E C O N O M I C S B U L L E T I N

EMU's Fiscal Rules and Economic Stabilization

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Abstract

This paper proposes a quantitative comparison of EMU's different fiscal rules, i.e., the stability and growth Pact, the structural deficit rule and the golden rule. From comparing the economic stabilizing effects of each rule, it concludes that the Pact is not the perfect solution.

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1 Introduction

Since EMU members have foregone the use of national monetary and exchange rate policies as adjustment mechanisms, they are now searching for alternative ways that can protect them from economic shocks. It is usually recognized that this role should be assigned to fiscal policies. The framework for EU fiscal policy is defined by the Stability and Growth Pact (SGP) which requires member States to maintain a fiscal position of close to balance or surplus over the cycle, and never to exceed the 3% of GDP ceiling.

The EU's current long economic slowdown and the subsequent deterioration of public finances well beyond the 3% limit have heightened the debate over whether the SGP is an appropriate framework for EMU fiscal policy. The paper deliberately avoids joining the debate but rather chooses to focus on the reform proposals presently under discussion, i.e., the balanced structural budget and the golden rule. The main advantage of the structural deficit rule is that it provides the increased flexibility that allows room for the automatic stabilizers to operate fully. In the golden rule, government budgets are to be split into a current budget which must be in balance, and an investment budget which has to be financed through borrowing. The rule is meant to boost the economy's potential growth rate by encouraging higher public investment.

This paper aims to rank the reform proposals and the SGP in terms of their relative performance in economic stabilization. Various studies have compare these rules (Buti and al. 2003, Creel 2003). However these studies have used the Kopitz and Symansky model (2001) which implies subjective judgments. We therefore propose to carry out a comparative study based on macroeconomic modeling. The main results show that alternative rules have the same economic stabilization impact and are more efficient than the Pact.

The paper is organized as follows: Section 2 develops the analytical framework, Section 3 presents the solution method, Section 4 presents a numerical simulation of the model, and the final section concludes.

2 The Model

We use a static model of closed monetary union with two countries i and j in which we introduce an asymmetric demand shock[1]. Demand is given by classical terms of literature (Buti and al., 2002): public deficit (d), common interest rate (r), and trade balance include intra-EU competitiveness (defined of inflation differential)

[1]We consider only demand shocks because efficiency of fiscal policy to counter supply shocks is widely argued (Brunila and al. , 2002).

and differences in economic situations. Demand can be written as follows:

$$y_i^d = \gamma d_i - \rho r + \eta(y_j - y_i) + \eta\varepsilon(\pi_j - \pi_i) + x_i \tag{1}$$

where y represents GDP, γ the sensibility of demand to public deficit, ρ the sensibility of demand to interest rate, η the measure of the countries'relative openness, ε the elasticity of trade balance to the inflation differential, π the inflation rate and x the asymmetric demand shock. Variables are in logarithms and expressed as deviations from their long-run non-inflationary equilibrium. All the parameters are positive.

Because of nominal rigidities, output and prices can diverge from their equilibrium values in the short run. This situation is rendered using a Phillips curve as supply function (Leith and Wren-Lewis, 2002):

$$\pi_i = \theta y_i + \eta(\pi_j - \pi_i) \qquad \theta \in [0;1] \tag{2}$$

We assume that the European Central Bank (ECB), uses the interest rate as a the tool for conducting its monetary policy. The aim of monetary policy is to minimize a linear-quadratic loss function (LM) which depends on average values. Price stability is the main objective of the single monetary policy. The implications is that inflation is more heavily weighted in the loss function than others variables[2]. The monetary loss function can therefore be written as follows:

$$LM = \frac{1}{2}\left[\overline{\pi}^2 + \beta_1\overline{y}^2 + \beta_2 r^2\right] \tag{3}$$

where β_1 and β_2 respectively capture the relative preferences for output stabilization and interest rate smoothing.

The behaviour of each government in the monetary union is described by a linear-quadratic loss function (LG) which depends on its output deviation of the baseline, its rate of inflation, and its public deficit. Fiscal rules are modelized by a financial penalty f that increases the fiscal loss function. This financial penalty depends on the spread between the actual public deficit and its target:

$$LG_i = \frac{1}{2}\left[y_i^2 + \phi_1\pi_i^2 + \phi_2 d_i^2\right] + f(d_i - \widetilde{d}) \tag{4}$$

where ϕ_1 and ϕ_2 are the weights of the inflation rate and public deficit in the fiscal loss function, and $\widetilde{d}$ is the deficit target.

[2]It must be noted that an extra term has been added to the interest rate in the loss function compare to traditional models. The simulations run on monetary policy rules indeed show that optimal rules lead to an excessive volatility of interest rate, although this situation is not due to the Central Bank's behaviour. The solution then consists to include the interest rate in the loss function (Rudebush and Svensson, 1998).

Supply and demand functions allow to determine output and inflation:

$$y_i = \gamma d_i - \rho r + \Omega\gamma(d_j - d_i) + (1 - 2\Omega)\, x_i \quad (5)$$

$$\pi_i = \theta\gamma d_i - \theta\rho r + \theta(\Omega + \mu)\gamma(d_j - d_i) + \theta\,(1 - 2(\Omega + \mu))\, x_i \quad (6)$$

with $\Omega = \frac{\eta\left(1+\frac{\varepsilon\theta}{1+2\eta}\right)}{1+2\eta\left(1+\frac{\varepsilon\theta}{1-2\eta}\right)}$, $\mu = \frac{\frac{\eta}{1+2\eta}}{1+2\eta\left(1+\frac{\varepsilon\theta}{1+2\eta}\right)}$. Parameters Ω and μ can be interpreted as the trade balance on output and prices. Both economies are connected by a number of channels through which price and output fluctuations spread across the two EMU member countries.

3 Model Solving

3.1 Solution method

We consider that governments internalize the Central Bank behaviour when making their own decisions. Indeed, if they take the single monetary policy's credible commitment to maintain price stability for granted, the alignment of expectations will be enhanced and behaviour conditioned in a way which will lead to implicit coordinated policy outcomes, while concurrently limiting policy conflicts and overall economic uncertainty (Issing, 2002). In order to modelize this situation we use a Stakelberg game in which governments are the leaders and the ECB the follower. Firstly, each government makes its own decision, it also accepts the other governments' behaviours as given and takes accounts ECB's function reaction. Then the ECB makes decision considering the governments' decisions as given. The resolution of such a game is made by backward induction.

3.2 Interest rate determination

The interest rate is determined by the ECB's behaviour. We define the interest rate by minimizing monetary loss function:

$$r = \frac{1}{2}\psi\gamma(d_i + d_j) \quad (7)$$

with $\psi = \frac{\rho\left(\theta^2+\beta_1\right)}{\rho^2\left(\theta^2+\beta_1\right)+\beta_2}$. The interest rate rises with the average amount of public deficit. Consequently monetary policy depends on fiscal policy, which means financial eviction does occur.

3.3 Key variables

The expression of interest rate allows us to express output and inflation from public deficits and the shock:

$$y_i = ad_i + bd_j + cx_i \quad (8)$$

$$\pi_i = \theta\,(a - \gamma\mu)\,d_i + \theta\,(b + \gamma\mu)\,d_j + \theta\,(c - 2\mu)\,x_i \quad (9)$$

with $a = \gamma - \frac{1}{2}\gamma\rho\psi - \gamma\Omega$, $b = \gamma\Omega - \frac{1}{2}\gamma\rho\psi$, $c = 1 - 2\Omega$. Parameter a capture the net impact of fiscal deficit on output. This impact depends on the sensibility of demand to public deficit (γ), interest rate ($\frac{1}{2}\gamma\rho\psi$) and trade balance ($\Omega$). Parameter b is the fiscal externality depending on effect on the interest rate and the trade balance.

3.4 Disaggregate public deficit

The public deficit can be broken down into three elements:

- the primary structural deficit, noted d_s, consists of the whole set of fiscal discretionary measures which are not *a priori* motivated by macroeconomic regulation. This primary structural deficit is made up of the current deficit and public capital expenditures, in proportion h.
- the cyclical deficit which depends of the economic situation according to sensibility χ. It includes the automatic stabilizers and discretionary measures.
- interest payment of the public debt (B).

From the public deficit breakdown it becomes possible to identify two different targets: the structural balance corresponds to the primary structural deficit, the golden rule is the current deficit. The golden rule stipulates that capital expenditures are financed by loan, which consequently increases the interest burden. The public deficit is written as follows:

$$d = (1 - h)d_s - \chi y + r(1 + h)B \quad (10)$$

Macroeconomic equilibria are derived from the minimization of the fiscal loss functions and from the public deficit breakdown.

4 Numerical Simulation

We considere that stabilization consists in reducing the shock impact on welfare losses. We study fiscal stabilization within the model when a negative asymmetric shock occurs (1% of GDP). The sensibility of demand to public deficit on demand is suggested by Bouthevillain and al. (2001). Interest rate sensitivity is issued from Mojon and Peersman (2001). Penalty value f corresponds to the variable part of the Pact financial sanction, i.e. a tenth of the fiscal overrun. Deficit sensitivity to the cycle, debt level and public investment growth are the euro zones' average values. The others parameters are issued from Engwerda and al. (2002). They will allow the determination of foreign trade influence (Ω and μ). The set of parameters is given in Table I.

Table I. Parameter Values

γ	ρ	η	ε	θ	β_1	β_2	ϕ_1	ϕ_2	f	h	χ	B	Ω	μ
0.75	0.2	0.4	0.5	0.25	0.2	0.25	0.5	0.25	0.1	0.1	0.5	0.6	0.23	0.03

The set of parameters above allows determination impact of interest rate (ψ), public deficit (a), fiscal externality (b) and shock (c). These parameters vary according to which rule is observed, either the Stability and Growth Pact (SGP), the structural deficit rule (SDR) or the golden rule (GR). Parameters are gathered in Table II.

Table II. Impact Parameter Values

	SGP	SDR	GR
ψ	0.201	-0.134	-0.156
a	0.562	0.411	0.368
b	0.158	0.117	0.104
c	0.539	0.392	0.392

From the public deficit breakdown, it is possible to consider the positive effect of interest payment on demand. These payment decrease the interest rate's negative influence on national product because payment constitutes an additional income for the agents. It consequently modifies the sign of the interest rate impact as interest rate sensitivity is weaker than interest payment ($\rho < \gamma B$). The structural fiscal rules therefore allow for a consistent policy mix since fiscal activism does not implie a tight monetary policy. The public deficit impact on product (a), fiscal externality (b) and the asymmetrical shock impact on product (c) are weaker than with the SGP. This is mainly due to the role of the automatic stabilizers which absorb part

of the shock propagation. Strong growth in public investment can also decrease the width of golden rule's parameters.

Simulation results for deficit, product, inflation and fiscal loss can be found in Table III. The results depend on fiscal rule is actually observed.

Table III. Results

	SGP	SDR	GR
d	0.491	0.442	0.381
y	-0.340	-0.260	-0.291
π	-0.076	-0.058	-0.065
LG	0.228	0.162	0.164

Values are variable reactions to a negative shock.
deficit is the effective deficit for the SGP, the structural deficit for SDR, and the current deficit for the GR.

Since public deficits are counter-cyclical, they evolve in the opposite direction to the shock. Deficit reactions are weaker when the structural rules are observed. They react only to the part of the shock which has not been absorbed by the cyclical deficit. As the golden rule does not take account of public investment, current deficit is weaker than the structural deficit. The risk is then that governments may substitute public expenditure for current expenditure so as to abide by the golden rule.

Fiscal impact parameters (a and b) and deficit reactions are lower with the structural rules than with the SGP. Fluctuations of the national products are consequently weaker, which means better stabilization. The same considerations apply to inflation. It results from this that the SGP is dominated by the structural rules since the shock has greater overall impact on the fiscal loss. The structural deficit rule generate a slightly weaker loss than the golden rule but the future repercussions of the golden rule on public investments also need consideration.

5 Conclusion

The objective of this paper is to provide a comparison between the Stability and Growth Pact and the structural rules (the structural deficit rule and the golden rule) in terms of stabilization performance. We used the same framework for all rules and noted that the structural rules lead to better stabilization. Consequently, the application of such rules through a reform of the SGP would be desirable in the EU. The reform of the Pact in March 2005 already constitutes a first step towards the golden rule.

The right target obviously needs to be struck between simplicity and effectiveness. Although the structural rules seem more effective, especially towards achieving fiscal stabilization, they also appear more complex than the Pact. Moreover, the application of these rules implies an harmonization of the evaluation techniques. The determination of potential growth must be clarified too. The golden rule also calls a clear definition of public investment and how it can be measured. These conditions must be met so the transparency of the rules can be guaranteed.

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