Does the Growth and Stability Pact Provide an Adequate and Consistent Fiscal Rule?

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ABSTRACT

       This paper examines the adequacy and consistency of the fiscal rule set by the Treaty of Maastricht and the Growth and Stability Pact. In the first place, it shows that the functional fiscal rule is adequate in ensuring the final goal of public debt sustainability. In the second place, it points out any arbitrary numerical value may ensure the achievement of the final goal, although different values would produce a different intergenerational distribution of the public debt burden. Finally, it shows that the updated numerical fiscal rule of the Growth and Stability Pact removes the inconsistency of the previous numerical fiscal rule − arising from a given set of GDP values embodied in the Treaty of Maastricht but, at the same time, it implies that in the long term public debt needs to be retired entirely, thus imposing a heavy burden on the generations living at the time of the fiscal adjustment.

1. Introduction

The first significant slowdown in economic activity and the budget balance difficulties arisen in the EU area after its launch, in 1997, have put the *Fiscal Policy Framework* of the European Union (FPF-EU) – based on the Treaty of Maastricht (TM) and the Growth and Stability Pact (GSP) – through the hoops and have revived the economic and political debate on its strengths and weaknesses.

The FPF-EU has taken the shape of a two-stage process. In 1992, the TM prescribed the *entry requirements* for EU membership: the Treaty qualified a European country for EU membership as long as it had satisfied four criteria, among which the sustainability of its finance position. Actually the TM does not expressly define the meaning of sustainability but simply required the country to meet two numerical fiscal reference values by 1997. The first one represented the numerical fiscal rule regulating government policies: the total public budget balance GDP ratio was not to exceed the reference value of -3%. The second one was the numerical final goal: the public debt GDP ratio was not to exceed the reference value of 60%. In 1997 the SGP further refined the FPF-EU architecture by laying down the *consolidation requirements* for EU members to retain solid and lasting balanced budgetary positions and, therefore, to ensure the sustainability of public debt. According to the further requirements, EU countries have to achieve, in the medium-term, *structural* budgets that are close to balance or in surplus. Furthermore, the SGP allows the *actual* public budget balance to overrun the reference value of 0% on the left hand side up to the safeguard limit of 3% below which, unless an annual decline in real output higher than 2% is registered, public budget balances become exceedingly high and, therefore, the

country is subject to financial penalties and public approbation. Indeed, SGP marked the significant tightening of the requirements aimed at ensuring public debt sustainability because of the shift of the reference value from -3% to 0%, towards which countries have to converge.

In conclusion, the FPF-EU is defined by three basic elements: i) a *numerical fiscal rule* which requires countries to converge, in the mid-term, towards a structural public budget balance equal to 0%; ii) an element of flexibility in the management of fiscal policy represented by the safeguard ceiling of -3% that marks the lower end of the *fluctuation interval* within which the actual total budget balance is constricted and, finally, iii) the fixing of a *final goal,* defined by an interval, according to which the public debt should converge towards (or not exceed) the limit of 60%. Recent research has examined broadly both the distinctive features and the manifold implications of the FPF-EU.

With respect to the constitutive *rationale* behind the FPF-EU, there is a broad agreement that the latter has been reckoned to be a system of effective political and economic regulations for disciplining public budget balance and, therefore, achieving the *final goal* of preventing public debt unsustainability. Indeed, the avoidance of the excessive accumulation of public debt is corroborated by both the historical experience in Europe during the seventies and the eighties, and recent and remote theoretical findings. On the one hand, the high and increasing public deficits pursued by some short-sighted and opportunist European governments from the early 70's up to the early 90's, has set public debt to trespass the psychological 100% threshold. On the other hand, the fiscal theory of the price level (Woodford, 1994, 1995) – that lays down its roots in the seminal work of Sargent and Wallace (1981) – reaffirms that the

current and intertemporal public budget constraints produce an indissoluble interdependence between fiscal and monetary policies which, in the long-run, could produce unpleasant repercussions on price stability. A fiscal loosening generating a divergent dynamic of public debt could entail, sooner or later, the monetization of public debt and, consequently, the loss of control of the money aggregate and the abandonment of price stability by the Central Bank. Indeed, if public debt unsustainability had occurred, it would have undermined the foundations of independence of the European Central Bank (ECB) in preserving price stability.

With respect to the *role for fiscal policy,* springing from the FPF-EU, recent research has pointed out the new tasks, compared with the old ones, of fiscal policies.

Firstly, the FPF-EU rebalances and reassigns the duties between discretionary fiscal policies and automatic stabilizers. Indeed, the FPF-EU requires a precise division of tasks between the two tools. The achievement of the mid-term target of balance or surplus of structural budgets should be dominated by the former, while the cyclical stabilization depends exclusively on the effectiveness of the latter[1]. The effectiveness of automatic stabilizers in terms of smoothing out business cycles crucially depends on the nature of the shock hitting the economy. Brunila, Buti and in't Veld (2002, 2003) show that with respect to demand shocks, automatic stabilizers react with different strength if the economy is stricken by a shock regarding consumption or by shocks regarding investments and exports: automatic stabilizers are more effective in the former circumstances than in the latter ones. Contrariwise, in presence of supply side shocks, automatic stabilizers show their weaknesses, since they are ineffective in cushioning the adverse shock.

The capacity of automatic stabilizers to restrain budget balance from overcoming the safeguard limit of -3% depends on both the measure of the derivative of total budget balance with respect to GDP – which in average in EU is equal to 0,5 (European Commission, 2002) – and the starting point of budget balance. Actually, assuming that the potential GDP growth rate is equal to 3% and that a structural budget balance equal to 0% corresponds to it, if the actual GDP growth rate was equal to -2% it follows that the total budget balance should be equal to -2% *i.e.,* greater than the – 3% threshold.

Artis and Buti (2000) try to draw up a policy guideline in order to quantify the correct dimension of the structural budget balance ensuring that automatic stabilizers work fully without infringing the -3% ceiling, and conclude that the FPF-EU target is "roughly right" with respect to these stabilizing tools. Leeftink (2000) maintains a more favourable attitude towards the reallocation of goals between discretionary fiscal policies and automatic stabilizers. He shows that in presence of uncertainty on fiscal sustainability, the stringent fiscal rules required by FPF-EU generate a synergy between discretionary fiscal policies and automatic stabilizers: in fact the former, removing the risk of public debt unsustainability, allow the latter to exert their full strength in stabilizing output.

Secondly, the FPF-EU revises the well-established and extensively shared procedure for financing the capital account of public budget deficits by public bonds. Actually, the mid-term provision regarding close-to-balance or in surplus budgets implies that capital expenditure has to be financed by an equivalent decrease in primary budget balance. Nevertheless, especially in front of a slowdown in economic activity which urges need for compliance with the FPF-EU requirement on public

budget balance, governments could be discouraged from carrying out public investments which will benefit the next generations (de Haan, Sturm and Sikken, 1996; Balassonone and Franco, 2000).

Thirdly, the FPF-EU, within the available range of discretionary fiscal policies, puts strong emphasis on structural reforms in order to achieve the medium-run target of a (structural) balanced budget, whereas it cautions governments about extemporary measures such as creative accounting and extraordinary measures. Nevertheless, even in this case, the closer the budget balances are to the limit of -3%, the more difficult it is for governments to undertake structural reforms – such as pension reforms – which could produce a significant worsening of their fiscal position in the short-run and, contrariwise, it could defer the budget balance improvements in the medium/long-term (Razin and Sadka, 2003).

With respect to the *fiscal rules* established by FPF-EU, doubts and scepticism have risen to the extent of inducing some scholars to drastic conclusions and harsh labels such as 'minor nuisance' (Eichengreen and Wyplosz, 1998), an 'albatross' (Canzoneri and Diba, 1999) or – regarding the 3% ceiling on public deficit/GDP ratio – a 'myth' and, more brutally, a 'folly' (Pasinetti, 1998). The debate on this issue stretches along different routes.

First, some authors draw up a list of general desirable criteria which concur to pick out an ideal fiscal rule and, at the same time, can be used as a benchmark for evaluating the fiscal rules of FPF-EU. Kopits and Symansky (1998) have singled out an accurate selection of basic and ideal features of fiscal rules, which should be: well-defined, transparent, simple, flexible, adequate relative to final goal, enforceable and consistent. By comparison of fiscal rules of FPF-EU to the above set of criteria, Buti,

Eijffinger and Franco (2003) reach the conclusion that the former perform, on the whole, quite well.

A second field of research goes in for finding out alternative fiscal rules which could replace or implement the FPF-EU rules. Buiter (2003) summarizes and compares the EU fiscal rules with the most significant alternative fiscal rules that have been proposed in the literature and/or that actually are applied in some countries: namely the "*Permanent Balance Rule*" – proposed by Buiter and Grafe (2003) – that basically is a tax-smoothing rule where taxes are a constant share of GDP and the "*Golden Rule*" that allows governments to borrow only in order to accumulate public capital and not to finance current public expenditures. Indeed, Buiter (2003), after drawing up the "ten commandments" for fiscal rules – following closely in Kopits and Symansky's (1998) footsteps –, concludes that the Golden Rule and the Permanent Balance Rule are more satisfactory than the FPF-EU fiscal rule since the former keeps a large numbers of commandments with respect to the latter.   Thirdly,   another area of research has investigated whether the fiscal rules of FPF-EU are adequate in fulfilling its crucial objective *i.e.,* public debt sustainability. In other words, investigations regarded which intermediate fiscal variable – among those under government's control *i.e.,* public debt, primary budget balance or total budget balance – is more suitable for ensuring the attainment of the final goal.

According to Pasinetti (1998, 2000), the definition of public debt unsustainability needs to be shaped based on public debt dynamics. By maintaining that debt sustainability requires public debt to reduce or to remain constant he reaches a quite paradoxical result, *i.e.,* during the nineties, while Italy and Belgium have

achieved a sustainable fiscal position, other countries such as Germany and France have shown a unsustainable one.

Canzoneri, Cumby and Diba (2001a, 2001b, 2002), after stressing the difficulty in identifying theoretically an adequate and, at the same time, simple fiscal discipline capable of ensuring public debt sustainability (in their language, the presence of a 'Ricardian regime'), nevertheless, were able to obtain from the intertemporal budget constraint a general criterion for evaluating fiscal rules. Indeed, they first deduce a government's reaction function based on the adjustment of primary budget balance to public debt change that ensures intertemporal budget constraints to be satisfied. Then they show that as long as the coefficient measuring the degree of reaction of primary budget balance to public debt is positive infinitely more often than the fiscal policy is capable of guaranteeing public debt sustainability. Finally, they conclude that the numerical fiscal rule imposed by FPF-EU indeed satisfies their criterion so that it turns out to be a sufficient condition for the sustainability of the fiscal position.

Kopitz (2001) holds an intermediate position between Pasinetti and Canzoneri *et al.*. Starting from a strong definition of public debt sustainability grounded on the reduction of public debt to a predetermined level, Kopitz determines the level of primary budget balance capable of ensuring the achievement of the final goal during each specific period.

In conclusion, the literature evidences a negative attitude rather than a broad agreement on the effectiveness and adequacy of the fiscal rule. Even the more favourable conclusion of Canzoneri *et.al.* – which prove that the reference value of 3% is a sufficient condition for public debt sustainability – leaves an open question: do other simple and adequate fiscal rules exist that could fulfil the same final goal without

generating negative effects? On the other hand, the alternative fiscal rules that are proposed are not persuasive – such us the one relying on the dynamics of public debt proposed by several scholars – not easy to apply and therefore to verify – such us the Permanent Balance Rule – or not fundamentally alternative to those of FPF-EU such as the Golden Rule.

This paper is aimed at examining two basic features of the fiscal rules embodied in the FPF-EU, *i.e.* its adequacy and consistency with respect to the final goal represented by the sustainability of public debt. In section 2, after recalling the standard definition of public debt sustainability, we compare three alternative variables for defining fiscal rules: public debt, primary budget balance and total budget balance. By comparing the three alternatives we conclude that the functional fiscal rule based on a constant total budget balance is more adequate than other choices. Of course, the draw of the numerical value from the functional fiscal rule inevitably is an arbitrary operation. In section 3 we examine the social cost of choosing one value rather another one, where the social cost is measured in terms of the public debt burden borne by future generations. Actually, while on the one hand the numerical fiscal rule which is drawn from the functional fiscal rule is indifferent with respect to the public debt sustainability, on the other hand, it produces different effects with respect to the intergenerational redistribution of public debt burden. Finally, in section 4 we examine the issue of the consistency of the numerical fiscal rule of FPF-EU on the total budget balance with the numerical final goal on the public debt.

2. Adequate Fiscal Rule for Public Debt Sustainability

In this section we first trace a simple theoretical framework for examining the adequacy of the numerical fiscal rule defined by the FPF-EU. Of course, the adequacy of a policy rule has to be assessed with respect to the realization of the final goal that commands the adoption of the policy rule itself. Therefore, the first step in working out the analytical framework consists in finding a definition which approximates more closely the definition of sustainability of public finance position since FPF-EU has not really provided one. We can safely presume that sustainability of public finance positions simply means public debt sustainability.

2.1 The Definition of Public Debt Sustainability

In the literature, the definition of public debt sustainability is actually a well-established topic (Blanchard e Fischer, 1989; Blanchard, Chouraqui, Hagemann and Sartor, 1990; Hamilton and Flavin 1986).

Let us first consider the current government public budget constraint at time t:

$$ s_t^g = s_t^p - \left(\frac{i}{1+\gamma}\right) d_{t-1} = -(d_t - d_{t-1}) - \left(\frac{\gamma}{1+\gamma}\right) d_{t-1} \tag{1} $$

where s_t^g is the total budget balance/GDP ratio equal to the primary budget balance (defined as the difference between revenues and expenditures), s_t^p, minus interest payments, $(i/(1+\gamma))d_{t-1}$, d_t is the public debt/GDP ratio, γ is the nominal rate of growth of GDP and finally i is the nominal rate of interest[2]. Equation (1) shows that the total budget balance has to be financed by a change in the stock of public bonds and/or by *growth dividend* on public debt.

Note that for simplifying the analysis we make three hypotheses. Firstly, governments and Central Banks are consolidated, so we do not consider explicitly money financing and, therefore, we do not discuss the way public debt unsustainability influences price levels in the long-run. Secondly, we do not break down the primary budget balance between the capital budget balance and the current budget balance. Thirdly, the primary budget balance is not divided into the two functional components *i.e.*, the discretionary fiscal policy and the automatic stabilizer. Actually, by removing the above assumptions, one would obtain the following more general version of the current government budget balance:

$$s_t^k + \left[s_0^c + \alpha(\gamma_t - \gamma^*) \right] - \frac{i}{1+\gamma} d_{t-1} = -(d_t - d_{t-1}) - \frac{\gamma}{1+\gamma} d_{t-1} + \frac{\theta \, m_{t-1}}{1+\gamma} \qquad (2)$$

where s_t^k is the capital budget balance; the current budget balance, s_t^c, is broken down in the discretionary fiscal policy component, s_0^c, and the automatic fiscal stabilizer that depends, according to a given reaction coefficient α on the gap between the actual and the potential GDP growth rate, γ^*; θ is the growth rate of the stock of money determined by the Central Bank exogenously and m_{t-1} is the stock of money.

Hence, by assuming the above assumptions (1) the equation may be rewritten as

$$s_t^p = \left(\frac{1+i}{1+\gamma} \right) d_{t-1} - d_t \qquad (3)$$

The intertemporal budget constraint in the interval $(0, N)$ may be derived from (3) – calculated at time $t = N$ – by backward substitution:

$$d_N = \left(\frac{1+i}{1+\gamma}\right)^N d_0 - \sum_{j=1}^{N}\left(\frac{1+i}{1+\gamma}\right)^{N-j} s_j^p \qquad (4)$$

Assuming that $i > \gamma$, so that the intertemporal budget constraint is binding, from (4) it follows:

Definition 1. *Public debt is sustainable if public debt grows for $N \to \infty$ at a ratio less than that of the discount factor i.e., as long as*

$$\lim_{N \to +\infty} \frac{d_N}{\left(\frac{1+i}{1+\gamma}\right)^N} = 0 \qquad \text{or} \qquad b_0 = \sum_{j=1}^{+\infty}\left(\frac{1+\gamma}{1+i}\right)^j s_j^p \qquad (5)$$

Hence, public debt sustainability requires that the present value of d_N is equal to zero for $N \to \infty$ or, equally, that the stock of public debt at time $t = 0$ has to be equal to the sum of the discounted primary budget balance.

2.2 Fiscal Rule Built on Public Debt Dynamic

Given the high abstractness of the definition and its scarce immediate applicability, one would wish to look for a simple fiscal rule which, besides satisfying (5) above, is clear and immediate. Of course, only a few fiscal variables are adequate to this purpose: public debt, total budget balance and primary budget balance.

First, let us verify whether by observing the dynamics of public debt or by computing its limit it is possible to find out the proper and adequate solution to the above issue[3]. Definition 1 implies that public debt is sustainable as long as one of the following conditions occurs: i) public debt diverges to infinity at a growth rate less than that of the discount rate; ii) public debt converges to a finite value.

The convergence of public debt to a finite value is compatible with the existence of a finite limit lower or greater than the initial stock of public debt: in other words, the convergence is compatible both with an increase and with a decrease in public debt. From the two general cases which single out sustainable growth patterns of public debt it follows:

Corollary 1. *If* $\Delta b \lessgtr 0$ *then public debt may be sustainable or unsustainable.*

Corollary 2. *If* $\Delta b = 0$ *then public debt is sustainable.*

Corollary 1 asserts that public debt sustainability can be supported by public debt diverging to $+\infty$. This claim, although, points out an interesting theoretical outcome, since it is not such an evident result, on a normative ground it could prove to be quite dangerous and costly. Indeed, it could expose policy makers to the temptation of running permanent and increasing public deficits and, consequently, it could feed policy makers' hopes that public sector has *free lunch* at its disposal. On the other hand, it points out that, on a theoretical ground, the decrease in public debt is neither a necessary nor a sufficient condition for sustainability: indeed, as long as public debt decreases at a growth rate greater than that of the discount factor, in absolute value, condition (5) is never satisfied. Corollary 2 shows that a constant public debt is a sufficient condition for public debt sustainability, although it is not necessary, since according to Corollary 1 public debt, theoretically speaking, could go to infinity.

Altogether, Corollaries 1-2 show that the attempt to identify powerful, necessary and sufficient conditions for the sustainability of a fiscal position in terms of public debt dynamics is unsuccessful. Specifically, in the presence of an increase in public debt, they are not able to conclude whether the fiscal position is sustainable or unsustainable. Indeed they allow to isolate a sufficient condition seen as intrinsically

weakly discriminating: as long as public debt is stable, or the limit value of public debt is finite, then the financial fiscal position is certainly sustainable.

2.3 Fiscal Rule Built on Constant Total Budget Balance

Another opportunity to find simple indicators for the sustainability of a fiscal position is provided by examining the specific fiscal discipline chosen by policy makers leading to the adoption of a *fiscal rule* within the definition of economic policy plans. The fiscal rule in this simple context necessarily involves the way in which the two intermediate fiscal variables, *i.e.* total and primary budget balance, are regulated by policy makers. Fiscal rules, besides many other features, need to be *simple*, *adequate* and *consistent*.

A first element that contributes to the simplicity of a fiscal rule is the temporal interval within which the rule needs to be implemented in order to ensure public debt sustainability that is uniperiodal or pluriperiodal. Naturally, a fiscal rule applicable to any given period is better than a rule requiring verification along an extended time period and, therefore, it could involve complex computations as, for instance, those required by (5). Another element that contributes to simplicity with regard to the functional nature of fiscal rules is that the fiscal rule may be a function of, or, on the other hand, may be represented simply by a number that needs to be satisfied during each period as the fiscal rule of FPF-EU does.

Proposition 1. *A constant total budget balance is a sufficient condition for public debt sustainability.*

Let us suppose that the Government chooses a fiscal rule which maintains the total budget balance constant at the level s_0^g for every t that is:

$$s_t^g = s_t^p - \left(\frac{i}{1+\gamma} \right) d_{t-1} = s_0^g \qquad (6)$$

Given the fiscal rule (6), the current budget constraint (3) may be rewritten in the following way:

$$d_t = \left(\frac{1}{1+\gamma} \right) d_{t-1} - s_0^g \qquad (7)$$

From (7), it follows straightforward that condition (5) – ensuring public debt sustainability – is satisfied. Indeed, the fiscal rule based on a constant total budget balance implies an adjustment of primary budget balance during each period according to the following *primary budget balance adjustment function*

$$s_t^p = s_0^g + \left(\frac{i}{1+\gamma} \right) d_{t-1} \qquad (8)$$

Therefore, referring to Woodford's (1995) terminology, the fiscal rule based on a constant total budget balance defines a *non-Ricardian* regime or, equivalently, in Canzoneri *et. al*.'s (2001a, 2001b) terminology, a *fiscal dominant* regime: primary budget balance are adjusted continuously in order to sustain the fiscal rule and, consequently, public debt sustainability.

Let us now consider the long-term implications of the above fiscal rule in terms of public debt and primary budget balance. From the general solution of the finite differential equation (7) it is possible to obtain the limit values of public debt:

$$d = -\left(\frac{1+\gamma}{\gamma} \right) s_0^g = d_0 \qquad (9)$$

and primary balance budget:

$$s^p = \left(\frac{i-\gamma}{1+\gamma}\right)d_0 = -\left(\frac{i-\gamma}{\gamma}\right)s_0^g = s_0^p \qquad (10)$$

Equations (9) and (10) show that: i) the limits of public debt and primary budget balance rely exclusively on the exogenous variables *i.e.,* the constant level based on which the total budget balanced is fixed and the GDP growth rate; ii) given the GDP growth rate, once the total budget balance is fixed at a constant value, therefore, the limits of public debt and primary budget balance are necessarily obtained by (9) and (10) respectively; iii) from equation (10) it follows that in front of lower GDP growth rates and higher interest rates, the primary balance budget needs to be higher in order to ensure the stabilization of public debt at the selected value.

Let us now illustrate on the above analysis diagrammatically in FIG. 1. Equation (9) identifies the *TD* schedule given by all combinations of public debt and total budget balance allowing public debt to remain constant. The slope of *TD* is equal to $-\gamma/(1+\gamma)$, which is a measure of *growth dividend*: the rate of growth of GDP represents an implicit tax since it reduces, given the stock of public debt, the ratio of public debt. Equation (10) identifies the *PD* schedule given by all combinations of public debt and primary budget balance which make public debt constant. The slope of *PD* is equal to $(i-\gamma)/(1+\gamma)$ and represents the *interest payments on public debt net of growth dividend*. Finally, the angle formed by schedules *PD* and *TD* is equal to $i/(1+\gamma)$, so that in correspondence of a given level of public debt, the distance between the two schedules represents the *interest payments* on public debt.

[FIGURE1]

Let us assume that at time $t=0$ public debt is equal to d_0^A, the total balance budget is s_0^g, and the primary balance budget is equal to $s_0^{p/A}$, therefore it cannot fully cover interest payments. Hence, public debt tends to increase. Moreover, let us assume that at $t=1$ policy makers decide to adopt a fiscal rule that fixes the total budget balance permanently at the level of period $t=0$. During the following periods, the increase in interest payments, caused by the increase in public debt, implies an increase in the primary budget balance along the *SP* schedule, which represents the primary budget balance adjustment function (8), in order to keep the total budget balance constant at the level fixed in advance. Public debt increases until the primary budget balance starting from point *B* finally reaches point *E* and public debt stabilizes at d_0. When public debt reaches the limit value, the sum of the growth dividend, equal to segment $\overline{Gd_0}$ plus the primary budget balance, equal to segment $\overline{Ed_0}$, are fitted for covering exactly the interest payments, equal to segment $\overline{EG}$.

On the other hand, let us assume that at time $t=0$ public debt is d_0^B while the primary balance budget is, $s_0^{p/B}$, and let us suppose that the government at $t=1$ forces itself to follow a fiscal rule requiring a constant total budget balance at the previous level, s_0^g. In these circumstances, the initial level of primary budget balance leads to a decrease in public debt which, given the constant total budget balance, implies a decrease in interest payments which, in turn, produces, during the following period, a decrease in primary budget balance along the *SP* schedule in order enable the total budget balance to remain constant. Finally, public debt approaches at the limit d_0 where it stops decreasing since the primary budget balance offsets exactly

the sum of the interest payments net of growth dividend. The two above examples imply

Corollary 3. *Public debt sustainability supported by a fiscal discipline resting on a constant total budget balance is consistent with both an increasing and decreasing public debt.*

Corollary 4. *A fiscal discipline resting on a constant total budget balance implies the existence of infinite combinations* (d, s^g) *which ensure the stability of public debt.*

Therefore, Corollary 3 reminds that from observing the dynamics of public debt we cannot infer anything in terms of public debt sustainability. Corollary 4 shows that all combinations (d, s^g) along the *TD* schedule guarantee the stability of public debt. Given the stability of total budget balance, whatever the starting point (d, s^g) is, public debt necessarily converges to a finite value.

2.4 Fiscal Rule Built on Constant Primary Budget Balance

The third and last intermediate fiscal variable, that could be chosen as the reference variable in determining the fiscal rule, is represented by the primary budget balance. As we have seen previously, Canzoneri *et. al.* (1999, 2001a) have shown that it is possible to identify the basic requirement for obtaining a broad class of fiscal policies capable of supporting a Ricardian regime: the coefficient which measures the reaction of primary budget balance has to be "positive infinitely often".

The intuition behind the finding is quite immediate: in order to avoid unsustainable public debt patterns, governments have to retire public debt so as to avoid the occurrence of a divergent growth of public debt. Nevertheless, as Canzoneri

et. al. say: "the response might be registered every other year, after a decade, or after a century". Of course this, in turn, reveals the weakness of the proposed fiscal rule. Opportunistic governments may postpone the adjustment of primary budget balance during a subsequent period and maybe in the next century! Actually, the requirement for public debt sustainability found out by Canzoneri *et. al*. (1999, 2001a) seems to be a criterion for evaluating fiscal rules rather than a fiscal rule itself.

Let us now verify if a fiscal rule based on a constant primary budget balance bring about public debt sustainability.

Proposition 2. *A constant primary budget balance is not a sufficient condition for public debt sustainability as long as it is fixed on a value s_0^p such that*

$$s^p \neq \left(\frac{i-g}{1+g} \right) d_0 \tag{11}$$

Actually, Proposition 2 shows that there exists an unique value, among the infinite ones, based on which the primary budget balance can be fixed for ensuring public debt sustainability *i.e*., the value given by (10): the primary budget balance is fixed exactly on that value that allows to finance the interest payment net of growth dividend. Hence with the exception of this value all the other values are not able to support the sustainability of public debt.

Using Woodford's (1995) terminology, the fiscal rule based on a constant primary budget balance defines a *non-Ricardian* regime or, equivalently, in Canzoneri *et. al*.'s (2001a) terminology a *monetary dominant* regime: primary budget balance are not adjusted every period so that public debt is unsustainable and consequently sooner or later the Central Bank has to adjust the stock of money for guaranteeing the fiscal solvency.

3. The Social Burden for Supporting the Fiscal Rule

Section 2 has shown that a simple and adequate functional fiscal rule aimed at ensuring an immediate or gradual stabilization of public debt lays in fixing a constant total budget balance. Nevertheless, the arithmetic of the budget balance constraint, on the one hand, provide simple guidelines for conducting fiscal policy while, on the other, they leave a large degree of irresoluteness, since they cannot provide a criterion for choosing the correct and fair value on which the fiscal rule has to be fixed. Indeed, as we have seen, there are infinite values of total budget balance that satisfy the condition (5) which are thus equivalent in order to ensure public debt sustainability.

At the same time, in Section 2 we pointed out that the stabilization of public debt necessarily implies the continuous adjustment of the primary budget balance along the convergence process. In turn, the size and sign of the primary budget balance reveals the degree of public debt burden carried on by the current generations where the public debt burden has two components *i.e.,* taxes required for interest payments and taxes required for retiring the stock of public debt.

Firstly, in the presence of a primary budget deficit, the current generations finance both interest payments and part of the current expenditures by public bonds and, therefore, both shift entirely the burden of public debt – in terms of interest payments – to next generations and, furthermore, make the burden even heavier since the public debt has registered a further increase. Secondly, when a budget surplus occurs, two circumstances can happen. On the one hand, if the primary budget balance is positive – but lower than the interest payments – the public debt has necessarily to increase. Therefore, the actual public debt burden falls partially on the current

generations and is partially shifted forward to the next generations. On the other hand, if the primary budget surplus is greater than the interest payments, it means that public debt is shrinking and, therefore, the current generations sustain a public debt burden constituted by two elements: the interest payments and the retirement of the public debt stock. The effort of the present generation benefit future generations. Indeed, the next generations, because of the reduction of public debt, will carry a smaller burden than the previous ones. Thirdly, if the primary budget surplus is exactly equal to interest payments, then public debt remains constant and the burden of public debt remains constant and equal on an intergenerational level.

In order to clarify the relationship between the fiscal rule and the public debt burden consequent to its adoption, let us consider two countries that lying on different points of the TD schedule in FIG. 2. For instance, we will position country A in point $A = (d_A^*, s_A^g)$, and country B in point $C = (d_B^*, s_B^g)$ – where $d_A^* < d_B^*$ – and let us assume that in the two countries GDP growth rates and interest rates are equal and, furthermore, that the total budget balance is kept constant at different values, $s_A^g > s_B^g$. Now let us suppose that the two countries are requested to converge towards the same value, for instance, d_0^*, where by assumption $d_A^* < d_0^* < d_B^*$ so that they have to adopt the same numerical fiscal rule so as to keep constant the total budget balance at s_0^g from then on where $s_A^g < s_0^g < s_B^g$. Therefore, the country A – bears a public debt burden – equal to the segment Md_A^* – less than that of country B – equal to the segment Sd_B^* – since its public debt is less than that of country B

[Figure 2]

Let us see how the burden for supporting the fiscal rule changes along the convergence process of public debt towards d_0^*. On the one hand, since $d_A^* < d_0^*$ and $s_A^g > s_0^g$, country A, during the first period, achieves a decrease in the primary budget balance and, consequently, in public debt burden. In FIG. 2 this results in a shift of the primary budget balance from point M to N and, accordingly, in a shift of the total budget balance from point A to B. Subsequently, because of the decrease in total budget balance, public debt increases. This, in turn, implies that in the following periods the primary budget balance has to increase in order to ensure the financing of interest payments, since the total budget balance has to be kept stable on a permanent basis. In these circumstances, the public debt burden, following a temporary initial decrease, starts to increase steadily: when public debt reaches the limit $d_A^* = d_0^*$, the public debt burden exceeds the initial value.

On the other hand, since $d_B^* > d_0^*$ and $s_B^g > s_0^*$, during the first period country B needs to produce an increase in the primary budget balance and, consequently, in the public debt burden. Graphically, this means that initially the primary budget balance increases, passing from point S to point R, so as to satisfy the constraint imposed on the total budget balance that shifts from point C to point D. Secondly, the decrease in total budget balance entails the reduction of public debt and, consequently, the reduction of interest payments. This, in turn, generates a decrease in the primary budget balance along schedule SP from point R to the limit value E. Finally, when the limit value of public debt is reached, the public debt burden is lower than that of the initial period.

By comparing the two convergence processes of public debt of two countries it follows that the fiscal adjustment requiring an identical limit value of public debt in country *A* implies an increase in public debt and, consequently, an increase in the public debt burden, while in country *B* it produces a decrease in public debt and, consequently, in the public debt burden. Nevertheless, during the entire period of adjustment towards the new public debt limit, the public debt burden in country *A* is always lower when compared to country *B*.

In conclusion, the adoption of a fiscal rule based on a constant total budget balance and the consequent fiscal adjustments necessarily imply an intergenerational redistribution of the burden of public debt. The direction and size of the redistribution crucially depend on two basic elements: the specific value on which the total budget balance is fixed and the gap between the actual public debt and the public debt limit compatible with the predetermined numerical fiscal rule which could be both positive and negative. The smaller the required level of total budget balance, the larger the positive gap between actual and limit public debt are, the bigger the increase of the public debt burden on current generations, the smaller the public debt burden on future generations.

4. The Consistency of Fiscal Rules of FPF-EU

This section deals with the issue of the consistency of fiscal rules on total budget balance with reference to the final public debt target established by FPF-EU. As we have already seen, the Stability Pact has tightened the fiscal rule regarding the total budget balance provided for by the Treaty of Maastricht, since there is a shift of both the reference value from -3% to 0% and of the reference variable from the current to

structural total budget balance. On the other hand, the final public debt target has remained unchanged *i.e.,* public debt is required to be equal or less than the critical value of 60%.

Let us first examine the consistency between the fiscal rule of $s_t^g \geq -3\%$ and the final target of $d \leq 60\%$ that the Treaty of Maastricht requires for EU membership.

$$\left[\, \text{Table}\, 1 \,\right]$$

TAB. 1 calculates the limit of public debt in correspondence of different values based on which total budget balance is kept constant at different GDP growth rates. Actually, each column of TAB. 1 is the numerical expression of schedule *TD* considered in SECTION 2 and, therefore, it reconfirms the existence of infinite combinations of total balance budget and GDP growth rates, and each combination corresponds to a finite limit value of public debt. Therefore, it reasserts the *arbitrariness* of the reference values selected by MT in order to ensure the sustainability of the public finance position of EMU members. Actually, theoretical findings do not provide definitive indications that a total budget balance less or equal to -3 is better than one equal to -2 or -4 in order to ensure the sustainability of the public finance position; analogously, it does not say if a public debt ratio equal to 60% is better than one equal to 40% or 80%. In other words, the reference values established by MT represent a sufficient but not *necessary* condition for ensuring the sustainability of public finance stance.

The *arbitrariness* of the reference values of -3% fixed by MT does not represent a real shortcoming. In other words, given the right functional fiscal rule *i.e.,* the stability of the total budget balance, any numerical reference chosen by MT would

have been arbitrary. Indeed, TAB. 1 points out the main weakness of the MT. In fact, it shows that assuming $s \leq -3\%$ the reference value of public debt $d \leq 60\%$ may be achieved simultaneously only if $g \geq 5,3$. This comes out directly from observing equation (11) which identifies the limit of public debt: since three variables appear in (11) *i.e.,* s^g, d and g, it appears evident that it is not possible to predetermine two variables at a given value *e.g.,* (s^g, d), without bearing in mind that a third variable necessarily needs to be obtained from (11). As a consequence, the MT suffers of an *inconsistency* between the fiscal rule regulated on the total budget balance and the reference value on public debt within the $g \leq 5,3$ interval. For instance, assuming $g = 3$, policy makers, even if they should achieve the target value $s = -3$ during each period, will be never able to achieve the reference value of the public debt since in these circumstance the limit value of public debt/GDP ratio is equal to 100%.

The GSP has modified the numerical fiscal rule by requiring countries to achieve medium-term close-to-balance or surplus budgets, i.e. $s^g \geq 0\%$, where s^g, in this case, represents the structural total budget balance while, on the background, there still remains the final public debt goal, *i.e.,* $d \leq 60\%$. TAB. 1 shows that the GSP overcomes the shortcoming undermining the MT, *i.e.* the inconsistency between the fiscal rule and the final goal within a given interval of the GDP growth rate: as long as the total (structural) budget balance is stable at $s^g = 0\%$, therefore, the public debt limit is $d = 0$. In other words, by tightening the fiscal rule, GSP makes the limit of public debt independent with reference to the GDP growth rate. At the same time, it shows that the underlying final goal of the FPF-EU is in fact represented by a single value rather than by an interval as the MT has stated previously and the GSP has

reaffirmed implicitly. In conclusion, to overcome the inconsistency of the MT with regard to this aspect requires a very strong result in the long-run: government will need to retire the public debt completely.

5. Conclusions

This paper has been focused on a single aspect of the fiscal policy framework deriving from the combination of the fiscal requirements of MT with those of the GSP which has been under attack recently: the fiscal rules. More specifically, we attempt to verify the soundness of the fiscal rule with respect to its two basic features: the adequacy and consistency relatively to the final goal of the sustainability of the fiscal position. The main results are the following ones.

In the fist place, it points out that as far as the definition of public debt sustainability is derived from the intertemporal budget constraint, the theoretical findings point out that a simple functional fiscal rule ensuring the final goal consists in keeping the total public budget balance constant. Therefore, the numerical fiscal rule of FPF-EU may indeed be seen as specifically drawn from the correct functional fiscal rule and it thus represents a simple and adequate fiscal rule for fulfilling the final goal. Furthermore, it is necessarily arbitrary, since on the theoretical ground it is not possible to determine which specific value is more adequate or preferable for public debt sustainability: therefore, there are infinite values on which the total budget balance can be fixed in order to ensure the sustainability of public debt.

In the second place, while on the one hand any numerical fiscal rule of FPF-EU obtained from the functional fiscal rule is capable of fulfilling the final goal, on the other hand, it produces different effects on the redistributions of public debt burden. In

fact, the paper shows that the direction and the size of redistribution rely on two basic factors: the specific value at which the total budget balance is maintained constant and the gap between the actual public debt and the limit of public debt. The smaller the required level of the total budget balance, the larger the positive gap results, while a higher increase of the public debt burden on current generations implies a smaller burden falling on the next generations.

Thirdly, it points out that the fiscal rule based on the reference value of 3% required by the Treaty of Maastricht for a given set of values of GDP growth rate is inconsistent with the final goal which requires public debt to be lower than 60%. Finally, it shows that the further refinement provided for by the Growth and Stability Pact – i.e. a structural total budget balance equal to 0% – actually removes the above inconsistency as long as the interval of the final goal shrinks to a single point *i.e.*, zero, so that in the long period the public debt has to be retired entirely.

Finally, the analysis shows that the fiscal rule provided by the FPF-EU is indeed adequate and consistent in order to ensure public debt sustainability. In fact, it points out that the calibration of the fiscal rule on total budget balance rather than public debt is the best choice in defining a fiscal discipline coherent with public debt sustainability. As a consequence, some recent reform suggestions of FPF-EU proposing to shift the emphasis from the total budget balance towards public debt dynamics do not appear to be strongly grounded on theoretical findings. On the other hand, the analysis shows that a significant shortcoming of the fiscal rule (scarcely evidenced in the literature) refers to the size and timing of the intergenerational redistribution of public debt deriving from its implementation. Indeed, the requirements according to which the medium-term structural budget should be close-

to-balance while in the short term the actual budget should not overcome the -3% limit could entail an excessive public debt burden on current generations which, in turn, could generate a rejection of the FPF-EU by European countries, especially if the structural budget and/or public debt should appear to be far from their respective goals. Actually to be too *impatient* in reaching the sustainability of public finance position could turn out to be a dangerous *boomerang* and could produce a complete and problematic rejection of the FPF-EU. As a consequence, an improvement of the FPF-EU relatively to the fiscal rule could consist in fixing both the priority between the constraints on the structural and the actual budget balance and the period within which they should be satisfied. At first, countries should be required to fulfill the structural budget goal – so that countries should not be pushed in adopting *creative* policy measures – and only subsequently the limit of -3% should become operative. Spreading the budget balance requirements along two phases and within a fixed period (as provided for by the Treaty of Maastricht with reference to the convergence criteria) would ensure two advantages: firstly it would distribute the public debt burden on a larger number of generations and, secondly, it could ensure the respect of the -3% actual budget balance ceiling by relying on the fiscal stabilizers rather than on the discretional fiscal policy as it would be happen if the structural budget balance was too far from the zero level.

Notes

1. Recently an increasing research has tackled the issue of manifold causes for restricting the role of discretional fiscal policy for stabilization purposes: i) inefficient budgetary decision-making processes (long decision lags, reining political nature of fiscal decisions; shortsighted governments); ii) destabilizing effects on economic activity since discretionary fiscal policy increase in GDP volatility; discretionary fiscal policy lives up to other goals apart stabilization *i.e.*, income distribution and resource allocation (Fatas and Mihov, 2003a, 2003b; Kopits, 2001; Taylor, 2000).

2. From now on, the variables s_t^g, s_t^p and d_t have to be considered as ratios to GDP growth rate even if, to make exposition lighter, we do not specify that.

3. Pasinetti (1998, 2000) and Harck (2000) discuss the issue of the significance of reference values of the Treaty of Maastricht assuming as a starting point a narrow definition of public debt sustainability i.e., public debt has to reduce or remain constant, and, consequently, they identify a narrow class of fiscal policies that support public debt sustainability.

4. Under this fiscal rule it follows

   that $d_n \left(\dfrac{1+\gamma}{1+i} \right)^N = \left(\dfrac{1}{1+i} \right)^N + s_0^g \left(\dfrac{1+\gamma}{1+i} \right)^N \sum_{j=0}^{N-1} \left(\dfrac{1}{1+i} \right)^j$ from which it follows that

   for $N \to +\infty$ the condition (5) is satisfied.

5. Indeed in the discussion on the "old" fiscal theory of the price level stated by Sargent and Wallace (1981) the role of the fiscal rules satisfying the intertemporal budget constraint and therefore the public debt sustainability has been already examined by McCallum (1984).

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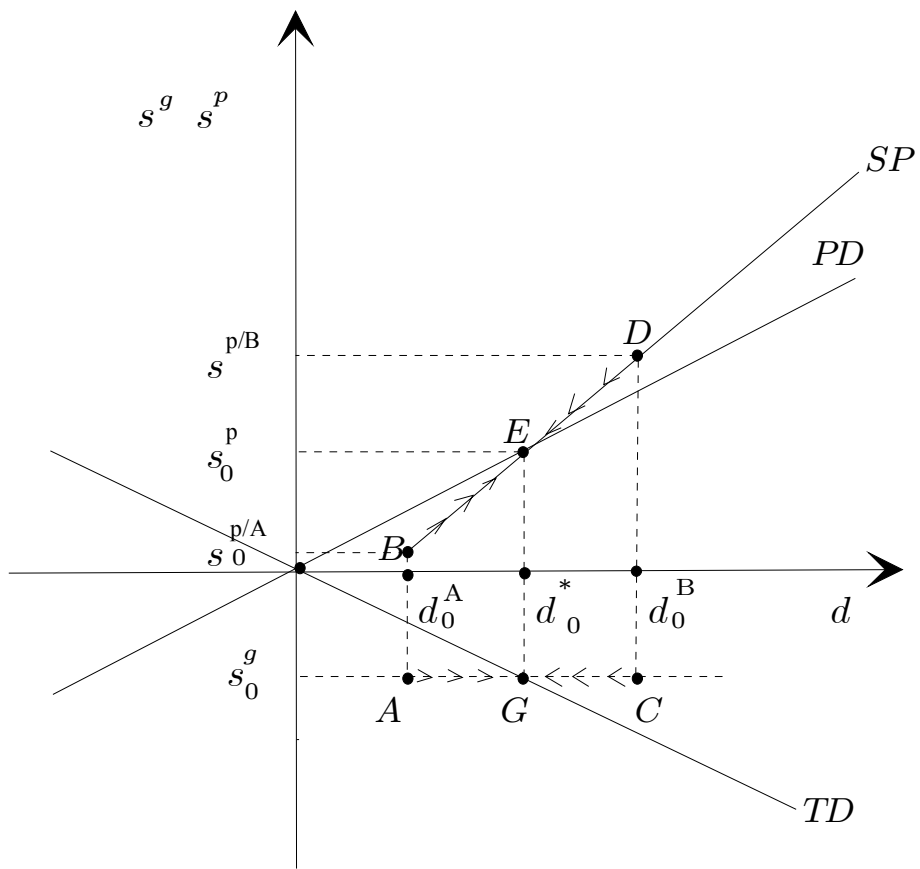
FIGURE 1. The Adoption of a fiscal rule based on a constant total budget balance
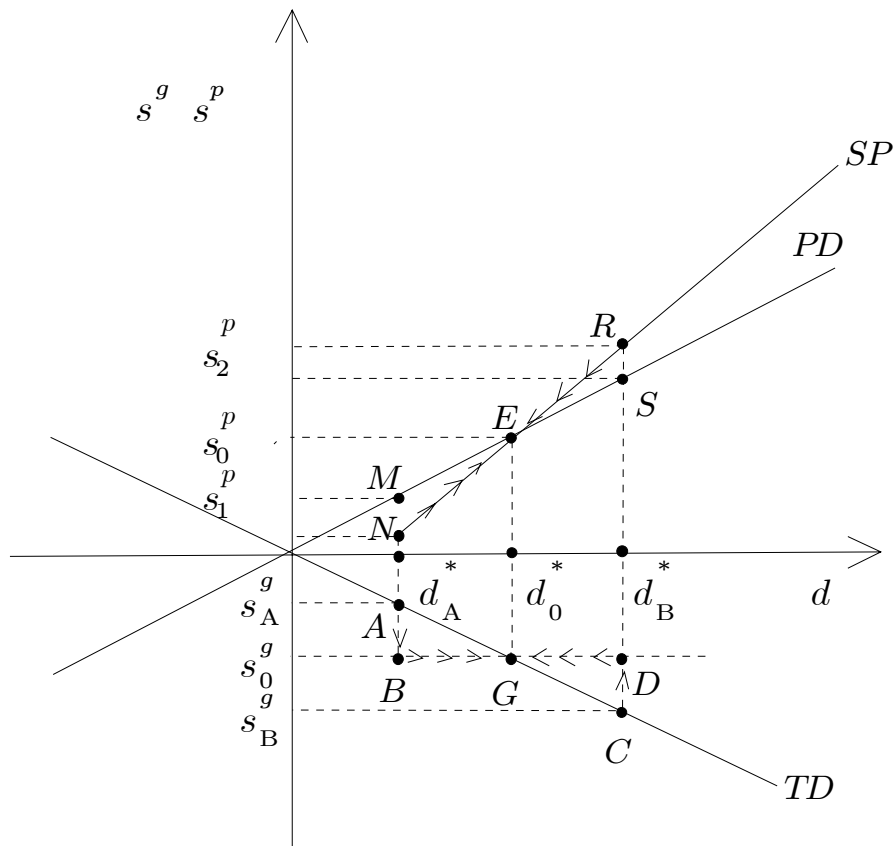
Figure 2. The social cost for supporting the fiscal rule

GDP Growth Rate	0,5	1,7	3	3,5	4	5	5,3	6	7	7,1	8	9	9,1	10
Total Budget Balance														
-11	2211	658	378	325	286	231	220	194	168	165	149	133	132	121
-10	2010	598	343	296	260	210	200	177	153	150	135	121	120	110
-9	1809	538	309	266	234	189	180	159	138	135	122	109	108	99
-8	1608	479	275	237	208	168	160	141	122	120	108	97	96	88
-7	1407	419	240	207	182	147	14	124	107	105	95	85	84	77
-6	1206	359	206	177	156	126	120	106	92	90	81	73	72	66
-5	1005	299	172	148	130	105	100	88	76	75	68	61	**60**	**55**
-4	804	239	137	118	104	84	80	71	61	**60**	54	**48**	**48**	44
-3	603	179	103	89	78	63	**60**	**53**	**46**	**45**	**41**	**36**	**36**	**33**
-2	402	120	69	**59**	**52**	**42**	**40**	**35**	**31**	**30**	**27**	**24**	**24**	**22**
-1	**201**	**60**	34	**30**	**26**	**21**	**20**	**18**	**15**	**15**	**14**	**12**	**12**	**11**
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 1. Public Debt Limit Values