case of an economic shock.

COUNTRIES WITH RESTRAINED ECONOMIC POLICIES

Let’s denote $\delta$ the degree of efficiency of fiscal policy whenever there is an economic shock. As shown on figure 2, $\delta$ is measured by the number of nodes, beginning with node $k$, where $k$ is even. In other words, $\delta$ captures the incentive a country has to use fiscal policy as a response to an economic shock, and $k$ represents the country’s budget deficit level. Both players know the degree of efficiency of their fiscal policy, but neither player knows the other’s degree of efficiency. The greater this degree, the more effective the fiscal response and the greater the incentive to use fiscal policy.
Let’s consider the sub-game $\Gamma^k$ beginning with node $k$ of the modified game. Since player $b$ has only one information set, he has two pure strategies: $C$ and $D$. Player $b$ has a degree $\delta$ of structural efficiency that starts at node $k$ ($k$ being even), representing the initial level of budget deficit. Given that player $a$ continues, player $b$’s payoff from playing $C$ is:

$$\Pi_b^k(C) = P_b^k + (\delta - 1) \varphi - (\delta) \lambda$$ \hspace{1cm} (3)

The ex-ante payoff from playing $D$ is $P_b^k$. However, a player who planned to use $C$ and consequently thinks he is in all nodes $i = 2k, ..., n$ with equal probability will expect to receive the following payoff from playing $D$:

$$\Pi_b^k(D) = \frac{1}{\delta} \left( P_b^k \delta + \frac{(\delta - 1) \delta}{2} (\varphi - \lambda) \right)$$ \hspace{1cm} (4)

Thus, $\Pi_b^k(C) \geq \Pi_b^k(D)$ if:

$$\delta \geq \frac{\varphi + \lambda}{\varphi - \lambda}$$ \hspace{1cm} (5)

Given player $b$’s strategy of continuing the game, player $a$’s best response is to continue as well as long as the marginal gains and losses fulfill equation (5)’s condition. In other words, the equilibrium payoffs $\Pi_a^k$ and $\Pi_b^k$ in the subgame $\Gamma^k$ satisfy $\left(\Pi_a^k, \Pi_b^k\right) \geq \left(P_a^{k-1}, P_b^{k-1}\right)$, and there exists a sub-game perfect equilibrium in
which both players cooperate at least until node $k$. Of course, the existence of such an equilibrium depends on $\varphi$ and $\lambda$. A Pareto-efficient perfect equilibrium sub-game in which both players use $C$ at all nodes exists if $\delta \geq \frac{\varphi + \lambda}{\varphi - \lambda}$.

Hence, the whole game has two pure sub-game perfect equilibria. The first is the standard centipede equilibrium with each player choosing $D$ at every node. The second is another dominant sub-game perfect equilibrium in terms of payoffs in which the players choose always $C$ (in the imperfect information case). In fact, $(C, C)$ is the dominant Nash equilibrium in terms of payoffs.

**INTERPRETATION OF THE MODEL**

In terms of policy implications, the model leads to interesting conclusions. The increase in payoffs represents the incentive for countries to use their budget deficit as a way of “absorbing” economic shocks.

In case of economic shocks, four scenarios are possible:

- First, a country may be close to its deficit ceiling, but there is a low efficiency of its fiscal response. In that case, it is not going to breach the rule.
- Second, a country may be close to its deficit ceiling but there is a high efficiency in applying its fiscal policy. In that case it will breach the rule.
- Third, a country may have a balanced budget, but a high fiscal policy efficiency: it is likely to breach the rule.
- Fourth, a country may have a balanced budget, but low fiscal policy efficiency. In that situation it is not going to breach the rule.

As can be seen from the model, one can select a scenario by considering both the level of a country’s deficit – measured by $k$ – and the country’s specific fiscal response to an economic shock – measured by $\delta$.

The next step is to apply this grid of analysis to the SGP, or any rule based on a deficit ceiling, be it the current deficit or any other measure such as a cyclically adjusted deficit (structural deficit). This framework helps to measure the impact of a change in the fiscal rule on the budgetary behavior of governments.

Both the Treaty of Maastricht and the SGP seem to have played a role in the reduction of deficits since 1992: the average deficit/GDP in 2003 for the Euro area as a whole is 2.7% whereas it was 5.12% in 1992 (Source: Eurostat and UNECE). Yet some countries have breached the 3% ceiling by the end of 2003 (see Figure 3).
From this real-world situation, we can establish the initial conditions of the model. To capture the influence of the fiscal rule (first the Treaty of Maastricht, second the SGP) on the deficits, Figure 4 sets $k$ at a level below the ceiling (countries’ deficits are measured by $k$):

Figure 3. Deficit/GDP. Source: Eurostat, UNECE, and own computations, 2004.
In presence of moral hazard behaviors, European countries should end up breaching the new rule, as explained below.

First, let’s consider a 4% ceiling. According to the model, moral hazard behaviors would push the EU deficit average upwards. In other words, $k$ is an endogenous parameter of the SGP deficit rule because of moral hazard behaviors.

A policy that would consist in changing the level of the authorized deficit would therefore not improve the situation. It is not only a question of measuring the performance of a country compared to the official ceiling – be it cyclically adjusted or not – it is also a question of creating incentives for countries to abide by the rule. There is an endogenous effect that may shift $k$ to the right. Any change in the measure of the deficit that would rely on such a performance criteria would have this endogenous effect.

Now, let’s consider a stricter rule with a 2% ceiling. $k$ (a country specific variable), would shift to the left. Yet this new rule would have no impact on the second component, $\delta$. The magnitude of $\delta$, which is also country specific, may be such that a country would still use fiscal policy as a response to an economic shock.

As a whole, for a policy to be effective, the fiscal rule has to create incentives so as to force countries to abide by the rule. In other words, it has to lead to a shift of $k$ to the left, but also to a decrease in the magnitude of $\delta$. 

Figure 4. Countries reaching the ceiling and the fiscal response to a shock.
POLICY IMPLICATIONS AND CONCLUSIONS

Based on our model, a fiscal rule can be effective only if it reduces countries’ incentives to use fiscal policy whenever they have to deal with an economic shock.

The model challenges the traditional comparative static analyses of fiscal rules. It highlights the importance of the way countries may adapt to a new fiscal rule. It sets up a “filter” to analyze proposals about new fiscal rules. It also clarifies what elements should be emphasized when considering a reform. The model does not conclude that deficit-ceiling rules are not worth implementing. It demonstrates that whatever the rule is, governments would adjust their behavior accordingly in an attempt to avoid the implied constraint.

A key component of a successful fiscal rule is therefore the enforcement of the penalties when the rule is not respected. These penalties are embodied in the SGP through article 104c of the Treaty of Maastricht via compulsory deposits that, after a while, can be transformed into fines if governments do not take measures to decrease their deficits. The non-interest bearing deposits are made up of two elements: a fixed sum equal to 0.2% of GDP and a supplement of 0.1% of GDP for every percentage point by which the budget deficit exceeds the 3% reference level. Derogation is possible for "exceptional and temporary" circumstances, in particular in the case of negative annual real growths. Countries are automatically exempted if their GDP has declined by at least 2% and if the excess deficit is temporary and small. Those countries in which the GDP declined between 0.75% and 2% could also be exempted, subject to the consent of the Council of Ministers.

The fact that France and Germany, following their breach of the 3% ceiling rule, did not have to incur the penalties eliminates the “incentive” feature of the SGP and, in that respect, diminishes the efficacy of such a fiscal rule.
REFERENCES


