

# PUBLIC DEBT AND FINANCIAL SUSTAINABILITY OF THE ITALIAN PUBLIC FINANCES

by *Federico Pica\** and *Salvatore Villani\*\**

## I. The Normative Framework

1. The provisions contained in Paragraphs 1 and 2 of Article 81 of the Italian Constitution, then amended through the Constitutional Law 20 April 2012, n. 1, are fundamental in order to understand the considerations that will be proposed in this paper. The aforementioned constitutional rules state the principle of the Equilibrium of the National Budget Estimates: from 2014 on it will be necessary “to ensure the balance between revenues and expenditures, taking into account the unfavorable and favorable phases of the cycle” (Par. 1). This principle, thus stated, refers to a period of time that can be (in general) more than one year: the aim is to get a balance between those phases of the economic cycle in which deficits can be justified and the other phases in which, instead, surpluses can be generated. This approach is confirmed in Par. 2 of Art. 81 currently in force: “Borrowing is allowed only by taking into account the effects of the economic cycle”. However, a second hypothesis is contemplated in the same Par. 2; when exceptional events occur, the Parliament may allow borrowing, “after receiving an authorization approved by an absolute majority of its members”.

The rules thus introduced in Par. 6 of Art. 81 are extended to all public bodies. It establishes that “the content of the National Budget Law, the basic rules and the criteria to ensure a balance between revenues and expenditures in the budgets and debt sustainability of all the public admin-

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istrations are established by a law endorsed by an absolute majority of the members of each Chamber, in accordance with the principles defined by constitutional law”.

The constitutional rules here mentioned have been implemented and further developed in the Law of 24 December 2012, n. 243, which defines some of the notions contained in it:

- “Public Administrations” are the Entities identified, in line with the European trend, by the accounting and public finance laws which refer to the list issued by ISTAT;
- “Consolidated Accounts” are the statement of profit and loss of Public Administrations, written in accordance with the procedures established by European regulations;
- “Balance of the Consolidated Accounts” is the net borrowing or the net lending defined for the purposes of the procedure concerning the excessive deficit of the European Union;
- “Structural Balance” is the balance of the account referred to above, net of non-recurring or temporary measures, corrected, still in accordance with European standards, in order to account for the effects of the cycle.

It is quite clear that the regulations in question, once the principles were stated, make reference to the rules issued by the European Union, in particular concerning the regulation of excessive deficits.

2. The constitutional law in force (from the accounting period 2014) and the similar European legislation lead the debt (i.e. the change in debt) back to a question of countercyclical policy. This approach denies the reasons for the debt on the allocative plane: the constitutional rules discussed in § 1 do not allow the national community to exercise its power to decide on net public savings.

In our opinion, the approach proposed by James Buchanan in 1958 is still worthwhile<sup>1</sup>: on the one hand, there is the community of taxpayers and, on the other hand, those who put their savings in the market. According to this approach, as Buchanan stated, the public debt is similar to a family’s debt, or to a local government’s debt (Municipality, Province, Region).

*In the case of local government’s debt, as in the case of household’s debt, the debtor bears the cost of the debt service (amortization charge plus interest), which is covered – mainly and, in the Italian case, in a widely predominant way – by its current revenues. At present, however, the State covers maturing bonds with new securities issues for almost the entire*

<sup>1</sup> See Buchanan J.M. (1958).

*amount. This solution is certainly the most convenient, if it is feasible. This will be discussed extensively in the following paragraphs.*

3. On the allocative plane, it can concretely be seen that, through the debt, the “community of taxpayers” would postpone in time the contraction of resources which the financing of public spending would produce, if it were supported (by taxpayers) with alternative instruments, such as the taxes or a tariff system.

From this point of view, there is nothing “sinful” in the debt, even if the Italian legislation with regards to the so-called “Fiscal federalism” continues to assign virtue labels to the richest communities and vice labels to the poorest ones just by taking into account the amount of their debt. On the side of the creditor, the postponement of consumption (savings) produces today less welfare (lower utility), which is offset by a price (the interest rate). There are those who are willing to pay this price (borrowing) in exchange for the benefit of the immediate use of the resources in question. As in all markets a state can be reached where the appraisal of those who ask is made compatible with those who offer. In this specific market the equilibrium quantity (the “indebtedness”, i.e. the variation of the debt contracted by the Public Administrations) is different from zero.

On the side of the debtor (the community of taxpayers) the “reason” for the contract can be identified in a smaller immediate utility of future consumption or in a forecast of lower future needs (for older people) or higher future income (for young people). The assignment of the sums borrowed may be relevant. However, it is also possible to assume that a person might borrow money and hold on the whole amount to speculate on the increase of the interest rate.

In the case of local governments, the physiological destination of the debt, as provided by a constitutional norm (Art. 119, Par. 6, of the Italian Constitution), is the financing of capital expenditures. If the expenditure in question is equal to 100 and it is destined for the acquisition of an asset whose useful life is 10 years and that is not going to produce any useful result after ten years, financing by debt would put the load of its relevant burden on each “generation” of citizens, according to the rule of “*pay as you go*”.

This implies that future generations will have to face the payment of the interest due and a part (on average, in the example above, 10%) of the borrowed principal. This is what happens, in Italy, in the case of Municipali-

ties<sup>2</sup>. Instead, as we reported, in the case of the State a total volume of debt builds up, that is converted at the foreseen maturity and increased by new debt – which is produced by the creation of a deficit – and that is not subject to amortization by resources taken from the current budget.

4. Among the current European rules which have been accepted and turned into law by the Italian Republic there is a second important component, which is “the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union” (the so-called “Fiscal Compact”), which is expected to become effective in 2014. These rules, actually, integrate and apply an already existing legislation (EC Regulation n. 1467/97, as amended by EC Regulation n. 1177/2011 of 8 November 2011) and, on the interpretation level, have the purpose of reducing the restrictions imposed by the “Treaty on the Functioning of the European Union”.

These have been initially introduced by EC Regulation n. 3605/93 of 22 November 1993, many times modified, which regulates the excessive deficit procedure.

The set of constraints in question – the contents of which are proposed, as an example, in the fourth case, which is discussed in § 11 – is now in force, in the sense that our Country is presently obliged to reduce the total amount of its debt. There is an issue regarding the ways and the times in which this obligation must be met and, more specifically, the reduction rate of the debt which will be imposed annually to our Country.

## **II. The Effects of the Italian Republic Debt. Some Preliminary Notes**

5. With reference to the constraints relating to the debt, which we have proposed in the first Section of this article, we have attempted to evaluate the change rate of the resources available to the citizens of Italy (taxpayers), resources which can be used both for private and public purposes. The analysis refers to the hypothesis that the change rate of GDP between 2013 and 2015 appears no different from what has been recorded between 2010 and 2011.

This paper deals with two main issues: the impact of debt and the sustainability of public finances in Italy; the absolute and relative situation of Southern Italy’s (Mezzogiorno’s) economy. In regard to this, two main var-

<sup>2</sup> See *Rapporto SVIMEZ 2011 sulla finanza dei Comuni*, edited by F. Pica and S. Villani, Quaderno SVIMEZ n. 30, Failli, 2011, esp. pp. 31-32.

variables are relevant: the change rate of GDP in euros at current value; the change rate of prices.

In this paper, “medium term” means a time interval of 3 years. A longer time interval would force us to deal with the issue of the relationship among price changes, savings and capital accumulation: we would have to deal with the set of issues implicitly included in the proposed scheme, and which are, significant (even, the most relevant). A shorter time interval, instead, would force us to analyze the possible specifications of short-term measures that the government would decide.

The economic variables are defined at the current prices. Paradoxically, if the GDP grew in nominal terms but not in real terms and if the growth rate was not less than the change rate of prices (consumer prices), the economic and social system of Italy might withstand the impact of the debt. We are forced to recognize that a bit of inflation would be a good thing: not only the increase in the real GDP is lower than in the past, but the stability of prices has prevented a significant reduction in the real value of the debt.

The proposed analysis is an algebraic exercise, not referred to the GDP or to the household income, but to the “resources”. In a completely simplified hypothesis, as shown in the simple exercise here proposed<sup>3</sup>, the value of the “product”, net of the amounts due by all the taxpayers to the creditors, is what is available for the financing of the “other” public expenses, the private consumptions and the investments.

We assumed that the system in the mean time stabilizes itself. Therefore, we deem it useful to analyze the period 2013-2015 starting from some data considered structural: a (bottom) level of nominal GDP growth, which is that of 2011, and a relatively low level in the growth rate of consumer prices. This leads us, as we will be showing below, to a sort of waterline, which will be (probably) sustainable, but with a significant emigration rate of young people and a capital loss for the middle class. The risk, of course, is a crack and the hope is a recovery under the conditions which we have set out in the *Conclusions* Section (§ 12).

**6.** We propose to show, in essence, some possible outcomes of the situation which is taking place. You could say that the information proposed by us in this paper does not constitute a forecast, but a prediction, a sort of prophecy which the authors have deduced from a very small set of data. In fact, we cannot show a probability scheme of the events, which gives some scientific license to the results of our exercise. Above all, in the evaluation

<sup>3</sup> See Pica F., Villani S. (2012).

of this exercise, attention must be paid to the assumptions we have made and which we have clearly stated.

On the other hand, it is clear that the present situation is, technically, disastrous. It is, in fact, a situation in which the parameters that describe the functioning of the Italian macroeconomic system are destined to change in the near future from a more or less stable structure to a different setting whose characteristics are not yet defined. If this assumption is true, the prognosis concerning the effects which, in the medium term, could be produced by the current financial crisis should be considered with the most careful consideration. This is especially true with regard to the North-South division, or, better, the sustainability of the economic and social system of Southern Italy. This conclusion is all that much stronger, the more complicated and detailed is the macroeconomic model from which these prognosis derives.

In addition, some variables that today should be the focus of the analysis (the change in prices rate, in all its various meanings and taking into account the VAT and fuel taxation; the issue of the effects on the aggregate demand and the supply, of the interest rate changes on the public debt) should be seriously reconsidered in their implications when the economic situation becomes clearer.

### **III. Alternative Rules for Debt Management. A Simple Exercise**

7. As we have already pointed out, the fundamental assumption, in our opinion, is that the match takes place between two players: the taxpayers who bears the burden of debt and the related interest; the creditors who have offered savings and expect their payback. In regard to this, it is useful to give some data to understand the real nature of this issue. In Table 1 the amount of the government debt is divided by the number of households: in Italy, in 2011, each Italian family has about a burden of about € 75,000, which is a 14% increase from 2007. The increase is, therefore, around 3.5% per year. If the GDP of the current prices had increased by 4% per year (1.5 % of real increase and 2.5 % of in price changes implicit in the GDP), the debt/GDP ratio would be reduced. However, the overall nominal GDP growth, from 2007 to 2010, was 0.19%; the fiscal resources available, compared with the interest on the debt, decreased (by 7.6% at the aggregate level; by 5.2% for each family: see the rows F and G of Table 1). At the same time, because of the trends in interest rates, the amount of interest for each family fell again by 3.4% from 2007 to 2011. In 2011, the situation became worse, as is shown in the Table: compared to 2010, the debt grew

by 3.0%; the nominal GDP grew by 1,7%; the amount of taxes grew by 0.9%; the rate of interest on the taxes paid by households and businesses in Italy passed from 16.0% to 17.4%.

*Tab. 1 – Government debt and tax revenue in Italy*

	2007	2008	2009	2010	2011
A. Debt (billion euros)	1.602	1.667	1.764	1.843	1.897
B. – per each family (euros)	65.978	67.635	70.824	73.560	(75.130)*
C. Interest (billion euros)	77	81	70	70	78
D. – per each family and per month (euros)	266	275	235	232	(257)*
E. of which: interest paid by the Municipalities (euros)	10,0	9,9	9,3	8,5	(8,9)*
F. Tax revenue (resources) (billion euros)	460	456	429	442	448
G. – per each family and per month (euros)	1.560	1.541	1.435	1.465	(1.479)*
H. Interest on taxes in %	16,8	17,8	16,4	15,9	17,4

Source: Elaborations of the data from the *Economic Bulletins* of the Bank of Italy.

\* The amounts marked with an asterisk are from SVIMEZ data.

In the exercise proposed in this paper, the problem is not the amount of interest: a family who has a part of a budget destined for public expenses equal to that shown in the Table (€ 1,480 per month) is not rich, but can pay – as indeed paid – the interests shown in the Table, and even a “reasonable” increase in them. *The problem is the debt or, better, the assumption that the “loss of trust” could generate, for a substantial part of the creditors, a request for repayment, or the imposition of harsh conditions.* The family shown in our exercise can cope with the burden of the interests, but the overall amount of the actual financial obligation is out of proportion compared to the annual resources available.

8. Another hypothesis concerns the role of the public budget we have established as a base for our proposed “exercise”. This hypothesis is related to the particular notion of sustainability which we have adopted for the public administrations system: there is no need to repay the debt, but it is necessary to take into account the different types of constraints (see from § 10 to § 13) which govern the debt change over time. This is true, except for the case of debt reduction obligation (*Fiscal Compact*). Instead, a certain amount of interest on the debt should be supported yearly.

At the national level, interest expenditure produces a burden which is financed by taxes or even by negative changes in other expenses. *In either cases*, the amount of resources which the community of taxpayers can dispose is what which is reduced. We assumed (implicitly) the hypothesis, referring to the different territorial situations, that the burden in question is divided among the territories in proportion to GDP. We have adopted this solution not because it seems appropriate, but simply because we believe

this is what happens in practice. However, a mechanism for the progressive debt allocation should work. This would produce the effect of subtracting a greater share of wealth from the richer communities, as also it is stated in Art. 53, para. 2, of the Italian Constitution.

9. The rudimentary scheme we suggest is based on the following expression:

$$R_n = \frac{Y_{n-1}(1 + \dot{\Pi}) - iD_{n-1}}{p_{n-1}(i + \dot{p})} \quad [1]$$

The resources of which the taxpayers' community (that is the families, the employees, etc.) can dispose in the period  $n$  are the resources produced in the period, which amount to  $Y_n = Y_{n-1}(1 + \dot{\Pi})$ , from which must be deducted the interest paid on the debt formed in the  $n - 1$  previous periods, debt which for the period  $n$  produces interest equal to  $iD_{n-1}$ . The real value of the resources of which the families can thus dispose of is determined by applying to it, as shown in the expression [1], an appropriate price index.

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*Glossary of the Variables Used in the Analysis*

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$Y_i = Y_{i-1}(1 + \dot{\Pi})$  = the Gross Domestic Product (GDP) at time  $i$ .

$D_i = D_{i-1} - \Delta_i$  = the debt at time  $i$ .

$D_0 = kY_0$  = the debt at time 0.

$k = \frac{D_0}{Y_0}$  = the ratio between the debt and the GDP at time 0.

$i$  = the interest rate on the debt, which is considered given and reflecting the ratio between the interest payments and the amount of the debt.

$R_i = Y_i - iD_{i-1} - \Delta_i$  = disposable income at time  $i$ .

$\dot{R}_i$  = the rate of income change.

$\dot{\Pi}$  = the rate of GDP change.

$p_i$  = the prices level.

$\dot{p}$  = the rate of prices change.

$\Delta_i$  = the amount of the debt payback (the *Fiscal Compact* hypothesis).

$a$  = the target percentage of the debt at the end of the *Fiscal Compact* period.

$b$  = the percentage of the annual curtailment of the debt.

$\delta = k - a$ .

$\varepsilon$  = the allowable percentage of the debt on the GDP.

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A "glossary" of terms used in this paper is proposed above. Here we just want to argue that the value of  $\dot{\pi}$  is assumed to be constant and equal, in the calculation presented for each case, to the values measured at the national level and for the Mezzogiorno, in the year 2010/2011; this also applies to the rate of prices change  $\dot{p}$ . The interest rate  $i$  is the exogenous variable.



The value of it depends on “trust”. The implications of this dependency are developed below and will be examined in our Conclusions (§). In the algebraic calculation,  $i$  is assumed to be equal to the ratio, relative to 2011, between the amount of interests and the amount of debt (4,1%).

## 10. The assumption of zero debt

The current European standards are applied to both the current and the capital account of public budgets. The assumption of the zero deficit, or the zero debt, means that, at the consolidated level, the total amount of the expenses of public administrations is equal to the amount of revenues taken in as a whole. The possibility of sustaining new debt can only occur if the existing debt is amortized. Therefore, the hypothesis  $D = \bar{D}$  is applied. In this case, equation [1] is to be written as follows:

$$R_i = \frac{Y_0(1 + \dot{\Pi})^i - i\bar{D}}{p_0(1 + \dot{p})^i} \quad [2]$$

The object of this proposed exercise regards the change rate of the variables indicated in the expression [2], from the period 0 (2013) to period 2 (2014), applying the relationship

$$\dot{R}_2 = \frac{R_2 - R_1}{R_1} \quad [3]$$

Solving expression [1] on the basis of expressions [2] and [3], as shown in Appendix 1, we obtain, for the third year to which this analysis is referred to, the following

$$\dot{R}_i = \frac{Y_0(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + i\bar{D}}{(1 + \dot{p})[Y_0(1 + \dot{\Pi}) - i\bar{D}]} \quad [4]$$

Now let us hypothesized, as indicated in Section C of Appendix 1, that  $D = kY_0$ . Expression [4], in this case, becomes

$$\dot{R}_i = \frac{Y_0(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + ik\dot{p}Y_0}{(1 + \dot{p})[Y_0(1 + \dot{\Pi}) - ikY_0]} = \frac{(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + ik\dot{p}}{(1 + \dot{p})(1 + \dot{\Pi} - ik)} \quad [5]$$

The critical element is the difference  $\dot{\pi} - \dot{p}$ : if the growth rate of the GDP, at current values, exceeds the rate of increase in consumer prices, ex-

pression [5] shows values greater than 0, so that the family resources grow. The situation described still shows a positive aspect: the increase in prices reduces the burden of interest (and debt).

If we solve expression [5] for the values given in Appendix 1, we obtain  $\dot{R}_2^{ITA} = -0,97$ , for Italy as a whole.  
 $\dot{R}_2^{MEZ} = -1,47$ , for Southern Italy, excluding the islands (the mainland of Southern Italy).

Generally, we say here (this consideration applies to all the cases we have considered) that the condition of a particular disadvantage, in the national context, of Southern Italy comes from a smaller increase in the nominal GDP and from a larger increase in prices.

These values prefigure, in the hypothesis that the debt is zero (debt is equal to a constant), a prognosis of stagnation in the economy of our country, which is more severe for enterprises and households of Southern Italy compared to the rest of Italy. In fact, it should be considered that the hypothesis shown in the expression [2], compared to the current state of the public financial variables is demanding: this means that the current account deficit must be reset and the capital expenditures must be covered with revenues other than from the debt. On the other hand, a situation in which current revenues do not cover expenses, so that all public administrations borrow to cover the interest on the debt, is contrary to the European constraints and undermines the confidence of the markets.

## 11. The assumption of a constant debt-to-GDP ratio

Let us now consider the case in which the debt-to-GDP ratio is, or should be, constant over time. This hypothesis could be possible in the future, if it is assumed that the State debt, in the current situation, is analogous to that of households or local governments. *In the future*, the state should commit itself to paying interest and a suitable installment, previously determined, on the new debt.

If the debt-GDP ratio is constant, the debt value in period 2 is determined as follows:

$$\frac{D_2}{Y_2} = \frac{D_1}{Y_1} \Rightarrow D_2 = D_1 \frac{Y_2}{Y_1} \quad [6]$$

On the basis of assumptions similar to those considered so far, we obtain

$$D_2 = kY_0(1 + \dot{\Pi})^2 \quad [7]$$

so that the expression [3] becomes

$$\dot{R}_2 = \frac{\frac{Y_0(1 + \dot{\Pi})^2}{p_0(1 + \dot{p})^2} - \frac{ikY_0(1 + \dot{\Pi})}{p_0(1 + \dot{p})} - \frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}}{\frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}} \quad [8]$$

Solving it, we get<sup>4</sup>:

$$\dot{R} = \frac{\dot{\Pi} - \dot{p}}{(1 + \dot{p})} \quad [9]$$

If we solve the expression [9] for the values given in Appendix 1, we obtain:

$$\dot{R}_2^{ITA} = -1,05\%, \text{ for Italy as a whole.}$$

$$\dot{R}_2^{MEZ} = -1,54\%, \text{ for the continental Mezzogiorno.}$$

Expression [9], of course, does not depend on the parameters  $i, k, D$ . What only matters is the comparison between the change rate in GDP and the change rate in consumer prices.

In case 2, which we have proposed, the situation for Italy (and the Mezzogiorno) is already a declining situation: with the given resources we are forced to cover, even if we consider only the interest on the debt, charges whose amount is increasing *with respect to real income*. However, the question does not concern the debt, but the ability of the country to grow, which is in itself considered. Applying, in fact, the equations of our simple exercise to imaginary case of debt 0, we obtain:

$$\dot{R}_2 = \frac{\frac{Y_0(1 + \dot{\Pi})^2}{p_0(1 + \dot{p})^2} - \frac{Y_0(1 + \dot{\Pi})}{p_0(1 + \dot{p})}}{\frac{Y_0(1 + \dot{\Pi})}{p_0(1 + \dot{p})}} \quad [10]$$

Expression [10] leads, compared to expression [8], to the same result<sup>5</sup>.

<sup>4</sup> See Appendix 1, Section C, Hypothesis II.

<sup>5</sup> See again Appendix 1.

## 12. The hypothesis of setting a cap on the public indebtedness

If we consider the case in which the indebtedness allowed (the “deficit”) is, at the most, for a given percentage of GDP (which was established at 3%, as one of the criteria set by the Maastricht Treaty for the admission of a country in the European Monetary Union), the resources available in the first and second period will be identified, respectively, by the following equations:

$$R_1 = \frac{Y_0(1 + \dot{\Pi}) - iD_0}{p_0(1 + \dot{p})} \quad [11]$$

$$R_2 = \frac{Y_0(1 + \dot{\Pi})^2 - i[D_0 + \varepsilon Y_0(1 + \dot{\Pi})]}{p_0(1 + \dot{p})^2} \quad [12]$$

Starting from these expressions, we can once again obtain the change rate of resources, which is equal to

$$\dot{R}_2 = \frac{(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + ik\dot{p} - i\varepsilon(1 + \dot{\Pi})}{(1 + \dot{p})(1 + \dot{\Pi} - ik)} \quad [13]$$

If we solve this expression using the values given in Appendix 1, we obtain:

$$\dot{R}_2^{ITA} = -1,37\%, \text{ for Italy as a whole.}$$

$$\dot{R}_2^{MEZ} = -1,88\%, \text{ for the mainland of Southern Italy.}$$

Even in this third scenario, the prognosis is still a declining situation. The results obtained are more stringent than those shown in the first and in the second hypothesis.

It should be noted in this case, as well as in the one proposed in § 11, the increase in prices reduces, however, the weight of the outstanding debt. On the other hand, in this case, the allowable variation of the debt is proportional to the GDP (and not to its growth). It follows, however, an increase in interests, which is destined to produce a severe (or better, a more severe) contraction of resources.

## 13. The hypothesis of debt relief

The fourth hypothesis includes the establishment of a mandatory plane for the reduction of the debt which leads to its contraction, each year, ac-

counting for 5% of the differences between its amount and the amount corresponding to 60% of the GDP. Therefore, assuming that  $a$  is worth 0.6 and  $b$  0.05, the aforementioned hypothesis may be formalized by the following expression:

$$\Delta_n = D_{n-1} \left( \frac{D_{n-1}}{Y_{n-1}} - a \right) b = \frac{bD_{n-1}^2}{Y_{n-1}} - \frac{abD_{n-1}Y_{n-1}}{Y_{n-1}} \quad [14]$$

Starting from the expression [14] and given the assumptions considered so far, we can reckon the amount of resources available in the first and second period:

$$R_1 = \frac{Y_0(1 + \dot{\Pi}) - ikY_0 - bkY_0(k - a)}{p_0(1 + \dot{p})}; \quad [15]$$

$$R_2 = \frac{Y_0(1 + \dot{\Pi})^2 - iD_1 + i\Delta_1 - \Delta_2}{p_0(1 + \dot{p})^2} \quad [16]$$

A complicated algebraic system follows. It is proposed in Appendix 1. The solution obtained is as follows:

$$\dot{R}_2 = \frac{M(\dot{\Pi} - \dot{p})}{E} + \frac{N(i)}{E} + \frac{Q(b)}{E} \quad [17]$$

In the numerator, the three functions  $M$ ,  $N$  and  $Q$  show the three components that the considered phenomenon will have:  $M$  depends, as we have so far noted for all the cases mentioned, the difference between nominal GDP growth rate and growth rate of prices;  $N$  depends on the interest rate and still has, as in the third case, a negative sign;  $Q$  depends on the allowable percentage of debt reduction (5% of the difference between its previous level and the desired level – 60% –) which has been imposed. Significantly the sign  $Q$  is positive: the reduction plane, *by itself*, does not reduce the rate of resource development. In this case, what happens is already provided by a *caveat* pharmacological specially modified: *quos non occidit, servat* (“what doesn’t kill you, saves you”).

Note that the denominator of the expression [17], namely the value  $E^6$ , depends negatively on  $b$ : the constraint increases the level of the bet, thereby making heavier the impact on the resources of a negative change rate in the real GDP ( $\dot{\Pi} - \dot{p}$ ).

<sup>6</sup> For the meaning of the E, see again Appendix 1.

This leads to the following values:

$$\begin{aligned}\dot{R}_{ITA} &= -1,13\%, \text{ for the country as a whole.} \\ \dot{R}_{MEZ} &= -1,69\%, \text{ for the mainland of Southern Italy.}\end{aligned}$$

The prognosis is still a decline in Italy (and the Mezzogiorno) and this time, compared to other cases, even more severe. The issue, which we hope someone will highlight over the long term, and to which we hope someone can give an answer, is a breaking point, which refers to the general considerations of § 6.

## 14. Conclusions

Let us consider, in first place, two simple facts, which we indicate below by the letters A and B.

A. The 2013 is not an *annus horribilis* (“a horrible year”), but not even is an *annus mirabilis* (“a marvelous year”). This is also true in the best of hypotheses. Moreover, if we assume the absence of the debt <sup>7</sup>, the effective increase in resources, calculated in a similar way to the one adopted in the simple exercise, is equal to  $\bar{\Pi} - \dot{p}$ . This means that, if we use as a base the data of 2010 and 2011, there could be a reduction of real resources of 1.03% for Italy and of 1.53% for the Mezzogiorno. *In any case*, therefore, we would have a problem.

B. In 2011 there is a gap between total current revenues and current expenditures of public administrations involving a “deficit” of the current account of 25 billion, which is added to the “deficit” of the capital account. The fact that the current “deficit” is also produced by the interest on the debt (so that there is a so-called “Primary Surplus”), amounting to 78 billion, could be considered not significant by the creditors. In the near future, therefore, nothing else but the deficit will matter.

The observation sub B brings back the question of the “analogies” (comp. § 2): it is clear today that a State which has given up its monetary sovereignty is actually similar, with regard to the debt, to a local government, or a household. Both are forced to cover, by their current revenue, a

<sup>7</sup> If the debt was equal to zero, the following values for  $R_i$ ,  $R_{i-1}$ ,  $\dot{R}$  would result:

$$R_i = \frac{Y_0(1+\pi)^i}{p_0(1+p)^i}; R_{i-1} = \frac{Y_0(1+\pi)^{i-1}}{p_0(1+p)^{i-1}}; \dot{R} = \frac{\pi-p}{[1+p]}$$

certain portion of the debt, including interest. If this does not happen, they will be exposed (or better, they will be more vulnerable) to the “trust crisis” until the debt is extinguished.

This situation actually involves, as we have tried to show in Appendix 2, a radical difference in the emphasis from the concepts of financial theory concerning the cost of the public debt: the problem is not to measure the burden, for the current generation and the future one, making different choices in order to finance the expenditure, but to establish the conditions for our economic survival.

Now it is necessary, in a disastrous situation (as it is defined in § 6), to find a new equilibrium. The cost of this process rises in terms of the debt sustainability, as specifically defined and adopted in this paper: the debt is paid by a severe fall in the rate of increase in the resources available to the “community of taxpayers”. This means reduced consumption, saving and investment, which risks to worsen in the long run and which is more serious for the people of the Mezzogiorno. Renouncing to austerity, or showing it, on the other hand, risks producing a serious “trust crisis”: the interest rate, and above all the interest rate for new initiatives (by households and enterprises) can grow as a result to unsustainable levels. Under these conditions, it is necessary to be highly selective, using scarce resources objectively: an appropriate tax reform and an efficient government spending capacity would be useful to reach this goal. Without it, the private sector is forced to use pro-cyclical measures, which now already contribute to aggravating the crisis.

## **Appendix 1. Actual Values Observed and Hypotheses Formulated in the Analysis**

### *A. Actual Values Observed for 2011*

$$k = 1,201$$

$$a = 0,6$$

$$\delta = k - a = 0,601$$

$$b = 0,05$$

$$i = 0,041$$

$$\varepsilon = 0,03$$

$$\dot{I}_{ITA} = +1,7\% = 0,0174$$

$$\dot{I}_{MEZ} = +1,3\% = 0,0130$$

$$\dot{p}_{ITA} = +2,8\% = 0,0280$$

$$\dot{p}_{MEZ} = +2,9\% = 0,0288$$

**B. Hypotheses Formulated in the Analysis**

**B.1. First Hypothesis:  $D = \bar{D}$ .**

$$R_1 = \frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})} \quad [1]$$

$$R_2 = \frac{Y_0(1 + \dot{\Pi})^2 - ikY_0}{p_0(1 + \dot{p})^2} \quad [2]$$

$$\begin{aligned} \dot{R}_2 &= \frac{\frac{Y_0(1 + \dot{\Pi})^2 - ikY_0}{p_0(1 + \dot{p})^2} - \frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}}{\frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}} = \\ &= \frac{Y_0[(1 + \dot{\Pi})^2 - ikY_0 - Y_0(1 + \dot{\Pi})(1 + \dot{p}) + ikY_0(1 + \dot{p})]}{p_0(1 + \dot{p})^2} \cdot \frac{p_0(1 + \dot{p})}{Y_0(1 + \dot{\Pi}) - ikY_0} = \\ &= \frac{(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + ik\dot{p}}{(1 + \dot{p})(1 + \dot{\Pi} - ik)} \quad [3] \end{aligned}$$

Using the data collected in 2011, we can calculate – with reference to a given year  $n$ , for example 2013 – the aforesaid change rate of the resources in the two areas examined:

$$\dot{R}_2^{ITA} = -0,97, \text{ for Italy as a whole.}$$

$$\dot{R}_2^{MEZ} = -1,47, \text{ for Southern Italy, excluding the islands (the mainland of Southern Italy).}$$

**B.2. Second Hypothesis:  $\frac{D_n}{Y_n} = \bar{k} \Rightarrow D_n = kY_n \Rightarrow \Delta D_n = k\Delta Y_n$ .**

In this case, the change rate of income is equal to

$$\dot{R}_2 = \frac{\frac{Y_0(1 + \dot{\Pi})^2 - ikY_0(1 + \dot{\Pi}) - Y_0(1 + \dot{\Pi})(1 + \dot{p}) + ikY_0(1 + \dot{p})}{p_0(1 + \dot{p})^2}}{\frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}}$$

Solving this expression, we get

$$= \frac{Y_0(1 + \dot{\Pi})(1 + \dot{\Pi} - 1 - \dot{p}) - ikY_0(1 + \dot{\Pi} - 1 - \dot{p})}{p_0(1 + \dot{p})^2} \cdot \frac{p_0(1 + \dot{p})}{Y_0(1 + \dot{\Pi}) - ikY_0} =$$



$$\begin{aligned}
&= \frac{(1+\dot{\Pi})(\dot{\Pi}-\dot{p})-ik(\dot{\Pi}-\dot{p})}{(1+\dot{p})(1+\dot{\Pi}-ik)} = \\
&= \frac{(\dot{\Pi}-\dot{p})(1+\dot{\Pi}-ik)}{(1+\dot{p})(1+\dot{\Pi}-ik)} = \\
&= \frac{\dot{\Pi}-\dot{p}}{1+\dot{p}} \quad [4]
\end{aligned}$$

If we solve the expression obtained for the values recorded in 2011, we obtain:  
 $\dot{R}_2^{ITA} = -1,05\%$ , with reference to Italy as a whole.  
 $\dot{R}_2^{MEZ} = -1,54\%$ , with reference to the mainland of Southern Italy.  
Expression [10], which refers to the imaginary case of debt 0, leads, compared to the expression [8], to the same result:

$$\begin{aligned}
\dot{R}_2 &= \frac{\frac{Y_0(1+\dot{\Pi})^2 - Y_0(1+\dot{\Pi})(1+\dot{p})}{p_0(1+\dot{p})^2}}{\frac{Y_0(1+\dot{\Pi})}{p_0(1+\dot{p})}} = \\
&= \frac{Y_0(1+\dot{\Pi})(1+\dot{\Pi}-1-\dot{p})}{p_0(1+\dot{p})^2} \cdot \frac{p_0(1+\dot{p})}{Y_0(1+\dot{\Pi})} = \\
&= \frac{\dot{\Pi}-\dot{p}}{1+\dot{p}} \quad [5]
\end{aligned}$$

### **B.3. Third Hypothesis: $D_i = D_{i-1} + \varepsilon Y_{i-1}$ .**

The hypothesis formulated in the paper can be proposed in the following form:

$$\text{Debito} \equiv D_i = D_{i-1} + \varepsilon Y_{i-1}$$

Starting from this expression and following the regulations of the Stability and Growth Pact, we can obtain the following expressions, from which we get a clear indication of the resources available in the first and in the second period:

$$R_1 = \frac{Y_0(1+\dot{\Pi}) - iD_0}{p_0(1+\dot{p})} \quad [6]$$

$$R_2 = \frac{Y_0(1+\dot{\Pi})^2 - i[D_0 + \varepsilon Y_0(1+\dot{\Pi})]}{p_0(1+\dot{p})^2} \quad [7]$$

Assuming that  $D_0 = kY_0$ , we get:

$$R_1 = \frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})} = \frac{Y_0(1 + \dot{\Pi} - ik)}{p_0(1 + \dot{p})} \quad [8]$$

$$R_2 = \frac{Y_0(1 + \dot{\Pi})^2 - ikY_0 + i\varepsilon Y_0(1 + \dot{\Pi})}{p_0(1 + \dot{p})^2} \quad [9]$$

Starting from these expressions, we can once again get the change rate of income, which is equal to

$$\begin{aligned} \dot{R}_2 &= \frac{\frac{Y_0(1 + \dot{\Pi})^2 - i[kY_0 - \varepsilon Y_0(1 + \dot{\Pi})]}{p_0(1 + \dot{p})^2} - \frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}}{\frac{Y_0(1 + \dot{\Pi}) - ikY_0}{p_0(1 + \dot{p})}} = \\ &= \frac{Y_0(1 + \dot{\Pi})^2 - Y_0(1 + \dot{\Pi})(1 + \dot{p}) - ikY_0 + ikY_0(1 + \dot{p}) - i\varepsilon Y_0(1 + \dot{\Pi})}{p_0(1 + \dot{p})^2} \cdot \frac{p_0(1 + \dot{p})}{Y_0(1 + \dot{\Pi}) - ikY_0} = \\ &= \frac{(1 + \dot{\Pi})(\dot{\Pi} - \dot{p}) + ik\dot{p} - i\varepsilon(1 + \dot{\Pi})}{(1 + \dot{p})(1 + \dot{\Pi} - ik)} \quad [10] \end{aligned}$$

If we solve the expression obtained for the values recorded in 2011, we obtain:

$$\dot{R}_2^{ITA} = -1,37\%, \text{ with reference to Italy as a whole.}$$

$$\dot{R}_2^{MEZ} = -1,88\%, \text{ with reference to the mainland of Southern Italy.}$$

**B.4. Fourth Hypothesis:**  $\Delta_n = D_{n-1} \left( \frac{D_{n-1}}{Y_{n-1}} - a \right) b = \frac{bD_{n-1}^2}{Y_{n-1}} - \frac{abD_{n-1}Y_{n-1}}{Y_{n-1}}$ .

Starting from the expression aforementioned and following the regulations of the *Fiscal Compact*, as indicated in the glossary, we obtain

$$\Delta_1 = D_0 \left( \frac{D_0}{Y_0} - a \right) b.$$

Assuming that  $Y_0 = \bar{Y}_0$ ,  $D_0 = 1,2Y_0$  and  $a = 0$ , we obtain the following formulation:

$$\Delta_1 = 1,2Y_0 \left( \frac{1,2Y_0}{Y_0} - a \right) b = 1,2Y_0(1,2 - 0,6)b = 0,72bY_0 \quad [11]$$

Considering also that  $D_i = D_{i-1} - \Delta_i$  and that  $D_1 = D_0 - \Delta_1 = 1,2Y_0 -$

$0,72bY_0 = Y_0(1,2 - 0,72b)$ , we can calculate the amount of the debt to be repaid in the second year:

$$\begin{aligned}\Delta_2 &= D_1 \left( \frac{D_1}{Y_1} - 0,6 \right) b = bY_0(1,2 - 0,72b) \left[ \frac{(1,2 - 0,72b)Y_0}{Y_0(1 + \dot{\Pi})} - 0,6 \right] = \\ &= \frac{bY_0(1,2 - 0,72b)}{(1 + \dot{\Pi})} [1,2 - 0,72b - 0,6(1 + \dot{\Pi})] \quad [12]\end{aligned}$$

Using the results obtained, it is possible to quantify the resources available in the first and in the second period:

$$R_1 = \frac{Y_0(1 + \dot{\Pi}) - 1,2iY_0 - 0,72bY_0}{p_0(1 + \dot{p})} \quad [13]$$

$$\begin{aligned}R_2 &= \frac{Y_2 - iD_1 - \Delta_2}{p_0(1 + \dot{p})^2} = \frac{Y_0(1 + \dot{\Pi}) - iD_1 - \Delta_2}{p_0(1 + \dot{p})^2} = \\ &= \frac{Y_0(1 + \dot{\Pi})^3 - iY_0(1,2 - 0,72b) - bY_0((1,2 - 0,72b)^2 - (1,2 - 0,72b)0,6(1 + \dot{\Pi}))}{(1 + \dot{\Pi})(1 + \dot{p})^2 p_0} \quad [14]\end{aligned}$$

At this point, in order to simplify the calculation of the change rate of the income, we establish that

$$\frac{Y_0(1 + \dot{\Pi})^3 - iY_0(1,2 - 0,72b) - bY_0((1,2 - 0,72b)^2 - (1,2 - 0,72b)0,6(1 + \dot{\Pi}))}{Y_0} = A$$

Consequently

$$\begin{aligned}\dot{R}_2 &= \frac{\frac{Y_0 A}{(1 + \dot{\Pi})(1 + \dot{p})^2 p_0} - \frac{Y_0(1 + \dot{\Pi}) - 1,2iY_0 - 0,72bY_0}{p_0(1 + \dot{p})}}{\frac{Y_0(1 + \dot{\Pi}) - 1,2iY_0 - 0,72bY_0}{p_0(1 + \dot{p})}} = \\ &= \frac{Y_0 A - Y_0(1 + \dot{\Pi})^2(1 + \dot{p}) + 1,2iY_0(1 + \dot{p})(1 + \dot{\Pi}) + 0,72bY_0(1 + \dot{p})(1 + \dot{\Pi})}{(1 + \dot{\Pi})(1 + \dot{p})^2 p_0} \cdot \frac{p_0(1 + \dot{p})}{Y_0[(1 + \dot{\Pi}) - 1,2i - 0,72b]} = \\ &= \frac{A - (1 + \dot{\Pi})^2(1 + \dot{p}) + 1,2i(1 + \dot{p})(1 + \dot{\Pi}) + 0,72b(1 + \dot{p})(1 + \dot{\Pi})}{(1 + \dot{\Pi})(1 + \dot{p})(1 + \dot{\Pi} - 1,2i - 0,72b)} \quad [15]\end{aligned}$$

Decomposing this math expression, we can identify the principal relationships on which is based the complicated algebraic system underlying it:

$$\dot{R}_2 = M(\dot{\Pi}) + N(i) + Q(b) \quad [16]$$

Where

$$M = \frac{(1 + \dot{\Pi})^2(1 + \dot{p})}{(1 + \dot{\Pi})(1 + \dot{p})(1 + \dot{\Pi} - 1,2i - 0,72b)} \quad [17]$$

$$N = \frac{1,2i[\dot{p}(1 + \dot{\Pi}) + 1,6b](1 + \dot{\Pi})}{(1 + \dot{\Pi})(1 + \dot{p})(1 + \dot{\Pi} - 1,2i - 0,72b)} \quad [18]$$

$$Q = \frac{-b[(1,2 - 0,72b)^2 - 0,6(1 + \dot{\Pi})(2,4 - 0,72b + 1,2\dot{p})]}{(1 + \dot{\Pi})(1 + \dot{p})(1 + \dot{\Pi} - 1,2i - 0,72b)} \quad [19]$$

Solving [16] for the values observed in 2011, we can obtain the change rate of income for the two areas considered:

$$\dot{R}_{ITA} = -1,13\%, \text{ for the country as a whole;}$$

$$\dot{R}_{MEZ} = -1,69\%, \text{ for the Mezzogiorno.}$$

## Appendix 2. The Notion of Public Debt Sustainability in the Economic Literature

### 1. The Origins

On the concepts of the burden of the public debt and its financial sustainability economic literature has not reached a definite and clear definition. Significant contributions to the analysis of the problem of debt growth and its effects on the economy date back to classical authors such as Hume, Smith and Ricardo. This last economist, in particular, identified three possible meanings for the term “burden of the debt”, using it to indicate:

- the real transfer of resources by the subscribers of government borrowings, according to the “macroeconomic” definition proposed in the *Principles of Political Economy and Taxation* (1817);
- the sacrifice of utility of the taxpayer required to pay the taxes which the government is forced to introduce or increase in order to find financial coverage for the interest due to the subscribers of government bonds and to repay, on the expiry of the debt, the borrowed funds, according to the “microeconomic” perspective illustrated by the famous British economist in the *Essay on the Funding System* (1820);
- the slowing down of the capital accumulation process, according to a further explanation of the debt effects provided once again by Ricardo in the *Funding System*.

This last meaning of the concept was proposed already by Smith in that part (i.e. in the book V) of *The Wealth of Nations* (1776) in which it is shown that the public debt is basically a share of the annual product of a nation which is “diverted away”, “reversed out” from the maintenance of productive workers, to be used for other purposes or to be spent and wasted in a short time, without even the hope of a future regeneration. Ricardo, however, has the merit of being the first who dealt with the issue of *the limits of government debt and its sustainability*. This scholar had in fact understood that the debt growth can lead to the phenomena of instability<sup>8</sup>, phenomena that are activated when individuals are no longer willing “submit to pay for the privilege merely of living in their native country” and “the temptation to remove himself and his capital to another country, where he will be exempted from such burthens, becomes at last irresistible”<sup>9</sup>.

## 2. The Five Pillars of Sustainability

However, the limits of the debt sustainability, beyond which the subjective reactions of the operators are triggered, are not predictable. For this reason, the economists have attempted to identify the “objective” conditions which produce these reactions and, referring to some concepts of physics (more specifically, concepts of mechanics and thermodynamics) and biology, have developed a more complex notion of financial sustainability or “objective” of the public debt, which rested – at least initially – on the following five pillars:

- 1) *time*, because the nature of the abovementioned notion is *dynamic*, being connected to the evolution over time of a particular parameter, or a value derived directly from parameters, which have the function of *indicator*;
- 2) *objective limits*, beyond which the subjective reactions are triggered, caused by an alteration of the climate of *trust* of economic agents, when the *credibility* of the governments in office decreases, in relation to the commitments made through the issuance of government securities, and the *credibility* of the economic policy authorities (the so-called *policy-makers*), with regard to the implementation of stabilisation or debt reduction policies;
- 3) the assumption that the capital absorbed by the loans has been *subtracted from the funds used for the production or intended to be used for that purpose*;
- 4) the comparison between the interests of the *current generations* and those of the *future*, in the case of the financing of the debt, who will be called to sustain the burden of the interest and the reimbursement, in order to allow the present generation to benefit from the expenses financed by it;
- 5) the existence of a form of social organization (a *market economy* or at least a form of *market democracy* in which there is a strong complementarity between the political and economic system), in which *the governments and the public*

<sup>8</sup> See, for example, Ricardo (1821), chap. XVII, para. 6: “A country which has accumulated a large debt, is placed in a most artificial situation”.

<sup>9</sup> Ricardo (1821), chap. XVII, para. 7.

*institutions are usually subject to the judgment of the markets*; it is obvious, in fact, that these will be willing to lend their resources only to those subjects who they consider “solvents”, i.e. endowed with the ability to use the abovementioned resources to produce other wealth, on which indirectly depends the probability of obtaining, in the future, the repayment of the amount lent.

In the light of these assumptions, we can derive a first rough definition of the debt financial sustainability. It can be intended as the ability of a given economic system to keep over time, and therefore sustaining, a certain level of the debt, draining resources from the private sector and future generations and without losing the ability to produce wealth in periods subsequent to that in which these resources are spent and do not affect employment or wages of the working classes. As can be noted, the notion of sustainability that comes from this definition is very complex and is not directly measurable, because it can not be regarded as an economic phenomenon in itself, but can be considered, at least, as an *ideal point*, as a “*safety*” area or as a *critical threshold* which should not be exceeded. On the contrary, situations of instability first of all financial and then also monetary, would be created and from which may arise, subsequently, even more harmful consequences. For this reason, economists have tried and are still trying to identify some *indicators* which can tell us whether that *threshold* has been *surpassed* or not, or how much more we still have to go in order to reach it and, therefore, *reduce the unsustainability*. According to Mill, “a certain and an obvious index” exists and could be represented by the interest rate: an increase in this parameter above the level at which it was before the assumption of debt is the “positive proof that the government is a competitor for capital with the ordinary channels of productive investment, and is carrying off, not merely funds which would not, but funds which would, have found productive employment within the country”<sup>10</sup>.

Starting from these studies, literature has offered and continues to offer new methods and indicators to define and measure the public debt financial sustainability. These methods and indicators differ both for the time horizon considered and for the choice of the selected variables.

### **3. The Two Main Approaches to the Study of Sustainability**

In general, it is correct to say that the study of sustainability has followed two main approaches.

The first approach is called “traditional dynamic approach”<sup>11</sup> and traces its origins back to a famous study by Domar (1944) on the factors which determine the growth of the public debt burden, defined as an increase in the tax rates which is necessary to establish in the long run the financing of the so-called “debt service”, i.e. the expenditure for the interest to be paid to the government bonds holders. According to this approach, the public debt can be considered sustainable only if its

<sup>10</sup> Mill (1848), book V, chap. VII, para. 4.

<sup>11</sup> See Bagnai (1996).

consistency, *related to the Gross Domestic Product (GDP)*, tends to decrease over time, or at least not to exceed *a certain threshold*, the one which indicates when the interest rate on government bonds exceeds the economic growth rate. Domar analysis has, therefore, shifted the focus of scholars towards a new indicator, not longer represented by the absolute value of the debt (see Ricardo, 1817) or by the interest rate (see Mill, 1848), but by the debt/product ratio. According to this approach, the problem of the financial sustainability of the public debt is represented *in dynamic terms* (the dynamics of the debt/GDP ratio is studied) and is identified with the *asymptotic stability* of the aforementioned ratio around a finite and constant value (the so-called *steady state* or *constant steady state*). We arrive, therefore, at a very encouraging conclusion: even assuming that we have a public budget continuously in deficit (a constant deficit with respect to GDP), it is possible to prevent that the debt/product ratio and the one between interest paid and GDP explodes, but this is possible only if the growth rate of the national economy is positive.

Two model classes are derived from this traditional dynamic approach and they are distinguished by the hypothesis regarding the impact of government spending (funded in deficit) on the real variables:

- 1) the models, in which the rates of interest and growth in real terms are independent from the method of financing the government deficit and, therefore, from the path of the debt, are usually defined as the *dynamic linear models with constant coefficients* (these latter, in fact, use systems of linear differential equations with constant coefficients) and are based on the Ricardian assumption of *absence of the physical capital crowding out*<sup>12</sup>;
- 2) the models, in which the method of financing the government deficit affect the performance of the real variables, are based on the assumption of *the private investments crowding out* (they are defined *linear dynamic models with crowding out*) and differ from each other for their transmission mechanisms of fiscal policy, that is, for the accepted interpretations of the nature of the effects of public expenditure financed in *deficit (deficit spending)*<sup>13</sup>.

A part of the economic literature, however, strongly criticised the traditional dynamic approach, arguing that in approach based on the asymptotic stability of the debt/GDP ratio would not allow the formulating of a single objective criterion to test the financial sustainability of the public debt, since the used stability conditions depend on the assumptions and on the structure of the theoretical base-model<sup>14</sup>. It was found, in particular, that:

- 1) the traditional analyses of stability (in particular, those which are based on dynamic linear models with constant coefficients) do not lead to the identification of *a certain critical threshold* beyond which the so-called “spiral of debt” is

<sup>12</sup> With regard to this type of models, see Masera (1985, 1986), Rossi and Salvemini (1987), Spaventa (1984, 1985, 1987, 1988).

<sup>13</sup> Among the most popular models included in this category there are the Keynesian dynamic model of Tobin and Buiter (1976) and the neoclassical with overlapping generations of Diamond (1965).

<sup>14</sup> See Bagnai (1996), pp. 43-44.

triggered, resulting in a crisis of credibility, debt repudiation and forms of financial repression<sup>15</sup>;

- 2) the use of the debt/product ratio as an indicator of difficulties in the issuance of the government securities is not correct; this is allowed only when *the ratio between (the aggregate demand of) wealth and the GDP* stays constant over time and, therefore, when the economic system is set in a situation of balanced economic growth. When we're outside of the equilibrium path, this ratio varies and, therefore, no longer makes sense to refer to the debt/GDP ratio. This last indicator could also lead to erroneous conclusions, if it is true that very often it tends to move even in a "perverse" way with respect to the phenomenon which it should signal<sup>16</sup>;
- 3) economic literature has never been able to identify an absolute level of debt/GDP ratio which is considered definitely negative to the economic growth and the redistribution<sup>17</sup>; it was deemed, therefore, that the dynamic conditions of the debt financial sustainability can only be identified in relation to a predetermined value, more or less arbitrarily, of the debt/product ratio<sup>18</sup>.

For these reasons, in recent times a new approach which identifies the debt sustainability with observance of *the intertemporal budget constraint of the government* has been gradually diffused. This approach requires that the average present value (APV) of the flow of all future payments of government (excluding the interest payments) does not exceed that of the flow of its future receipts (including the seigniorage). This condition (which is called *the Solvency or Transversality Condition*) is considered less stringent than the Asymptotic Stability Condition of the debt/GDP ratio, which is the base of the traditional dynamic approach<sup>19</sup> and is always met if the interest rate on the debt is lower than the growth rate of the economy. This helps to prevent that the government does a Ponzi type of financing operations (*n.-Ponzi Game Condition*, commonly indicated by the NPG acronym<sup>20</sup>), which would make the public debt formally analogous to a *speculative bubble*<sup>21</sup>.

The approach based on the intertemporal budget constraint led to two diametrically opposed definitions of the sustainability depending on whether one is willing

<sup>15</sup> See, in this regard, Jappelli (1988), Blanchard, Chouraqui *et al.* (1990), and also Buiter, Corsetti *et al.* (1993).

<sup>16</sup> For analogous affirmations, see Casarosa (1988).

<sup>17</sup> There are different opinions regarding this. However, the most recent economic literature has shown how the values of the debt/GDP ratio higher than 85% would produce a negative effect on the growth. See, for example, Cecchetti, Mohanty and Zampolli (2011).

<sup>18</sup> So Blanchard, Chouraqui *et al.* (1990) and, principally, Pasinetti (1998).

<sup>19</sup> In fact, it does not necessarily require that the debt assumes finite values in relation to GDP. For analogous affirmations, see Cividini, Gauls and Masera (1987) and Marano (1996).

<sup>20</sup> In the literature on the financial instability, the behavior of the insolvent debtor who subscribes to new loans to pay the interest on those already contracted is called "Ponzi finance". For further information regarding this, see Minsky (1982), O'Connell and Zeldes (1988), and also Buiter and Kletzer (1994, 1998).

<sup>21</sup> See, regarding this, O'Connell and Zeldes (1988).



to assume that *the economy is efficient in a dynamic sense* (Wilcox's definition)<sup>22</sup> or one considers irrelevant the issue whether it is efficient or not, imagining that the economy constantly follows *intertemporal equilibrium paths*<sup>23</sup> and, therefore, that the NPG can be violated when this does not compromise the general economic equilibrium (Hamilton and Flavin's definition)<sup>24</sup>.

#### 4. Sustainability Tests and Indicators

As a result from the two definitions previously mentioned (see § 3) new tools for empirical verification of the financial sustainability of the public debt, i.e. the tests and the indicators, were born.

The first ones are, basically, *backward-looking tools*<sup>25</sup>, used in order to determine whether the fiscal policy variables, considered individually, more or less meet certain statistical conditions (stationary and/or cointegration conditions) which ensure the sustainability. These tests, in particular, are commonly used to verify that the time series of the observed variables are stationary<sup>26</sup> or to measure their integration degree<sup>27</sup>.

Instead, the sustainability indicators are *looking-forward tools*. They use, in fact, current information to verify whether the current values of the economic variables analyzed are aligned with the future path of the debt. For this reason, they are now considered as the most appropriate tool to calculate the extent of the fiscal adjustment to be implemented in order to restore the sustainability conditions<sup>28</sup>. The

<sup>22</sup> It is assumed that the economy is on a *path of dynamically efficient steady state* and, therefore, that the NPG is functioning. In this case, a fiscal policy will be sustainable only if the paths of the debt generated by it meet the abovementioned condition. See Wilcox (1989).

<sup>23</sup> Within efficient economies the solvency condition is assumed to be respected. Therefore, any deviation from the paths meeting it this condition necessarily transient. See Wilcox (1989), p. 294.

<sup>24</sup> In this case, one can say that the default is compatible with the equilibrium and, therefore, that NPG is not functioning. It follows that not all fiscal policies are sustainable. Paradoxically, the public debt will certainly be sustainable if its observed path does not meet the solvency condition, while it may not be sustainable even though it meets this condition. See, regarding this, Hamilton and Flavin (1986).

<sup>25</sup> The tools abovementioned, in fact, are useful in checking whether or not the survey data used correspond or not to the theoretical values, which in the past would have indicated the debt sustainability conditions.

<sup>26</sup> See Hamilton and Flavin (1986) and Wilcox (1989). Similar tests were conducted regarding the Italian economy by Corsetti (1991) and by Baglioni and Cherubini (1993).

<sup>27</sup> See Trehan and Walsh (1988), Smith and Zin (1991), Hakkio and Rush (1991). In Italy this type of test was used by De Luzenberger *et al.* (1992) and by Baglioni and Cherubini (1993).

<sup>28</sup> Estimates of the sustainability indicators for the Italian economy are provided by Blanchard *et al.* (1990), De Luzenberger *et al.* (1992) and Buitier WH *et al.* (1993). In Formenti (2008) it has been proposed, however, an empirical test of the sustainability of the Italian fiscal policy using both instruments, namely both the indicators and the tests. In order

most recent studies are intended, however, to identify a more structured and organic analytical approach, in order to better take into account the interdependencies between financial variables which influence the debt dynamics (for example, the possible feedback effects among the fiscal policies, the macroeconomic activity and the financial sector)<sup>29</sup>, the short-term liquidity risks, the country specific risks and finally the additional risks arising from contingent liabilities (such as those related to government guarantees or financial support to the banking sector) and/or from the implicit ones (such as pensions and other public expenditure items related to demographic trends<sup>30,31</sup> and also from other off-balance sheet obligations of the governments<sup>32</sup>.

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to resolve the conflicting results between the two methods the approach proposed by De Lutzenberger and Marini (1992), which is based on the application of the Chow test to the time series of the primary budget, was adopted.

<sup>29</sup> While the traditional indicators do not take into account the interactions among the main determinants (GDP growth, interest rates and primary balances) of the debt dynamics, the empirical evidence have shown how much they may be relevant. For example, some studies have shown that primary balances are sensitive to changes in the debt/GDP ratio, at least above a certain threshold of the debt. See, for example, Bohn (1998). Additional empirical studies, however, have shown that governments tend to increase the tax burden on labor in response to rising public debt and even more in response to increase in interest payments. For further details regarding this, see, Holm-Hadulla *et al.* (2011).

<sup>30</sup> This type of factors are included, for example, in the calculation of the indicators of public finances sustainability currently used by the European Commission. See, regarding this, the European Commission (2006).

<sup>31</sup> For a classification of government liabilities depending on the degree of certainty (liabilities versus non-potential) and on whether they have a legal base (explicit liabilities versus the implicit ones), cf. Giammarioli *et al.* (2007).

<sup>32</sup> An obvious limitation of the analysis of public debt sustainability is that it usually focuses exclusively on explicit liabilities, ignoring the fact that the extent of the debt may be affected by both the contingent liabilities and the implicit ones, and also by other off-balance sheet obligations. See, regarding this, Lojsch Hartwig *et al.* (2011).

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## **Abstract**

### *Public Debt and Financial Sustainability of the Italian Public Finances*

The analysis presented in this paper deals with two main issues: the one of debt sustainability, meant in the particular acceptation proposed in this article, and the one of the effects of debt decumulation for the various territorial communities, in particular for the weak areas of Italy (Mezzogiorno).

The proposed analysis aims at showing some possible outcomes of the current economic crisis. Four hypotheses, concerning various kinds of constraints regulating the variation over time of the debt amount, are proposed: the zero (or constant) debt hypothesis, the invariance of GDP-debt ratio, the hypothesis of a ceiling on public debt and, lastly, the case of a programmed path of public debt reduction (the *Fiscal Compact*).

In the best case proposed (the zero debt hypothesis), the results prefigure a prognosis of stagnation, which is more serious for the enterprises and the families of the Mezzogiorno than for the rest of Italy.

*Keywords:* Sovereign Debt Sustainability, State and Local Budget and Expenditures, Interjurisdictional Differentials and Their Effects, State and Local Borrowing.

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