How to deal with the public debt

Ideas from Keynes, Lerner, Domar and Hicks

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Abstract

The paper proposes an alternative approach to the problem of public deficits and debts. This alternative approach is inspired by the Keynesian tradition of thought, in particular by the contributions of Keynes, Domar, Lerner and Hicks.

A fundamental feature of this Keynesian approach is that the public debt cannot be regarded and dealt with as if it were the same as the private debt. In particular, it is no true that the public debt must be necessarily extinguished.

For the mainstream, when the economy's growth rate is lower than the interest rate, the ratio of the public debt to GDP can be reduced or stabilised only if the government runs budget surpluses.

The paper shows that it is possible to stabilise the ratio of the public debt to GDP even though the government runs primary deficits. This result is obtained by choosing a composition of public spending associated with a growth rate larger than the interest rate on the public debt.

The analysis is essentially based on the idea that public expenditure can be disaggregated into two components: 'productive' expenditures', which positively and directly affect the economy's growth rate; 'unproductive' expenditures, which do not affect the growth rate directly.

1 Introduction

Mainstream economics is prisoner of a vision of the public debt from which it derives policies that, in the present situation, clearly appear incapable to provide a satisfactory solution to the problem, by ensuring a permanent stabilisation or reduction of the ratio of the public debt to GDP. This paper proposes an alternative approach to the public debt and public deficits, which is based on ideas and views first developed by the Keynesian tradition of thought, in particular by Keynes, Lerner, Domar and Hicks. By drawing on the contributions from these economists, we construct a simple analytical framework to show that the problem of the public debt can be dealt with and solved satisfactorily in ways different from those predicated by the mainstream.

Six years after the outbreak of the present crisis, many economies are experiencing very high ratios of the public debt to GDP. Attempts to put public finance under control and reduce the debt ratio have been largely unsuccessful. In particular, the policies of austerity implemented in Europe prove to be not only unable to reduce the debt ratio significantly, but they are producing perverse effects. As austerity has obvious contractionary effects on demand and output, the debt ratio tends to increase because its denominator declines while the tax revenue decreases and some public expenditures (e.g. unemployments benefits) increase.

The inefficiency of the policies implemented so far is primarily due to the wrong concept of public debt on which they are based. In our view, the fundamental flaw of the mainstream view of the public debt is the idea that it is essentially the same as private debt. From this this vision of state liabilities it obviously follows that attempts to reduce them must be based on the same rationale that applies to the debt of private agents.

There exists an alternative view of state liabilities. This alternative approach derives from the Keynesian tradition of thought, which criticises the very notion of public debt and offers a different view of the role of public finance in modern market economies. The fundamental features of the Keynesian approach to the public debt and public finance are the following.

1. The public debt cannot be regarded as the same as private liabilities. The very notion of 'public' debt is dubious and misleading.

2. Hence, the public debt need not be extinguished at a certain future date.

3. To ensure satisfactory levels of output and employment it can be necessary for the economy to experience public deficits permanently.

4. The analysis of the dynamics of the ratio of the public debt to GDP must be carried out by taking the GDP and its growth as functions of the public budget and the debt itself, not as independent variables as the mainstream does.

5. Public expenditures can be divided into two different classes: expenditures that have a positive direct impact on the economy's growth rate ('productive expendi-

tures') and expenditures that do not have such an impact ('unproductive expenditures').

This theoretical and analytical framework allows us to construct a simple model showing that it is possible for the state to run permanent budget deficits without experiencing an indefinite growth of the ratio of the public debt to GDP. This result can be achieved thanks to changes in the composition of the public expenditure which favour productive expenditures. In this way the economy's growth rate can be increased and made larger than the interest rate, so that the debt ratio can be stabilised. The stabilisation of the debt ratio is important. It is an indicator of the effectiveness of the policies implemented and reduces the risk of speculative attacks on the stock of public liabilities, which can trigger a debt crisis.

The paper is organised as follows. Section 2 briefly outlines the mainstream approach to the problem of the public debt. Section 3 presents the Keynesian view of the nature of the public debt. Section 4 is concerned with the problem of budget deficits by concentrating on Keynes's and Lerner's positions. Section 5 deals with the problem of the quality and effects of public spending on growth by looking at Domar's contributions. Finally, sections 6 and 7 present a Keynesian model for the analysis of the dynamics of the public debt ratio and, in particular, the conditions for its stabilisation. Section 8 concludes.

2 The mainstream view of the public debt

The so-called dynamic budget constraint is commonly used to deal with the problem of the reduction or stabilisation of the ratio of the public debt to GDP. The rate of change of the ratio of the public debt to GDP is

$$\dot{b} = (\gamma - \tau) + (r - g)b - mg_M \tag{1}$$

with $b = \frac{B}{py}, \gamma = \frac{G}{py}, \tau = \frac{T}{py}$. r is the real interest rate on the debt, g is the economy's growth rate, $m = \frac{M}{py}$ is the ratio of high-powered money to the GDP and g_M is the growth rate of high-powered money.

The analysis is usually carried out by making the following hypotheses.

1. The possibility to finance budget deficits through the creation of high-powered money is ruled away.

2. The economy's growth rate is exogenously given and, in particular, is independent of public spending.

3. The real interest rate is higher than the economy's growth rate $(r > g)$.

Therefore (1) reduces to

$$\dot{b} = (\gamma - \tau) + (r - g)b \tag{2}$$
$$(r > g)$$

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The ratio of the public debt to the GDP, therefore, can be reduced ($\dot{b} < 0$) or stabilised ($\dot{b} = 0$) only by running a primary surplus, i.e. either by increasing the tax ratio and/or by reducing the expenditure ratio.

The cruciality for this conclusion of the three hypotheses above is evident. If budget deficits can be financed by issuing additional money, they obviously have no impact on the stock of public debt. On the other hand, if the economy's growth rate g is higher than the interest rate r, the ratio of the public debt to the GDP can be stabilised or reduced even if the government runs a primary deficit. More precisely, if the government runs a primary deficit of any size, the debt ratio converges to a constant level, equal to $\frac{(\gamma - \tau)}{(g - r)}$. If, instead, the government runs a primary surplus, the debt ratio b declines over time at a rate $(g - r)$ (Blanchard et al. 1990).

It is then necessary to try to explain the rationale behind the mainstream hypotheses. The possibility to finance public deficits by issuing high-powered money is excluded because financing deficits through the creation of additional money would generate inflation in the medium-long run (Carlin and Soskice 2006).

The assumption of non-monetization derives from the mainstream view of demand policies rather than from the notion of public debt. In a New Keynesian model, the increase in the supply of money generates inflation in so far as it determines an increase in aggregate demand and, hence, in employment. The rise in the level of employment, in turn, generates wage rises and, consequently, a price rise. However, if the economy is, at a certain time, below its natural equilibrium, both the increase in employment and in prices are acceptable, indeed inevitable.

If, instead, the economy is at its natural equilibrium, the issuing of additional money to finance the public deficit would push it beyond the state of constant inflation. However, if the economy is at its natural equilibrium, why should the government try to stimulate the demand by running a budget deficit? One answer can be that the government and the central bank with its accommodating monetary policy are erroneously trying to bring the economy to an unsustainable level of activity. This answer is based on the more general idea that demand policies cannot move the economy away from its natural equilibrium permanently.[1] But this answer has little to do with the problem of the public debt; in fact, if the economy is at its natural equilibrium, also an increase of the public deficit financed by borrowing would produce inflationary effects.

Mainstream economists justify the exclusion of the possibility to monetize the debt also on the grounds of empirical evidence:

1. In advanced economies the financing of deficits, and the associated problem of seignorage, is not a significant phenomenon. Deficits, in fact, are largely financed by borrowing from the private sector (Blanchard 2002).

2. Since in most countries central banks are independent of governments, it is not

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[1]Another possible answer could be that the public sector tends to expand its expenditures and debt without any serious concern for their economic impact and the general welfare but merely in order to benefit its bureaucratic apparatuses and/or their constituencies. This essentially amounts to hold that public spending is a mere waste of resources, with no positive economic impact.

possible to force the issuing authority to finance government deficits (Greiner and Fincke 2009).

Empirical evidence is invoked also for the hypotheses that the interest rate on the debt is higher than the growth rate, taken as exogenous and independent of public spending and taxation.[2] In this case, however, the theoretical justifications are more relevant. Such justifications ultimately derive from the mainstream view of the nature of the public debt.

For the mainstream, the problem of the public debt is essentially the same as the problem of the private debt. More precisely, the public debt is seen as equivalent to the debt of a household that borrows in order to finance its consumption.[3] If this notion of the public debt is accepted, it follows that the government, like any household, cannot keep on borrowing indefinitely. At some time in the future, the government must repay its debt. This view of the public debt is at the heart of the so-called Ricardian equivalence (Barro 1974, 1989).

In order to repay its debt, the government must raise taxes sometime in the future. This increase in future taxes is embodied into the the private agents' expectations and behaviour, so that they react by reducing their demand. The reduction of the private demand offsets the positive effects of the initial deficit spending.

Although it is acknowledged that, in some cases, public spending, in particular public investment, can positively affect the economy's productive capacity and its growth, the assumption of a growth rate unaffected by such expenditures is based on the idea that their positive effect on growth is neutralised by the negative effect produced by taxes. Therefore, the net effect on the growth rate of these expenditures can be assumed to be nil (see, for example, Aschauer 2000).[4]

The idea that public debts are equivalent to private debts is also used to justify why it must be assumed that the interest rate is higher than the economy's growth rate. If the GDP grows at a rate higher than the interest rate, this can imply that the public debt is never extinguished and that the government borrows to pay the interest on its debt. To avoid this outcome, which evidently contradicts the principle that private as well as public debts must be paid back, Blanchard and Fischer (1989, pp. 49-51) introduce the so-called No-Ponzi-Game condition, which amounts to introducing the hypothesis that $r > g$, and forces the government to run primary surpluses to repay its debt or, at least, to maintain the debt ratio stable.[5]

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[2]For example, Blanchard et al. (1990, p. 15) observe that, since the 1990s the interest rate on the public debt has been higher than the growth rate in most OECD countries. See similar and more updated considerations in Blanchard (2002, pp. 556-7). See also Carlin and Soskice (2006, p. 187) and Greiner and Fincke (2009, p. 7).

[3]The sustainability of the public debt is 'basically about good housekeeping' (Blanchard et al. 1990, p. 8).

[4]Others, however, go further and regard the government's expenditure as a pure waste of resources, which does not affect the growth rate. For example, Greiner and Fincke (2009, p. 74) assume that public spending is a 'mere waste of resources that is neither productive nor yields utility for the household.'

[5]Carlin and Soskice (2006, pp.186-7) also argue that a continuously increasing public debt must even-

3 An alternative view of the nature of the public debt

The public debt is different from the private debt in two fundamental respects. The public debt cannot be dealt with in the same manner as the private debt because of its dimensions and macroeconomic implications. When a household (or a firm) is in debt and wants to reduce or extinguish it, the obvious way to do it is either to increase its revenues or to reduce its expenditures. But this cannot work for the debt of the state. When the state decides to reduce its expenditures or increase taxes, these decisions have obvious depressive effects on the economy: aggregate demand declines and this can imply a perverse effect on the ratio of the public debt to GDP. While the denominator of the ratio (the GDP) declines, the worsening of the economic situation makes some classes of expenditures rise (e.g. unemployment subsidies) and tax revenue decrease; the result of the attempts to reduce the debt ratio produce the opposite result. It is the Keynesian paradox of thrift applied to the state (Shiller 2013).

The public debt is different from the private debt for another deeper reason. The state is a 'special' borrower, inherently different from private borrowers. Keynes provides the general framework in which this aspect of the public debt can be considered. For Keynes, the very notion of public debt is inappropriate and misleading. Keynes's ideas on the public debt are strictly related to his notion of money and the role of the state.

The existence of debt contracts, their enforcement and discharge imply a fundamental role for the state to play. The state enforces the delivery of contracts and establishes which instrument must be used to discharge them (Keynes 1971, pp. 3-4). The instrument, defined by the state, that discharges contracts is what Keynes called 'money proper', but transactions can be also settled by using some form of debt acknowledgment as a substitute for money proper (Keynes's 'bank money').

The state has the power to establish which instrument must be used to discharge liabilities. It can establish that its liability is the instrument to discharge any other liability deriving from any contract. Thus, a particular type of liability becomes money proper and it should no longer be regarded as a debt. Keynes observes:

> When ... what was merely a debt has become money proper, it has changed its character and *should no longer be reckoned as a debt*, since it is the essence of a debt to be enforceable in terms of something other than itself. To regard representative money ... as being still a debt will suggest false analogies' (Keynes 1971, p. 6; emphasis added)[6]

Keynes is evidently referring to high-powered money, that is to say the banknotes issued by the central bank. From a technical point of view, the issuing of high-powered money (the 'printing of money') corresponds to borrowing by the state from the central bank. However, since the central bank is an essential component of the state itself,

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tually lead to an increase in the risk premium on the debt and to an interest rate higher than the growth rate. When this occurs, the government finds itself in a very vulnerable position: when $r > g$ at a high level of debt, the fiscal tightening required to stabilise the debt ratio would be particularly severe.

[6]The false analogy obviously is with private debts.

borrowing from it cannot be interpreted as the same as the state borrowing from the private sector. Since the state 'borrows' from itself, it has the power to create all the money it wants to carry out its activities.

The state can borrow also from the the private sector. When the state does so, its decision does not depend on the impossibility to finance its expenditures by issuing new money but on other reasons. For example, the state might not to increase the amount of money in circulation to avoid the decline of interest rates.

When the state borrows from its central bank, the quantity of high-powered money increases correspondingly; when the state borrows from the private sector, the quantity of high-powered money in circulation does not vary. Thus, the difference between issuing the two classes of state liabilities can be reduced to decisions concerning the amount of liquidity that the state wants to be available to the economy.

This vision and interpretation of the public debt, however, needs a qualification. That the state is different from a private borrower is strictly true only if we refer to a 'sovereign state', that is to say a state with the actual power to create money proper. A sovereign state issues and spends high-powered money without any promise to convert it to any other currency, nor to gold or any other commodity, at any fixed exchange rate (see also Sardoni and Wray 2007).

A sovereign state can make payments without being constrained by its revenues and it is not forced to borrow from the private sector any time its expenditures exceed its revenues; but a sovereign state can decide to borrow from the private sector. In this case, the state sells to the private sector liabilities (bonds) that are less liquid than money. Privates purchase such liabilities in view of their positive yield.

Instead, the state is forced to finance its deficit by borrowing from private agents when it is a non-sovereign state, i.e. a state that, for whatever reason, has lost its power to create money through the national central bank.[7] A non-sovereign state is more similar to a private borrower as it must rely on some external source for the liquidity required to finance its expenditures in excess of revenues.[8]

Whether the state is sovereign or not, when it acts as a borrower from the private sector, a difficulty may emerge. It has to do with the private lenders' uncertainty about the state's ability to repay its debts in the future. If the state borrows funds now, will it be able to find the funds necessary to repay its debt at the due future date?

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[7]For example, nations that decide to adopt a foreign currency as their own currency (e.g. cases of dollarisation) or nations that renounce their national currency to adopt a supranational currency (e.g. the countries belonging to the European Monetary Union).

[8]There is another qualification, which concerns the distinction between domestic and external public debt. If a state borrows from foreigners and its debt is denominated in the domestic currency, the difference between internal and external debt is not relevant in so far as foreigners are willing to accept the state's liabilities because they trust them, i.e. they trust the debtor's ability to honour its contracts and pay the interests on the debt. The situation is different if the state issues liabilities denominated in a foreign currency. In this case, the state finds itself in a position in which it has no longer the ability to create the instrument to discharge its liabilities. It must rely on an external source. For example, the required liquid resources can be acquired by running an external current surplus. A state that issues liabilities denominated in a foreign currency is essentially a non-sovereign state.

This question could be answered by following the logic of the Ricardian equivalence (the state must sooner or later raise taxes), but Hicks (1989, p. 54) gives a different answer, which is more solidly grounded on the historical experience of modern states. For Hicks, private lenders take for granted that, when the its debt comes to maturity, the state will borrow again and they engage themselves to re-lend to it. In this perspective, the stock of outstanding public debt need not be necessarily extinguished and does not imply an increase of future taxes for its repayment.[9]

Also Lerner, by referring to a sovereign state (the US), takes into consideration the possibility that the private sector might be unwilling to lend to the state and observes: 'If the public becomes reluctant to keep on lending, it must either hoard the money or spend it. If the public hoards, the government can print the money to meet its interests and other obligations ... If the public spends, this will increase the rate of total spending so that it will not be necessary for the government to borrow' (Lerner 1943, pp. 42-3). The private sector's refusal to lend to the state does not imply any difficulty for the state to fund its expenditures. If it cannot borrow from the private sector, it can 'borrow' from the central bank, i.e. print money.

The possibility that the state can generally re-borrow from the private sector whenever it sees it as necessary implies the permanent existence of a positive stock of debt, which in turn implies the existence of a class of *rentiers*, the owners of the state liabilities. The existence of a class of people who earn their income from the interests on the debt gives the problem of the public debt also a distributive dimension. In fact, there is no necessary coincidence between tax payers and *rentiers* and, therefore, the creation of public liabilities implies a redistribution of income. This is an important issue, which deserves more attention than it is usually given. However, for brevity, here we do not pursue this line of analysis any further.

4 Public debt and deficits

The existence of a permanent stock of public debt is associated with the government running public deficits over time, which raises the question concerning the economic rationale of running public deficits. The standard Keynesian and Post Keynesian answer to this question is that budget deficits are necessary to ensure levels of aggregate demand and profits higher than those generated by the private sector.[10] Here, we present this position on deficits by considering Lerner's ideas and his notion of functional finance.

It is well known, however, that Keynes himself expressed his aversion to running budget deficits (see, e.g., Kregel 1983). We contrast Keynes's own position to Lerner's

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[9]Also mainstream economists recognise that the public debt need not necessarily be extinguished at some future date and that, therefore, there can always exist a positive stock of public debt (see, e.g., Blanchard et al. 1990). However, their positions is somewhat in contradiction with the general idea that all debts, public or private, must be eventually repaid.

[10]Kalecki, for example, regards budget deficits as essentially similar to external current surpluses for their effects on demand and profits: 'A budget deficit has an effect similar to that of an export surplus. It also permits profits to increase above the level determined by private investment and capitalists' consumption.' (Kalecki 1965, p. 51).

and we conclude that, on the whole, their differences are less significant than they might appear superficially.

4.1 Lerner's functional finance and the role of budget deficits

Lerner's notion of functional finance is based on his rejection of any idea of 'sound finance' and provides an important theoretical justification and explanation of budget deficits and their implications on the public debt.

The fundamental principle of functional finance (its first law) is that

> ... fiscal policy, its spending and taxing, its borrowing and repayment of loans, its issue of new money and its withdrawal of money, shall all be undertaken with an eye to the *results* of these actions on the economy and not to any established traditional doctrine about what is sound or unsound. (Lerner 1943, p. 39)

The first result to which the government should aim at is to guarantee the level of demand that buys all the goods and services that the economy can produce; in other words to ensure full employment. The achievement of this result can imply running deficits permanently.

What Lerner regards as a corollary of the first law is that the rationale of taxation is not collecting money to finance the government's payments. Taxation is relevant for the effects that it produces on the economy and must be judged by such effects. The most important effect of taxes is that they reduce the amount of money that the private sector can spend (Lerner 1943, p. 40).

The second law of functional finance follows from this corollary: 'the government should borrow money only if it is desirable that the public should have less money and more government bonds' (Lerner 1943, p. 40).[11]

For Lerner, there is no reason to hold that public expenditures and revenues must necessarily balance over a longer period of time. The government can run public deficits permanently, if this is necessary to ensure the required level of effective demand.

Running a primary deficit permanently can imply that the economy experiences a continuously increasing public debt.[12] Lerner, however, argues that an ever-growing public debt is not harmful to the economy, in so far as functional finance keeps on guaranteeing the adequate level of demand. An increasing amount of public debt implies the increase of the interest payments, but interests can be paid by borrowing more.[13]

The argumentations against a continuously increasing public debt are essentially based on the idea that the interest on the debt must be paid by increasing taxes and this leads the economy into a vicious circle. An increasing taxation affects profitability and

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[11]The reduction of money in circulation could be desirable if the interest rate must be prevented from decreasing excessively.

[12]In so far as the government borrows from the private sector instead of printing money and the economy's rate of growth is lower that the interest rate on the debt (see equation 2 above).

[13]'As long as the public is willing to keep on lending to the government there is no difficulty, no matter how many zeros are added to the national debt' (Lerner 1943, p. 42).

investment negatively; this in turn depresses demand and induces the government to undertake still more deficit financing, with the consequence of even higher taxes and further negative effects on investment and demand; and so on.

But Lerner rejects the idea that the funds required for the payment of interests on the debt must come from taxes. There is no reason to assume that all the interest payments should be financed by current taxes.

> The unfounded assumption that current interest on the debt must be collected in taxes springs from the idea that the debt must be kept in a "reasonable" or "manageable" ratio to income (whatever that may be). If this restriction is accepted, *borrowing* to pay the interest is eliminated as soon as the limit of "reasonableness" is reached, and if we further rule out, as an indecent thought, the possibility of *printing* the money, there remains only the possibility of raising the interest payments by taxes. Fortunately there is no need to assume these limitations so long as Functional Finance is on guard against inflation, for it is the fear of inflation which is the only rational basis for suspicion of the printing of money. (Lerner 1943, p. 48)

Lerner considers also cases in which the interests are paid through taxes and sees some mistakes usually made in this regard. A mistake is to overlook that income taxes that reduce the return on investment are deductible in the case of losses from investment. Lerner (1943, pp. 45-6) makes some examples to show that the net return on the risk of loss is unaffected by the level of income taxes. Another mistake consists in ignoring the multiplier effect of deficit spending (Lerner 1943, p. 46).

4.2 Keynes on deficits and the quality of public spending

Lerner's analysis of the role of budget deficits and their implications on the debt is carried out at a very general level. Keynes developed a more detailed analysis of these issues. For Lerner, the public budget in general is the instrument through which the government maintains the level of demand that ensures the full employment of the existing resources. He does not enter into a more a detailed analysis of the public budget and, in particular, he does not make any distinction between the current and the capital budget. Keynes, instead, enters into a more detailed analysis of the budget and argues that full employment should be ensured and maintained through variations of the capital budget, whereas the current budget should be maintained balanced.

In a letter to James Meade of April 1943,[14] Keynes argues against the use of current expenditure and taxation to control the level of aggregate demand

> ... it is not nearly so easily politically and to the common man to put across the encouragement of consumption in bad times as it is to induce the encouragement of capital expenditure. The former is a much more violent version of deficit budgeting. ... the very reason that capital expenditure

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[14]Meade expressed his position in a paper for the British Reconstruction Committee.

is capable of paying for itself makes it much better budgetwise and does not involve the progressive increase of budgetary difficulties, which deficit budgeting for the sake of consumption may bring about or, at any rate, would be accused of bringing about. (Keynes 1980, pp. 319-20)

Moreover, it is better to supplement aggregate demand to ensure full employment by increasing the social stock of capital rather than by simply increasing consumption: 'Thus the capital budgeting is a method of maintaining equilibrium; the deficit budgeting is a means of attempting to cure disequilibrium if and when it arises' (Keynes 1980, pp. 352-3). Keynes regarded deficit financing as a 'rather desperate expedient' (Keynes 1980, p. 354).

Keynes made further considerations about capital public expenditures. First, he observed that, in several cases, such expenditures should be extra-budget.[15] In any case, capital expenditures should be efficient and carried out according to economic principles:

> The more socialise we become, the more important is to associate as closely as possible the cost of particular services with the sources out of which they are provided, even when a grant-in-aid is also required from general taxes. This is the only way by which to preserve sound accounting, to measure efficiency, to maintain economy and to keep the public properly aware of what things cost. (Keynes 1980, pp. 224-5)

Keynes preferred public capital expenditures to current expenditures and or tax reduction to stimulate private demand; but, unless it is assumed that all public capital expenditure are extra-budgetary, it is obvious that capital expenditures imply running budget deficits. It cannot be assumed, in fact, that capital expenditures are financed entirely by current revenues (taxes).

If public investment is capable to yield a positive return, it pays for itself and, therefore, the initial deficit that it generates will be extinguished. However, in so far as the state keeps on making new capital expenditures, new deficits will arise. Thus, there must be a recurrent capital account deficit and a consequent increase in the public debt, which will be reabsorbed in due time thanks to the returns to public investment. The rationale of public investment financing is not different from that of private investment financing.

Thus, the differences between Lerner and Keynes are not about their views of the role of public finance in modern economies. Their differences essentially depend on the fact that their analyses were carried out at different levels of detail. While Lerner considered the budget in general, Keynes distinguished between the current and capital budgets.

What is more important to stress in considering Keynes's position is the emphasis he laid on the quality and efficiency of public spending. Considering this aspect brings us to Domar's approach to the problem of the public debt and public expenditure.

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[15]'We need to extend, rather than curtail, the theory and practice of extra-budgetary funds for state operated or supported functions' (Keynes 1980, p. 224).

5 Domar's pioneering analysis of the public debt

The main objective of Domar's pioneering article on the 'burden' of the public debt (Domar 1944) was to contrast the opinion that deficit spending leads to an ever-growing public debt, the servicing of which inevitably leads to an increasing tax burden on the economy.[16]

For Domar, while all previous analyses underlined the obvious fact that continuous borrowing results in an ever-increasing debt, many tended to overlook that deficit spending affects income.[17] This sort of approach is evidently still prevailing today, since the dynamics of the public debt ratio is studied by assuming that the public budget has no effect on the dynamics of aggregate output.

Domar, more in particular, studies the relationship between running budget deficits and the behaviour over time of the ratio of the public debt to GDP. He argues that there need not be a tendency for such ratio to grow indefinitely. Also Lerner argues against the idea that the budget deficits associated with functional finance necessary lead to an ever-growing public debt,[18] but Domar deals with the problem in a more analytical way.

To study the analytical relation between deficit spending and the public debt, Domar considers four different cases.[19] In the first case, it is assumed that income remains constant while, in each period, the government borrows a percentage α of income. It is clear that in this case the ratio of debt to income will grow indefinitely. But 'there is something inherently odd about an economy with a continuous stream of investment expenditures and a stationary national income' (Domar 1944, p. 804).[20]

The second case is analogous to the first. Now income grows over time but at a constant *absolute* rate ($Y_h = d + fh$). Since the government keeps on borrowing $\alpha\%$ of the income, also in this case the ratio of debt to income will grow with no limit (Domar 1944, p. 806).[21]

The third case is the most important. Domar now assumes that income grows at a 'constant percentage rate' g ($Y_h = de^{gh}$). In this case the growth rate of debt will approach the growth rate of income and, therefore, the ratio of debt to income will tend to a constant value (Domar 1944, p. 809). More precisely, it will approach the value $\frac{\alpha}{g}$.

It follows that, given the percentage α of income borrowed by the state, the larger is the rate of growth of income, the lower is the ultimate ratio of debt to income.[22] Thus,

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[16]On Domar's approach to the problem of the public debt, see also Pasinetti (1997).

[17]'... that deficit financing may have some effect on income (...) has received a different treatment. Opponents of deficit financing often disregard it completely, or imply, without any proof, that income will not rise as fast as the debt.' (Domar 1944, p. 801).

[18]In particular, Lerner considers the fact that an increasing debt implies an increasing private wealth and, hence, higher tax revenues and a higher propensity to consume with positive effects on private aggregate demand (Lerner 1943, pp. 48-9).

[19]In all four cases, the interest rate on the debt and the price level are taken as given and constant.

[20]Such a case could occur because investment does not have any positive effect on productivity and the number of working hours remains unchanged. Alternatively, productivity grows but the number of working hours diminishes.

[21]The reasons why such a case could occur are the same as in the first case.

[22]See the mathematical appendix to Domar's article (1944, pp. 823-5). The fourth case is a 'war model',

the problem of the debt ratio lies in the ability to make income grow rather than in attempting to reduce it without taking account of the effects of such a reduction on income.[23]

A certain growth rate of income can be achieved if aggregate demand grows at that rate and, at the same time, a sufficient amount of the expenditures is directed toward 'increasing the efficiency of production, so as to allow the required volume of monetary expenditures to take place without a rise in prices.' (Domar 1944, p. 820). For Domar, the government can contribute to increasing the economy's growth rate by converting part of the private income that it absorbs through taxation into 'productive expenditures', i.e. expenditures that increase the productive capacity of the economy.

For simplicity, such expenditures can be thought of as public investment, as opposed to current expenditures seen as 'unproductive', even though Domar is careful to point out that the distinction between investment and current expenditure may be misleading:

> As a matter of fact, the term "investment expenditures" may be misleading, because it is too closely associated with steel and concrete. If healthier people are more productive, expenditures on public health satisfy these requirements. The same holds true for expenditures on education, research, flood control, resource development and so on. (Domar 1944, p. 820)[24]

Domar's idea that public spending should be analysed by distinguishing between productive and unproductive expenditures plays an important role in the model presented in the next section.

6 A Keynesian model for the analysis of the public debt

6.1 The general features of the model

We are now able to present a simple model to deal with the problem of the public debt and its dynamics from a Keynesian perspective. On the grounds of what we considered in sections 2 to 5, such a model has two crucial features.

1. The public debt is regarded as essentially different from the debt of private agents. There is no necessity to postulate that it must be extinguished some time in the future.

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in which the percentage of income borrowed differs between peace times and war times. For brevity, this case is not considered here.

[23]'Now, some economic and political circles are burning with a desire to reduce the debt burden (...). They recognize no other method of achieving their goal but by reducing the absolute size of the debt; that the government must stop borrowing is of course taken for granted. They should beware, however, lest the policies they advocate exert such a depressing effect on the national income as to result in an actually heavier debt burden, even though they succeed in paying off a part of the debt.' (Domar 1944, pp. 815-6).

[24]For a recent contribution on the effects of public spending and, more generally, of the public sector on the economy's growth and productivity, see Fitoussi et al. (2013, pp. 61-71).

2. Public expenditures, taxes and, hence, the public budget have an effect on aggregate output. The economy's growth rate cannot be taken as independent of the policies implemented to affect such variables.

The model developed along these lines allows a more correct analysis of the public debt dynamics than that deriving from the mainstream approach.

As we saw, budget deficits can be financed by issuing high-powered money, so that they do not necessarily imply an increase in the amount of bonds in the hands of the public sector. However, the possibility to 'monetize' the public debt is a prerogative of sovereign states. In order to develop a model applicable to both sovereign and non-sovereign states, here we assume away the possibility to finance deficits by 'printing money'.

In view of the fact that the realisation of a certain level of output and employment may require running budget deficits, the model concentrates on the analysis of the conditions under which the ratio of the public debt to GDP is stable over time, rather than on the extinction of total debt. The stabilisation of the public debt ratio is an important issue, as it can be regarded as an indicator of the efficiency and efficacy of public finance.

The dynamics of the ratio of the public debt to GDP obviously depends on the dynamics of the GDP itself, which in turn is affected by the public debt and budget. These relations can be analysed by using a simple model of growth, in which the households' income include the interests on the public debt and part of the public expenditure is productive, i.e. it affects the economy's growth rate positively.

The most important element of the model is the functional relation between the productive component of public spending and private investment as this is one of the ways in which the economy's growth rate can be affected by the public sector.[25] Once this relation is introduced, the model can be solved and the dynamics of the public debt ratio determined. However, the solutions of the model can be complex and not easy to interpret. Therefore, here for simplicity we consider a simplified version of the model and we concentrate on the analysis of the conditions under which the ratio of the public debt to GDP can be stabilised even though the government runs primary deficits.

6.2 A case of stabilisation of the debt ratio with a primary deficit

Without considering an explicit functional relation between productive public expenditures and the rate of growth, we simply assume that the growth rate g is an increasing function of productive expenditures G_1. Total public expenditure is

$$G_1 + G_2 = G$$

with G_2 denoting unproductive public expenditures.

The possibility to have a stable debt ratio despite running a primary deficit depends on the relationship between the interest rate r and the economy's growth rate g. If

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[25]Of course, those productive public expenditures that are capital expenditures (public investment) directly affect the economy's rate of growth.

$g > r$, the debt ratio can be stable. Since the growth rate g is increasing in G_1, our problem reduces to find a value of G_1 such that $g > r$. We express all the variables in terms of ratios to the GDP and we make the the following additional hypotheses.

1. The ratio of taxes to GDP (τ) is given and constant.

2. At time t, the government is running a primary deficit: the tax revenue is less than total public expenditures.

3. Initially, the real interest rate r on the public debt, which is given, is higher than the economy's growth rate g.

This economy, consequently, experiences a growing ratio of the public debt to the GDP ($\dot{b} > 0$ in 2 above), which necessarily tends to infinity. In this situation, for the mainstream, the stabilisation of the debt ratio ($\dot{b} = 0$) can be realised if the government shifts from running a primary deficit to running a primary surplus.[26]

Once the possibility to affect the growth rate through public spending is admitted, the stabilisation of the debt ratio can be achieved even though the government keeps on running a primary deficit. If productive public expenditures are able to raise the economy's growth rate, the stabilisation of the debt ratio can be achieved through changes in the composition of the public expenditure, while the ratio of total public spending to GDP (and the ratio of taxes to GDP) can be left unvaried.

A change of composition of the public expenditure in favour of productive expenditures makes the stabilisation of the debt ratio possible because it makes the economy's growth rate rise to a level higher than the interest rate. The economy moves from a growth path characterized by a debt ratio increasing over time to a higher growth path characterized by a stable debt ratio.

Let us write the dynamic budget constraint in the following way:

$$\dot{b} = \gamma_1 + \gamma_2 - \tau + [r - g(\gamma_2)]b \tag{3}$$
$$\text{with } \gamma_1 + \gamma_2 = \gamma < 1$$

γ_1 is the ratio of productive public expenditure to the GDP ($\frac{G_1}{Y}$, γ_2 is the ratio of unproductive public expenditures to the GDP ($\frac{G_2}{Y}$) and $g(\gamma_1)$ is the economy's growth rate, which is expressed as an increasing function of productive public expenditures.

The economy's growth rate would reach its maximum when $\gamma_1 = \gamma$ ($\gamma_2 = 0$), i.e. when all public expenditures affect the economy's productivity positively. However, here we assume that γ_2 must remain positive.

In the initial situation, it is $\gamma_1 + \gamma_2 > \tau$, $g(\gamma_1) < r$ and $\dot{b} = \beta > 0$. The problem to solve is to find two values of γ_1 and γ_2, say $\bar{\gamma}_1$ and $\bar{\gamma}_2$, such that $\dot{b}$ is reduced to zero while the government keeps on running a primary deficit, i.e. it is still $\bar{\gamma}_1 + \bar{\gamma}_2 = \gamma > \tau$.

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[26]In this particular case, the stabilisation of the debt ratio could be obtained only by reducing the ratio of public spending to GDP (γ) as τ is assumed to be constant.

It must be

$$\bar{\gamma}_1 + \bar{\gamma}_2 - \tau + [r - g(\bar{\gamma}_2)]b = 0 \tag{4}$$
$$\text{s. t. } \bar{\gamma}_1 + \bar{\gamma}_2 = \gamma > \tau$$
$$\text{and } \bar{\gamma}_1 < 1, \bar{\gamma}_2 > 0$$

The possibility to find solutions for (4) depends on the value of r and the functional relationship between the growth rate and productive public expenditures. Here we assume that such solutions exist, which essentially amounts to assume that r is not excessively high and the economy's growth rate is sufficiently responsive to increases in public productive expenditures.[27] If solutions for (4) exist, the economy's debt ratio will converge to

$$\bar{b} = \frac{(\bar{\gamma}_1 + \bar{\gamma}_2 - \tau)}{(g(\bar{\gamma}_1) - r)} \tag{5}$$

In this case, it is possible to stabilise the debt ratio even though the government is running a primary deficit. It is so because the composition of the public expenditure is such that the economy's growth rate is higher than the interest rate on the debt.

7 The importance of debt stabilisation

The public debt is essentially different from the private debt. There is no cogent reason why it should be extinguished. Apart from exceptional situations, the state, even if cannot create additional money, is always able to keep on borrowing from the private sector. This, however, does not imply that the ratio of the public debt to GDP should be left free to increase indefinitely over time. A viable economic system should be characterised by a public debt ratio that is stable over a relatively long period of time.

However, our conclusion concerning the stabilisation of the debt ratio must be interpreted differently from the mainstream. In the analytical framework expounded above, a growing debt ratio denotes the fact that the public sector is spending in a wrong way, that is to say it is using resources in a way that does not contribute to the overall growth of the economy. Thus, a growing debt ratio is a negative phenomenon because the public expenditure is excessively devoted to unproductive spending. It is the state's inability to use its resources to favour growth that has to be regarded as the fundamental reason why its debt keeps on growing.

A large and growing debt ratio must be stopped because public spending is inefficient in terms of growth. But there are also other reasons why there should be concern for a growing debt ratio. A large and growing stock of debt increases the risk of speculative attacks against the state's debt. A conventionally established conviction that a state is on the verge of a default crisis is usually a fertile terrain for speculation, which brings about a fall in bond prices and an increase in interest rates and risk premia that, in turn, contribute to make the debt problem even more serious.[28] In a situation in which the

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[27]See the Appendix, for a more formal treatment of the problem.
[28]On this see also Pasinetti (1997).

economy is not growing sufficiently to keep in check the debt ratio, both the deficit and the debt further increase for the 'wrong' reason, that is to say to pay interests rather than to promote productive expenditures to raise the growth rate.

For the mainstream, if the debt ratio is high and increasing, there is only one way to at least stabilize it: to run primary surpluses. We have shown that this is not the only possible policy prescription. An important reason not to follow the mainstream indications is that they can be counterproductive and give rise to perverse effects. Attempts at stabilising the debt ratio through restrictive fiscal policies can determine the worsening of the debt problem because of their negative impact on the economy's aggregate output.

A significant part of public expenditures is endogenously determined and tends to increase as the economic conditions worsen (e.g. unemployment and welfare benefits) while, at the same time, tax revenues tend to decline, so that the budget deficit varies counter-cyclically. If the worsening of the deficit and the increase of the debt give rise to further restrictive fiscal policies with a negative impact on the output, there is an evident risk to enter a vicious circle. The situation is further aggravated by the fact that the expenditures that are more easily and rapidly cut are those that can promote growth (e.g. investments in infrastructures, etc.)

In conclusion, a high and growing debt ratio must be regarded as a serious problem. A growing public debt ratio is an indicator of the inefficient use of resources by the state and, moreover, implies a higher risk of speculative attacks. The solution of the debt problem, however, need not be socially costly as the mainstream solution, which moreover runs the risk of producing perverse outcomes. Rigorous fiscal policies aiming at the creation of primary surpluses can appear successful in the short run because they are consistent with the conventional view of the public debt seen as the same as private debts, but they are not a solution in the longer run as they do not affect the primary cause of a growing debt ratio, that is to say a low growth rate.

8 Conclusion

The approach to the problem of the public debt that is currently prevailing both in the economics profession and in policy makers is essentially based on the idea that state liabilities are basically the same as private liabilities. The policy implications deriving from this vision are that the public debt must necessarily be extinguished or, at least, kept at a reasonable level with respect to GDP. The typical way to realise such objective is running primary surpluses.

We show that there exists an alternative approach to the public debt, which derives from the contributions of Keynes and some other prominent Keynesian economists. This approach is based on the idea that the public debt cannot be regarded as the same as private debt. In this regard, Keynes's position is of crucial relevance. The debt of an agent (the state) with the power to establish the instrument that must be used to discharge any liability cannot be regarded as similar to the debt of any other agent without such power.

Sovereign states have the power to create as much money as they need to pay for the resources they want to acquire from the private sector. Sovereign states, however, may decide no to issue additional money to finance their deficits and, instead, to borrow from private agents. Non-sovereign states must always borrow from some agents because they do not have the power to create money. In the paper, in order to make our analysis applicable to both sovereign and non-sovereign states, we concentrate on cases in which the state borrows from the private sector.

Although we excluded the possibility for the state to issue additional money to finance its deficit, our approach and conclusions differ significantly from the mainstream. First of all, we study the dynamics of the ratio of the public debt to GDP by rejecting the idea that both the GDP and its rate of growth are independent of public spending, taxes and, hence, the public budget. We regard the GDP as a function of these variables as well as of private investment and consumption. Secondly, we draw the distinction between 'productive' public expenditures (those that have a direct impact on the economy's growth rate) and 'unproductive' expenditure (those that do not have a direct impact on the growth rate).

On these grounds, we show that the state is able to stabilise, or reduce, the ratio of the public debt to GDP through adequate variations of the compositions of its expenditures; namely by increasing productive spending and decreasing unproductive spending. It follows that, in situations in which the growth rate is lower than the interest rate, the stabilisation or reduction of the debt ratio does not necessarily require running primary surpluses, as predicated by the mainstream.

In the present situation, many hold that the problem of public debt must be solved by raising the economy's growth rate. But many also believe that higher growth rates can be obtained by 'freeing' the economy from the 'interference' of the state, which means to reduce the public debt and deficits. This paper, in the tradition mentioned above, follows a different route. Higher growth rates can be achieved thanks to a significant and permanent role of the public sector.

To determine the conditions under which the ratio of the public debt to the GDP is stabilised or reduced is not a mere analytical exercise. If a state, sovereign or not, keeps on borrowing without producing significant effects on the economy's ability to grow, this is an evident indication that the state is not working efficiently and interventions are in order, also to avoid the risk of speculative attacks, which can lead to a debt crisis.

For a non-sovereign state, such a crisis amounts to the impossibility for the state to acquire the liquidity that it needs and/or the impossibility, or the growing cost, to honour its debts. For a sovereign state, there exists the possibility that the private sector refuses to accept the state money or to buy state bonds. The economy might experience a crisis so severe that not even the instrument backed by the central bank is trusted by agents, who switch to an alternative money. Phenomena of hyperinflation and/or social and economic turmoil, that lead to the adoption of a foreign currency as the economy's medium of exchange and unit of account are obvious examples.

To avoid such risks, we argue that what is required is a 'reform' of the public expenditure through changes of its composition in favour of those expenditures that have a positive impact on the economy's growth, rather than trying to reduce the debt ratio through restrictive fiscal policies that can produce the perverse effect to increase the debt rather than reduce it.

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Appendix: The conditions for the existence of solutions

Let us assume that the economy's growth rate g increases with the ratio of the productive public spending to the GDP, γ_1, but less than proportionally. It is

$$g(\gamma_1) = h\gamma_1^{1/2} \tag{6}$$
$$\text{with } h > 0$$

In such a case, the solution of (4) above is

$$
\begin{aligned}
\bar{\gamma}_1 &= \frac{(\gamma + br - \tau)^2}{(bh)^2} \\
\bar{\gamma}_2 &= \gamma - \frac{(\gamma + br - \tau)^2}{(bh)^2}
\end{aligned}
\tag{7}
$$

This solution exists only for

$$r < h\gamma^{\frac{1}{2}} + \frac{\tau - \gamma}{b} \tag{8}$$

$\bar{\gamma}_1$ is increasing in the budget deficit γ and decreasing in b;[29] but it is also increasing in r. Since the ratio of productive expenditures to GDP cannot increase indefinitely as it must be $\gamma_1 \leq \gamma$, this means that we can obtain a growth rate higher than the interest rate only if the latter is sufficiently low. (8) above shows that the binding value of r is increasing in h, which expresses the sensitivity of the growth rate to productive public expenditures. The more the growth rate is sensitive to productive public expenditures, the higher tha interest rate can be. Fig. 1 shows the values of r for which it is possible to find solutions for (4), with a given value of h. The interest rate r must be lower than OA, which corresponds to the maximum growth rate that the economy can achieve by changing the composition of its public spending.
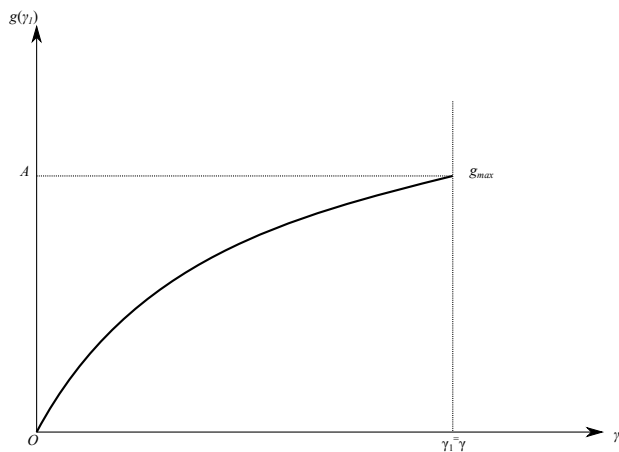

Figure 1: The functional relation between r, γ_2 and g

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[29]The larger is the initial debt ratio b, the larger is the impact of obtaining that $r < g$.