

Nuove e vecchie sfide per l'Italia che riparte

2017/1-2-3

Economia Italiana

Fondata da Mario Arcelli

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Economia italiana

Fondata da Mario Arcelli



FONDAZIONE
DI PIACENZA E VIGEVANO

numero 1-2-3/2017

Pubblicazione quadrimestrale

Roma

ECONOMIA ITALIANA

Rivista quadrimestrale fondata nel 1979 da Mario Arcelli

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Autorizzazione Tribunale di Roma n. 43/1991

ISSN: 0034-6799

Gli articoli firmati o siglati rispecchiano soltanto il pensiero dell'Autore e non impegnano la Direzione della Rivista.

Per le recensioni, i libri vanno inviati in duplice copia alla Direzione.

È vietata la riproduzione degli articoli e note senza preventivo consenso della Direzione.

Supplemento a Rivista Bancaria n. 6/2017

Finito di stampare nel mese di dicembre 2017 presso Press Up, Roma.

www.economiaitaliana.org

Editrice Minerva Bancaria srl

DIREZIONE E REDAZIONE Largo Luigi Antonelli, 27 – 00145 Roma
redazione@economiaitaliana.org

AMMINISTRAZIONE EDITRICE MINERVA BANCARIA S.r.l.
presso P&B Gestioni Srl, Viale di Villa
Massimo, 29 - 00161 - Roma -
Fax +39 06 83700502
amministrazione@editriceminervabancaria.it

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Can fiscal discipline be counterproductive? \diamond

Lorenzo Codogno*

Giampaolo Galli**

Abstract

In the aftermath of the Great Recession, some have argued that fiscal discipline can be counterproductive in the sense that it worsens the outlook for public finance. We show that fiscal discipline is a necessary ingredient in any fiscal consolidation plan. Alternative propositions, such as that fiscal discipline is counterproductive, are found to be fundamentally untenable within the framework of a standard Keynesian demand-led model. They are theoretically possible, but empirically implausible if supply-side effects are taken into consideration. However, there may well be special cases of severe recessions in which a restrictive fiscal package has perverse effects on the debt-to-GDP ratio that last for several years; this may pose serious challenges to policymakers. In deep recessions, hysteresis effects may be important, which suggests that, in some cases, temporary stimulus packages may be appropriate and in part be self-financing.

\diamond The authors thank Francesco Del Prato for careful checking of the text and the formulas of the manuscript.

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Sintesi - *La disciplina di bilancio può essere controproducente per le finanze pubbliche?*

L'esperienza della Grande Recessione ha indotto alcuni a sostenere che la disciplina di bilancio può essere controproducente nel senso che può peggiorare, anziché migliorare, le prospettive per i conti pubblici. In questo lavoro si argomenta che la disciplina fiscale è invece un ingrediente necessario di qualsiasi piano di consolidamento fiscale. Proposizioni alternative, come quelle che sostengono che la disciplina fiscale è controproducente, si rivelano fundamentalmente insostenibili nell'ambito di un modello keynesiano standard, in cui il reddito nazionale è trainato dalla domanda; sono teoricamente possibili, ma empiricamente non plausibili, se si prendono in considerazione gli effetti 'supply side' che possono essere indotti da politiche di sostegno della domanda. Tuttavia, possono verificarsi casi particolari di gravi recessioni in cui politiche fiscali restrittive hanno effetti perversi sul rapporto debito/PIL che durano diversi anni; questa circostanza può rappresentare una seria sfida per i policymakers. Inoltre, nelle recessioni profonde gli effetti d'isteresi delle politiche possono essere importanti, il che suggerisce che, in alcuni casi, manovre espansive temporanee possono essere appropriate e possono, in parte, autofinanziarsi.

JEL Classification: E60, E61, E62, H62, H63.

Keywords: Macroeconomic Aspects of Public Finance, Fiscal policy, Public Deficit and Debt, Fiscal Consolidation.

Parole Chiave: Aspetti macroeconomici della finanza pubblica, Politica Fiscale, Deficit e Debito Pubblico, Consolidamento Fiscale.

1. Motivations and main results

The great recession that hit the world economy in 2008 led many economists to profoundly change their views about fiscal policy. Until about a decade ago, fiscal policy was believed to have no significant effect on output, and using it for the purpose of stabilising the economy was not perceived as appropriate. In fact, one of the main problems was related to the long time lags in the implementation of any policy actions, which may well make fiscal policy pro-cyclical rather than countercyclical. The prevailing opinion was that undertaking new public investment projects during a recession could produce results only in a much more advanced cyclical phase, in which the economy was already recovering if not even overheating. Moreover, it was very easy to increase spending during a recession, but it was challenging to rein the extra spending back when the cycle turned expansionary. Monetary policy was thus generally considered as a more flexible and effective tool to be used for stabilisation purposes. As forcefully argued by Jason Furman, the chairman of the Council of Economic Advisors under President Obama, the great recession forced policymakers and economists to reconsider these ideas. It was because most central banks had already brought interest rates to, or even below, zero and had injected an unprecedented amount of high power money into the economy (see Furman (2016)). Following the near catastrophe of 2008-2009, few economists would now question the appropriateness of the massive fiscal stimulus packages that were then implemented almost everywhere to rescue banks, companies and people.

The issue that is still very much debated is whether, in the years that followed 2008-2009, it was appropriate to rein in the deficits in order to gradually reintroduce fiscal consolidation. Over this period, a number of new theories, or new pieces of empirical evidence on old theories, were put forward trying to establish an entirely new paradigm. For many people, economists as well as policymakers, 'austerity' has become the evil. It has become not only bad for people, or at least for current voters as opposed to younger generations, but also for public finances. Following their arguments, austerity would contribute to making the debt less, rather than more, sustainable, even in countries where it is already very high. In other words, fiscal consolidation

would become self-defeating.

This paper argues that, usually a government that needs to improve its fiscal outlook should reduce the deficit. Here, 'fiscal discipline' is defined as budgetary policies aimed to reduce the deficit, or increase the surplus, on a structural basis. In this sense, it is argued that fiscal discipline is the right course of action, especially in countries with a high level of debt relative to GDP (i.e. the debt-to-GDP ratio, 'debt ratio' henceforth).

Several policymakers do not seem to be convinced by this argument. What is somewhat surprising is that several trained economists seem to believe that fiscal discipline is counterproductive and that the right way to reduce public debt is by relaxing budgetary policy. This position is particularly widespread among economists who like to label themselves as 'Keynesians' and appeal to such concepts as the Keynesian multiplier or the investment accelerator to give substance to their claims. For this reason, the first part of the paper is devoted to ancient or 'naïve Keynesian' theories.

The paper does not claim to introduce any scientific novelty; it merely tries to bring to bear old linkages and wisdom that sometimes seem to have been forgotten.

To be sure, it is of course entirely legitimate to argue that austerity was excessive in certain circumstances, or that the appropriate policy was sustaining economic growth at the expense of pursuing public finance objectives. These are empirical issues in which policy judgment needs to be exercised amid difficult tradeoffs.

This paper does not deal with these policy issues: the primary purpose here is analytical. It is, nonetheless, very relevant for policy discussions to know that there are tradeoffs. Policymakers cannot have it both ways. They have to choose between having the cake, i.e. controlling the debt, and eating it, i.e. getting a stronger growth rate, at least in the short run. Over the medium term, the tradeoff does not necessarily exist.

These propositions are very neat and clear if one confines the analysis to standard demand-led models. If supply-side effects are brought into the picture, at least in principle, things can change. For instance, the Laffer curve effect can, in principle, do the trick of producing at the same time more growth and a lower debt ratio (Laffer (2004)). The same result can be achieved, again

in principle, by extremely productive public investments that significantly raise the potential growth rate of output. Here, the issues cannot be addressed only analytically, and one needs to resort to historical experience or model estimates, which meaningfully capture the supply side of the economy. Until recently, the standard economists' view was that such supply-side effects, though significant, were not strong enough to offset the arithmetical effect of a larger deficit on the stock of debt. However, a new strand of literature, started by De Long and Summers (2012), argues that there may be circumstances, such as deep recessions, in which fiscal policy does indeed affect the supply side of the economy and therefore its potential growth in the long run.

The paper is organised as follows. In section 2, we present some common misconceptions about the multiplier in standard Keynesian models. In section 3, there is a simple restatement of a forgotten theorem by Paul Samuelson (1940), according to which the multiplier cannot be so high as to cause an increase in tax revenue that brings the budget back to balance after an initial fiscal stimulus. Section 4 extends and qualifies the analysis, again along the lines of Samuelson, in order to consider the multiplier-accelerator effects on private investment, i.e. the supposed 'tax miracle' by which a large multiplier brings about a substantial increase in tax revenue as to balance the budget. In section 5, another common proposition is analysed, according to which, when the multiplier is high, a fiscal expansion reduces the debt ratio. According to this view, the multiplier does not perform the tax miracle as in the previous propositions. However, the effect of the deficit on the debt is considered to be smaller than that on national income, so that a fiscal expansion reduces the debt ratio or, as it is more often heard, fiscal consolidation increases the debt ratio. In this section, we show that this proposition may indeed be true, but only in the short run and in specific circumstances: over time, a fiscal expansion is bound to worsen the debt outlook. However, as one looks at longer time horizons, many other linkages, besides those of the standard textbook Keynesian model, must be taken into consideration. We consider some of such linkages in section 6, which deals with the old debate about the long-run effects of fiscal policy as originally analysed in Blinder and Solow (1972). In this section, we show that such debate does not change the fundamental conclusion of this paper that fiscal discipline, taken in appropriate doses, cannot

be counterproductive. Section 7 and 8 are devoted to supply-side effects and their interactions with short-run demand management policies.

2. Common misconceptions about the multiplier

This section considers some common misconceptions about the multiplier which have led to the rather striking statement that in order to fix public finance problems the best way is to expand fiscal policy rather than restrict it. To be sure, there are some cases in which a weaker version of this proposition is valid, but it would require supply-side factors being brought into the picture. Our analysis is initially confined to a standard Keynesian framework in which there are idle resources, both capital and labour, in the economy and national income is determined by aggregate demand. In this context, four issues can be identified:

1. The proposition that the multiplier is so high that a budgetary expansion can boost income and tax revenue by such a large amount as to bring the budget back to its initial situation. So, if the budget was initially balanced, it will return to balance after the initial expansion, with no need to raise taxes or reduce spending over time.
2. The role of investment and the accelerator principle. Here again, the idea is that tax revenue can rise by a very large amount and cause the budget to return to balance.
3. A fiscal expansion may cause income to rise by such a large amount as to reduce the debt-to-GDP ratio. Here again, the idea is that the multiplier is very large, although not as much as it is claimed by the supporters of the idea that the budget returns to balance. The problem with this view is that it looks only at the very short run. As soon as one lengthens the time horizon of the analysis, this proposition becomes less likely to hold. For very long horizons, it is certainly false.
4. As longer time horizons are considered, however, the standard Keynesian assumptions may no longer be very useful, in that many other phenomena may be going on in the economy that modify the effectiveness of fiscal policy. This is the problem that was first addressed by Blinder

and Solow (1972), who introduced a Pigouvian wealth effect in the consumption function and found, once again, that a fiscal expansion could be self-financing - at least in the very long run and under certain assumption about economic stability. The contemporary literature follows a different approach, which consists in merging into a single model the present time, in which income is determined by demand, and a future time, when income is at its potential and supply-side considerations become critical. The consideration of the interaction of a demand constrained short run and supply constrained long run was studied by De Long and Summers (2012), who came up with a set of conditions in which a temporary fiscal expansion can, in some appropriate sense, be self-financing.

3. The public finance miracle through tax revenue

A common misconception about the multiplier is that it can be so large to allow an automatic rebalancing through increased tax revenue. The idea is that a high value of the multiplier causes a very large increase in income, which in turn causes an increase in tax revenue substantial enough to bring the budget back to balance after an initial and sustained fiscal shock. We are not aware of any paper in the scientific literature with such a claim. However, the idea must have been around for a long time if many years ago Paul Samuelson (1940) decided to state as a theorem that such an idea is a mistake: “Under the hypotheses made, it can be stated as a theorem of the Multiplier analysis that *the increase of expenditure of an extra dollar cannot result in increased tax revenues of as much as a dollar even though all succeeding time is taken into consideration*”. The italics are Samuelson’s. The assumptions he refers to are those of the standard demand-led Keynesian model, plus the assumption of no “pump-priming” – to which we will return in a moment.

Of course, for policymakers, it is very nice to believe that one can spend more, for instance, for much-needed investment projects, and by doing so automatically generate the tax revenues that are needed to finance such projects. Unfortunately, this is a mistake, at least to the extent that the reasoning

is confined to the conceptual framework of the Keynesian model. Note that there is a radically different statement from the so-called “balance budget multiplier theorem”, stated in Haavelmo (1945). This theorem states that an equal increase in spending and in taxes, such that the budget is left balanced by construction, has a positive impact on national income if the multipliers of spending are higher than those of taxes. The key point is that the budget remains balanced because taxes are raised by as much as spending is. Instead, in the common misconception analysed here, taxes rise as a consequence of the income increase. From a policy point of view, a radical difference arises, since in one case the government has to introduce higher taxes, while in the other taxes fall like ‘manna from heaven’.

For instance, it is sometimes claimed that in Italy the multiplier of public investment is 2 and that elasticity of tax revenue with respect to income is 0.5. The conclusion is often drawn that each euro of increased investment creates two euros of additional income, which in turn creates one euro of additional tax revenue¹.

This reasoning hides the fact that an increase in tax revenue is a negative component of the multiplier and thus dampens the effect of spending on income.

The simplest way to see this is to write the usual textbook multiplier of government spending as:

$$\frac{dY}{dG} = \frac{1}{1 - c(1 - \tau)} \tag{3.1}$$

Where Y and G are income and public spending, respectively. Coefficients c and τ are the marginal propensity to consume and the response of tax revenue to changes in national income, respectively.

The effect of a one-euro increase in spending on tax revenue is then given by the increase in income multiplied by the effective marginal tax rate:

¹ This seems to be the reasoning behind an article of a highly respected economist, Pierluigi Ciocca: “Investire, non dissipare”, in *Il Sole24Ore*, 4 April 2017.

$$\frac{dT}{dG} = \frac{dY}{dG} \tau = \frac{\tau}{1 - c(1 - \tau)} \quad (3.2)$$

From equation 3.2 it is clear that the budget remains balanced, i.e. tax revenue rises as much as spending, only if parameter τ is equal to unity. This is absurd because it implies a marginal tax rate of 100%, i.e. every euro of additional income goes to the State.

It should also be noticed that the larger τ , the smaller the multiplier. In the limit case of $\tau = 1$, the multiplier collapses to 1. The analytical point is that one cannot have a large multiplier if the government takes back all the additional purchasing power injected in the economy in the form of higher tax revenue.

Even with model refinements, such as introducing for example lags in tax collection as well as in the consumption function, this conclusion remains unchanged.

The general point, here, is that policymakers cannot have it both ways. Either they want more purchasing power injected into the economy through public spending or want the purchasing power to be absorbed back by the government in the form of tax revenue to fix the budget.

4. The public finance miracle through the accelerator

The additional condition that Samuelson stated for the validity of his theorem was that of no “pump-priming”. Pump-priming suggests that a large increase in spending may “act as a catalyst to speed the upward movement of investment...” or may “form the spark to ignite business activity...”. Paul Samuelson was very sceptical about such statements, but the key point he wanted to make is that pump-priming is a different notion from the accelerator principle. The mere presence of the accelerator, which Samuelson considered as an integral part of the multiplier, does not affect the theorem as stated above. The intuitive reason is that the accelerator implies to see investment as a function of the change in income (or in final consumption). Such change

affects the dynamic properties of the system but does not affect the comparative statics across steady states, which remains as described by equations 3.1 and 3.2 above. In formulas, the investment function can be written as

$$I = b_0 + b_1 Y + b_2 \Delta Y \tag{4.1}$$

The term in the level of income (with coefficient b_1) does not appear in most textbook expositions of the accelerator, as it did not appear in the landmark paper of Samuelson (1939).

Hence, with $b_1 = 0$, the formulas of the multiplier remain the same as equations 3.1 and 3.2 above. However, if b_1 is not zero, the formulas for the multiplier and tax revenue become, respectively

$$\frac{dY}{dG} = \frac{1}{1 - c(1 - \tau) - b_1} \tag{4.2}$$

$$\frac{dT}{dG} = \frac{\tau}{1 - c(1 - \tau) - b_1} \tag{4.3}$$

Now, at least in principle, things may change because the term $\frac{dT}{dG}$ can be equal or even greater than one, which means that tax revenue can increase by as much as the initial increase in spending, thus causing the budget to return to its initial position.

The question then becomes empirical, assessing the likely magnitude of the relevant coefficients. This issue requires a much more detailed empirical model. When trying to establish a general presumption, two points are relevant. The first one is that in several large econometric models the elasticity of investment with respect to output is either estimated or imposed to be equal to unity². This implies that b_1 is roughly equal to the ratio of investment to output. This number is typically around 0.2 and sometimes reaches 0.3. In Italy, it is currently around 0.17. The second observation is that a more realistic

2 See for instance the latest version of the econometric model of the Bank of Italy in Bulligan, et al. (2017). The rationale behind unit elasticity has to do with the notion that depreciation is proportional to the stock of capital which in turn, in the long run, depends on the level of output.

multiplier must include, to the very least, imports. The relevant coefficient in this context is the marginal propensity to import; however, if the average propensity can be considered as an approximation to it, a number is obtained which depends on many factors, such as the size and degree of openness of the economy, and for a country like Italy is around 0.27. This means that, if one considers both the level effect in the investment function and the reality of an open economy, the multiplier is likely to become smaller than that of the simple model of the previous section. It is hence unlikely that an increase in government expenditure can bring about such a large increase in tax revenue as to balance the budget.

The same analysis can be performed about taxes. In general, a policy that reduces the tax burden is very unlikely to generate such a significant increase in income and tax revenue as to balance the budget.

5. The multiplier and the debt ratio

Another common idea among 'naïve Keynesian' economists and policy-makers is that, when the multiplier is high, a fiscal expansion reduces the debt ratio. More often one ears the symmetric statement that fiscal consolidation increases the debt ratio. Here, the multiplier does not perform the tax miracle as in the above sections, so that the budget does worsen after a fiscal expansion. Nevertheless – so the story goes – the deficit effect on the debt is smaller than its effect on national income. So that, in the end, the debt ratio falls instead of rising as a consequence of the expansion. Of course, the debt ratio – not the deficit per se – is the key variable to look at when financial markets look at the sustainability of a sovereign debt. The problem with this idea is that it is confined to the short run and does not consider that a sustained deficit feeds continuously on the debt so that eventually the debt ratio is bound to rise, unless the deficit itself is rained in through higher taxes or lower spending.

A clear statement of the proposition that a fiscal consolidation can worsen the debt ratio can be found in Nuti (2013). Here his approach is followed, with minor changes, in order to show that Nuti is indeed right, but only if

one confines the analysis to the short run.

We consider, again, a simple Keynesian model, with the purpose of studying the effects of a larger deficit on the debt one period ahead. The shock is assumed to take the form of an increase in public spending. The dynamics of the debt stock can be written as:

$$B_{t+1} = (1 + r)[B_t + G_t - T(Y_t)] \quad (5.1)$$

A subscript indicates time. So B_t and B_{t+1} are the stocks of public debt (in the form of bonds, because monetary financing is neglected) at the beginning of time t and $t+1$ respectively. G_t and $T(Y_t)$ are public spending and tax revenue during time t . Interest is supposed to be paid at the end of the period on the initial stock of debt and the additional debt created by the primary deficit occurred during period t .

For simplicity, a simple linear tax function is considered:

$$T(Y_t) = \tau_0 + \tau Y_t \quad (5.2)$$

τ_0 and τ are parameters, the latter being smaller than one. It is assumed, again for simplicity, that the system starts in a stationary state in which all relevant variables (in particular, the debt and national income) are constant³. The change in national income can then be written as:

$$\Delta Y_1 = \mu G_1 \quad (5.3)$$

where ΔY is the change in income ($= Y_1 - Y_0$) due to the change in spending ($\Delta G_1 = G_1 - G_0$) and μ is the Keynesian multiplier.

In turn, the deficit, which is equal to the change in the debt, can be written as:

$$\Delta B_1 = R_1(1 - \tau\mu)\Delta G_1 \quad (5.4)$$

3 This assumption avoids a rather messy notation in which one would have to index variables as a function of time as well as a function of the scenario (with or without the fiscal shock).

where the term $\tau\mu$ captures the effect of a higher level of income on tax revenue and is strictly smaller than one. $R_1 = (1 + r)$ is the cost of financing one euro of increase in deficit for one period. Note that the interest rate is assumed to be fixed. Hence, there are neither crowding out nor investors' confidence effects in this model.

The variable of interest is the change in debt ratio ($b_t \equiv \frac{B_t}{Y_t}$).

$$\begin{aligned} \Delta b_1 = b_1 - b_0 &= \frac{B_1}{Y_1} - \frac{B_0}{Y_0} = \frac{(B_1 - B_0)Y_0 - (Y_1 - Y_0)B_0}{Y_1Y_0} = \\ &= \frac{\Delta G_1}{Y_1} [(1 - \tau\mu)R_1 - \mu b_0] \end{aligned} \quad (5.5)$$

If this expression is negative, a fiscal expansion has a 'perverse' effect on the debt ratio. This occurs if:

$$\mu > \frac{R_1 [1 - \tau\mu]}{b_0} \quad (5.6)$$

The inequality is satisfied if the multiplier is larger than the change in the deficit caused by one additional euro of spending divided by the initial value of the debt ratio⁴. If both τ and r are set equal to zero, one obtains the simple formula of Nuti (2012), which states that the multiplier must be greater than the inverse of the debt ratio. Inequality 5.7 departs from Nuti's formula: both the cost of financing the deficit and the effect of additional income on the tax revenue are considered. In any case, it is clear that the possibility that 5.7 is satisfied cannot be ruled out.

As an example, consider the numbers suggested by Nuti himself ($\mu = 3$ and $b_0 = 120\%$) with $\tau = 0.2$ and $r = 2\%$: the right-hand-side of equation 5.6 is equal to 0.34 which is certainly smaller than 3. If one assumes $\tau = 0.5$ (a number that seems closer to the reality of a country like Italy) and $\mu = 1$ (a number that seems reasonable given the large spillovers through taxes as well as imports), the right-hand-side of the inequality is equal to 0.43, again

4 Without the assumption of a stationary initial condition, in the denominator one would find the debt ratio that would have prevailed at time 1 (rather at time 0) if the shock had not occurred.

smaller than the multiplier.

So, this expression establishes a rather strong presumption that fiscal policy has a perverse effect on the debt ratio, in the sense that a stimulus package may reduce the debt ratio and a restrictive package may increase it. In this model, the presumption is much stronger than in Nuti’s model, because of the explicit consideration of the feedback on a budget of a higher level of income.

Although it is a short run effect, a policy of excessively fast fiscal consolidation may have a perverse effect on the debt ratio, and this may induce financial markets to lose confidence in the country.

Note that this result is stronger the higher the initial, pre-shock, level of the debt ratio. This variable appears in the denominator of the right-hand-side of 5.6, because given changes in the numerator and the denominator have different effects depending on the size of the ratio itself. For instance, if the ratio is very large, a change in the denominator tends to have a greater weight than the same change in the numerator.

Note also that this parameter values choice implicitly assumes that the time horizon is one year. So, in the time span of one year, the assumed perverse effect of a fiscal consolidation is likely to become reality.

However, these results change if a longer time horizon is considered. By repeated substitution in the dynamic equation of the debt, the level of the debt at time $t = n$ can be written as

$$B_n = (1 + r)^n B_0 + \sum_{t=0}^{n-1} (1 + r)^{n-t} [G_t - T(Y_t)] \tag{5.7}$$

Under the same assumptions as above, the change in the debt can be written as

$$\Delta B_n \equiv B_n - B_0 = \Delta G_1 (1 - \tau \mu) R_n \tag{5.8}$$

where $R_n = \sum_{t=0}^{n-1} (1 + r)^{n-t}$ is the cumulative cost of one euro of additional deficit protracted for n periods. Note that, by assumption, G changes once and for all. Hence, the change after one period is the same as after n periods. This consideration holds for all other flow variables of the model (income, tax revenue and the deficit). The only variable that keeps changing over time is

the stock of the debt.

This formula can be used instead of formula 5.4 above to compute in the same way, the change in the debt ratio as,

$$\Delta b_n = b_n - b_0 = \frac{\Delta G_1}{Y_n} [(1 - \tau\mu)] R_n \quad (5.9)$$

Note that this formula is a straightforward extension of 5.5 above, and it is identical to it when $n = 1$. In this case, in fact, $R_n = (1 + r)$.

As above, this expression is negative if:

$$\mu > \frac{R_1 [1 - \tau\mu]}{b_0} \quad (5.10)$$

The new aspect in this multi-period formula is the term R_n , which increases rapidly with time. Consider first the case when $r = 0$. Then $R_n = n$. For instance, after 5 years, the remaining terms of the right-hand-side of 5.11 are multiplied by 5. With an interest rate of 2%, R_n turns out to be equal to 5.31. Consider again $\tau = 0.5$, $\mu = 1$ and $b_0 = 120\%$. Then the right-hand-side of 5.11 is equal to 2.2 (instead of 0.43) which is certainly greater than the multiplier. The breakeven is reached after 2 years, meaning that after 2 years the debt ratio behaves normally following a sustained fiscal shock.

If μ is raised to 1.5, leaving all other parameters unchanged, the breakeven is reached after 4 years. It does not make sense to experiment with a multiplier equal or greater than 2, because in this case, while maintaining $\tau = 0.5$, there would be no deficit to begin with, and one would be back to the discussion of the previous section.

This section suggests that, if the government wants to reduce the debt ratio, it has no alternative to a reduction in the deficit. The idea that the debt ratio can be reduced through an expansionary fiscal policy is undoubtedly flawed. However, it may take several years before a consolidation strategy bears visible fruits; in the meanwhile, the debt ratio may rise rather than fall, and this may indeed create a problem of credibility both with financial markets and the electorate. The latter has to bear sacrifices, but sees no results.

There is a major caveat in this analysis. When the time horizon of the analysis is extended to several years, many other things may be going on in the economy, significantly modifying the effectiveness of fiscal policy. The rest of this paper is hence devoted to a survey of some old and recent literature,

which we consider analytically relevant in order to determine whether fiscal discipline can be counterproductive.

6. The Blinder and Solow debate on long-run effects of fiscal policy

The primary conclusion of the previous section was challenged in the past by some Keynesian economists on the basis of the well-known model of Blinder and Solow (1973), which looked at the long run effect of fiscal policy in a Keynesian model enriched by Pigouvian wealth effects in the behaviour of consumers and investors⁵. According to some initial interpretations, the Blinder-Solow (henceforth BS) model implied that the issuing of new debt fed into the consumption function, and through this channel contributed to sustaining national income and tax revenue. Under the assumption that the model is stable, the conclusion was that income increased continuously until the tax revenue was so large as to match the initial increase in government spending. Hence, in equilibrium, income would be higher, and the budget balanced again.

This line of reasoning spurred a very lively debate in the 1970s but was abandoned afterwards⁶. This section explains the reasons why it was abandoned, and why the fundamental proposition of this paper – that budget deficits cannot be self-financing – survives the BS debate.

The focus of the BS paper and the subsequent discussion that took place for about a decade was the monetarists-versus-Keynesians debate. In particular, Blinder and Solow tried to argue that an expansionary budgetary policy could have lasting effects on national income, even though money was held constant by the central bank. They were thus arguing against the well-known proposition of Milton Friedman that “only money matters” for the determination of national income⁷. The underlying rationale for this latter proposition was the idea that the demand for money is essentially inelastic to interest rates, which in turn implies that the LM curve, in the synthesis proposed by

5 This paper built on Christ (1968). See also Modigliani, F. (1961).

6 See in particular Tobin and Buitert (1976), Fischer (1976), Infante & Stein (1976), Turnovsky (1977).

7 Friedman (1956, 1968).

Hicks (1937)⁸, is vertical.

This paper is concerned about a very different issue, but the BS analysis does pose an intellectual challenge to our analysis, because, following Pigou (1943) and the life cycle model of Modigliani (1971), they include wealth in the consumption function. Since the public debt is a component of wealth, their analysis implies that deficit spending (or a deficit caused by a permanent tax cut) feeds continuously into the consumption function as well as in the stock of the public debt. It would hence appear that it is no longer true that the deficit has a permanent effect on the level of national income alone, because its growth over time is affected as well. This does not mean that an increase in the deficit brings about a decrease in the debt ratio, but the analysis of how the debt ratio behaves over time becomes considerably more complex than it is suggested by the analysis performed in section 5. In BS, public debt continues to rise until the budget is back to balance. The mechanism through which this occurs is the increase in the debt, which increases consumption and therefore national income and tax revenue. Provided that the system is dynamically stable, BS reach the rather striking proposition that an initial increase in spending boosts national income and tax revenue over time until the budget is back to balance. The steady state effect of an increase in spending can thus be derived directly from the government budget constraint. By omitting interest payments, BS write the following expression for the primary budget, which needs to be balanced in steady state:

$$PS = T(Y) - G = 0 \quad (6.1)$$

The effect of a permanent increase in G (the Keynesian multiplier of this model) is hence

$$\frac{dY}{dG} = \frac{1}{T'(Y)} \quad (6.2)$$

where $T'(Y)$ indicates the derivative of the tax revenue function with respect to national income (parameter τ of this paper). This is a rather striking formula because it says that the long-run effects of fiscal policy depend only on

8 See also Modigliani (1944).

the shape of the revenue function, $T(y)$, regardless of the other model parameters, such as the propensity to consume. If the income sensitivity of tax revenue is 0.5, then the multiplier is 2, meaning that a one-euro increase in spending causes national income to rise by 2 euros and the budget to return to balance. In a later paper, BS take interest payments into consideration and come to the even more striking conclusion that, once this is done, the long run fiscal multiplier is even greater because tax revenue must rise by a larger amount in order to finance both the initial increase in spending and the subsequent accumulation of interest spending⁹.

This model sparked a remarkable debate in the 1970s which highlighted several hidden assumptions of the model as well as several paradoxes. The key paradox was that in this model monetary financing of the deficit is much less expansionary than debt financing. The reason is that money does not bear interest, and hence formula 6.2 above holds without the addition of interest spending by the government. At any rate, the crucial problem with this model is that it is not clear through which mechanism the public debt should contribute to the accumulation of wealth by the private sector, over and above what the private sector wants to accumulate through its savings decisions. In other words, wealth accumulation depends on savings decision, and the latter may or may not be influenced by the issuing of the debt by the public sector. To make this point clear, consider an extreme case in which the private sector is content with the stock of wealth that it has accumulated so far so that net saving is equal to zero. Then, if the government runs a budget deficit, the new debt that is issued to finance it must either go abroad (if the system is open) or crowd out private capital. It is for this reason that a prominent Keynesian as Janet Yellen concluded the debate by stating: *“In the closed economy scenario, deficits retard domestic capital formation and shift the economy to a growth path with lower per capita output and capital per worker. In the open economy scenario, current account deficits induce growing foreign indebtedness and result in a burden of future interest payments which will lower the disposable income of domestic residents.”* (Yellen (1989)).

An even more explicit statement comes from Blinder (1982) himself. He first summed up his original contribution with Solow (1973) as “showing that

9 Blinder and Solow (1974).

a policy of holding the money supply constant and financing all deficits by issuing bonds could destabilise the economy...” He then affirmed that Tobin and Buiter (1976) had come to the same result – that debt financing is explosive – in the context of a model with full employment and flexible prices. A point that had been reaffirmed in a number of different models by McCallum (1981, 1984), Smith (1982) and Sargent and Wallace (1981). He finally exposed the functioning of the unstable mechanism by stating: *“Suppose that some shock opens up a deficit in the government budget and the hard-core monetary monetarist regime is in force: bonds will be issued to finance the deficit. With both interest rates and the number of bonds increasing, interest payments on the national debt will be increasing. However, this increases the deficit still further in subsequent periods, and the process repeats. Consequently, unless bonds are irrelevant to other economic variables, as in the non-Ricardian view of Barro (1974), the whole economy will explode”*.

In an interesting footnote, Blinder adds that in a complex system many other variables interact with the budget deficit, *“Yet the basic mechanism described here seems to come through in all models”*.

These words should dispel any doubt about the possibility that a bond-financed sustained fiscal deficit may be self-financing. Although the literature on the long run effects of fiscal policy is very rich and complex, we feel justified in sticking to our consideration reached in section 5. If the government wants to reduce the debt ratio, it has no alternative to reducing the deficit. Miracles and manna from heaven do belong to this world, although, as we said, excessively fast fiscal consolidations may cause deep recessions and temporary, though potentially quite problematic, increases in the debt ratio. When long-run considerations are brought into the picture, interest rates, prices and potential output can no longer be taken as exogenous. The main additional insight we gain from the long-term models considered so far is that the debt is likely to crowd out either real productive capital or net foreign assets or both. Even in models which are very far from the Keynesian tradition, such as Sargent and Wallace (1984), in which prices are perfectly flexible and debt is not net wealth, the government has to resort to fiscal consolidation (or indeed monetisation), when the debt grows out of control.

7. Supply-side effects of fiscal expansions

As we stated above, results about the effectiveness of fiscal policy may change when supply-side effects are taken into considerations. There are two classic cases in this respect. The first one is the so-called Laffer Curve, named after Arthur Laffer, an advisor to President Ronald Reagan. He claimed that reducing tax rates, especially the top marginal rates, induces individuals and companies to increase their work efforts and this may lead to such a large increase in national income and tax revenue as to balance the budget¹⁰. This approach has been completely abandoned by economists after the experiment done during the Reagan years, which did probably bring more growth, but at the expense of the federal budget. During the Reagan years, the public debt of the US rose by some 20 percentage points of GDP. The budget deficit led to a deficit in the current account, and for many years afterwards, the US had to cope with the problem of the twin deficits, which in turn led to very large and undesired fluctuations in the exchange rate of the dollar vis-a-vis major currencies. In 2012, economists surveyed by the University of Chicago rejected the viewpoint that the Laffer Curve's postulation of increased tax revenue through a rate cut applies to federal US income taxes over the medium term. When asked whether a "cut in federal income tax rates in the US right now would raise taxable income enough so that the annual total tax revenue would be higher within five years than without the tax cut", none of the economists surveyed agreed and 71% disagreed¹¹. This is not just based on the effectiveness of the policy to reduce the debt ratio, but also taking into account the positive effects on growth. The fact that economists have abandoned this approach does not mean of course that politicians have done the same, as is shown by current tax cut proposals in the United States.

The second case has to do with very productive public investment. It is often claimed that a deficit that is incurred in order to finance very productive investment projects may be self-financing because it increases the productive potential of the economy¹². This idea is at the origin of the fact that almost

10 See Laffer (2004) and Feige & McGee (1982).

11 "Poll Results" (http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_2irlrs-s5UC27YXi). IGM Forum.

12 For a survey of the linkages between public investment and debt sustainability, see Berg et al. (2012). See also:

all state and local authorities in the US are bound to balance their books only with respect to current items. This implies that, for investment, they can resort to deficit financing, which they do; in fact, the market for state and municipal bonds is one of the largest financial markets in the world. In Europe, the idea that investment can be self-financing is at the origin of the widespread request to amend the Growth and Stability Pact according to what has come to be known as the ‘golden rule’. According to this rule, investment expenditure should be taken out of the Pact and the whole set of rules governing budgetary policy in the European Union¹³. On this point, the jury is still out. Critics toward the golden rule argue that it is far from clear that items that are classified as investment expenditure in the national accounts are indeed more productive than many items which are classified as current. For instance, it is not obvious that investing in better school buildings should be more productive than spending to improve the quality of teachers or researchers. This latter is typically not classified as investment, while the former is. Moreover, it is argued that the quality of investment project is of crucial importance in assessing whether one can effectively expect self-financing, but it is in practice almost impossible to monitor.

Italy has always had much higher public investment spending than Germany (in relation to respective GDPs) up until the crisis, but this has not translated into faster growth. Since World War II, Southern Italy has also always had a much higher investment ratio (public and also ‘incentivised private’) than the rest of the country, but this has not translated into higher growth¹⁴.

In recent times, the discussion about these issues has been relaunched and redefined within the framework proposed by Summers and De Long (2012)¹⁵, who stressed the role of permanent or ‘hysteresis’ effects of deep recessions on potential output as well as on debt sustainability. This framework has been justified by the extraordinary recession that hit the world in 2008 and thereafter, and contributed to revitalise Keynesian economics¹⁶.

Wyplosz (2007) and IMF and World Bank (2009).

13 See, for instance, Mario Monti: “Regole Ue sul deficit ormai poco credibili, cambiamo il Trattato per fare investimenti”. Interview with *la Repubblica*, December 9, 2014.

14 On the issue of the quality of investment projects, see Hulten (1996) and Leduc & Wilson (2013).

15 See also Fatás and Summers (2016); Ball et al. (2014) and Fatás, A. (2000).

16 For a strong statement of how economists have changed their mind about the role of fiscal policy after the last recession, see Furman (2016) and Blanchard and Summer (2017).

8. Hysteresis and the long run effects of fiscal policy

The basic idea of De Long and Summers (henceforth DS) is that, in times of deep recession, a fiscal expansion may positively affect not only current income but also future potential income – and through this channel future tax revenues. Under certain conditions, the enhanced tax revenue may offset the interest cost of the increased debt resulting from the original fiscal stimulus.

In turn, the effects of a fiscal expansion on future income are due to so-called ‘hysteresis’ effects. These positive effects happen when fewer people remain out of work for a long time and lose skills and ability to cope with the job market or when more investment is undertaken to upgrade the capital stock¹⁷.

The importance of this result has sometimes been exaggerated by sentences such as the ones we have been criticising in this paper. It has been claimed that a fiscal expansion is self-financing or that austerity is counterproductive not only in terms of the negative effects it has on income and employment but even on the debt ratio. It is hence essential to clarify what BS prove and under which assumptions. Three points are worth emphasising.

The first one is that they are concerned about situations of deep recessions, in which monetary policy is constrained by the so-called zero lower bound, i.e. it is already very expansionary but cannot become even more expansionary due to diminishing effectiveness of unconventional policies. This is an important point for DS because they state that in normal times the values of the multipliers are much smaller (or even zero) and little or no expansion can be engineered through a fiscal stimulus. Hence, the argument is that in a situation like the one that occurred in 2008-2009, it was appropriate to implement packages of fiscal stimulus, as it was done in virtually all major countries.

The second key assumption of DS is that interest rates are not affected by the decision to expand fiscal policy, both because the central bank pursues a very expansionary policy and because markets do not have doubts about the

¹⁷ These effects were first analysed in Blanchard and Summers (1986).

sustainability of the debt. This may well have been the situation in the United States in 2009, but it was hardly the situation of those European countries that risked losing access to market financing in the period between 2010 and 2012. It would thus remain open the issue of fiscal tightening as opposed to fiscal loosening in times of distress if market access is at stake, as it was the case in Italy in 2011-2012.

The crucial third assumption, the one that in this context is most important, is that they consider the effects of a temporary fiscal expansion. Spending is increased for a limited period, which in their empirical simulations is typically one year, and then reduced to its initial level. This is a fundamental qualification: it may be true that, under certain circumstances, a fiscal expansion is self-financing, but it must be clear that following any current expansion there must be restriction at a later stage.

What does then mean that the expansion is self-financing? The answer is that the future increase in potential income is such that in the future the increased cost of the debt may be matched by a larger tax revenue. It does not mean that the government can spend more forever and do away with it.

From the policy viewpoint, this theme is of fundamental importance. It must be made clear to policymakers that a stimulus package today implies a restriction tomorrow. Moreover, it also implies that, when the stimulus is withdrawn from the economy, national income falls by almost as much as it rose when the stimulus was introduced. The novel aspect here is the word “almost”. While in all the Keynesian models we have considered so far in this paper, when the stimulus is withdrawn, income goes back exactly to its initial level, in the DS framework, it does not do so – because the state of the current cycle has lasting effects on future potential income. BS’s empirical estimates of such lasting effect are indeed minimal, but they may be important precisely because they last over time. For instance, if one considers the baseline estimate contained in their 2012 paper, a one dollar increase in spending for one year has a multiplier of 1.5, i.e. causes income to rise by 1.5 dollars. What happens in the second year? Their hysteresis parameter is 0.1, meaning that 1.5 additional dollars of income in year one has lasting effects of 0.15 ($=1.5 \times 0.1$). Therefore, it is correct to state that income goes back “almost”, but not quite to its initial level from year two onwards.

Given the small coefficient of the hysteresis effect, one may wonder why it is so important in terms of the long run sustainability of the debt. The answer lies in the above assumption that the expansion is temporary so that the increase in the debt is quite small. Still, using DS numbers, the additional debt that is created by a one-dollar expansion for one year is half a dollar, because the multiplier is 1.5 and the revenue increases by $1/3$ for every dollar of additional national income. So, the debt which is created (which is equal to the increase in the deficit) is $0.5 \left(= 1 - \frac{1.5}{3} \right)$. If the real interest rate on the debt (in excess of the real growth of the economy) is 2.5%, then the burden of the debt on the national economy is 0.0125 dollars (=2.5% on half a dollar). This number is easily matched by even a tiny increase in tax revenue caused by the future increase in income; the latter will be 0.15 (the increase in future income) multiplied by the tax share ($1/3$), that is 0.05 dollars. Therefore, under these assumptions, the burden of the debt increases by 1.25 cents and tax revenue by 5 cents. These are all pretty small numbers relative to the one-dollar initial fiscal package, but again they are justified by the fact that the debt increases by very little because the stimulus is temporary. However, the fact that these numbers are quite small makes them very sensitive to relatively small changes in assumptions.

A further critical assumption of the BS framework is that economic agents neglect the fact that the stimulus package is temporary. In practice, this may be one of the most challenging issues for a policymaker who wants to implement the suggestion of DS. On the one hand, it is widely believed that only permanent actions affect economic behaviour; for instance, a temporary tax cut is very likely to lead to higher savings, not to higher spending. On the other hand, it is necessary to make clear that the action is temporary to maintain confidence within financial markets. This problem becomes evident in an important IMF policy paper (Gaspar et al. (2016)) that tries to design what IMF managing director Christine Lagarde defined as a “comprehensive, consistent, and coordinated approach to economic policy”. In this context, it is essential for a package of fiscal stimulus to be part of a framework aimed at financial stability in the long run. At the same time, the authors do recognise that a fiscal stimulus that is perceived as temporary is unlikely to be effective.

A further problem connected with the previous one is that commitments

about fiscal policy are rarely credible. A government may well state that a fiscal expansion is temporary. However, experience shows that it is very easy to expand, and it is very difficult to rain in the expansion when it is no longer needed. Moreover, if it is perceived as temporary, it may not trigger the change in the behaviour of economic agents that would be necessary to enhance economic growth. This is indeed the main reason why most economists used to think that it was better to use monetary policy to stabilise the economy than to use fiscal policy. Only the recent experience with monetary policy constrained by the zero-lower-bound has forced economists to rethink how to appropriately use fiscal policy as a stabilisation tool.

Of course, the DS paper has spurred new empirical work about the relevant parameters and, more generally, the effects of fiscal policy on income and the debt ratio. According to Auerbach and Gorodnichenko (2017), a fiscal shock can be beneficial in terms of the sustainability of the debt, while an opposite view emerges from work done for instance by Valerie A. Ramey (2012, 2017).

What then can we conclude from this brief survey? As Cottarelli (2017) argues, these new theories may be useful for times when the economy is in a deep recession, as in 2009. In that circumstance, a stimulus package was appropriate and was appropriately presented in most countries as an extraordinary measure justified by extraordinary times. However, once economies started to recover, it was also appropriate to gradually return to fiscal discipline¹⁸. It can be discussed whether the pace of fiscal consolidation has been too fast, especially in Europe. However, it would not make much sense to propose a renewed fiscal expansion in normal times. There is no need to save the world economy from near-collapse, as it was the case in 2008-2009. In normal times, the focus should be on enhancing economic growth on a sustainable basis. In this circumstance, we cannot use fiscal expansion as in 2008-2009. The idea of putting in place a new stimulus package while committing to fiscal discipline in the long run, would have zero credibility in most countries: increased spending is not a good way to commit to fiscal discipline. It can perhaps be done once, but it can be hardly repeated over time. From now, we have to worry about very high levels of debt in most countries, which

18 See Skidelsky & Fraccharoli (2017).

is the legacy of the great recession. DS may well be right in arguing that the fiscal stimulus packages implemented during the recession have improved the outlook for the real economy for an extended period. However, the time has come to worry about debt levels that are a source of dangerous fragility in many countries.

9. Conclusions

This paper has tried to answer the question of whether fiscal discipline can indeed be counterproductive. The answer cannot be summed up in one line because some nuances need to be taken into account. In general, budgetary discipline is a necessary ingredient for any plan of fiscal consolidation. So, if the ratio of debt to national income is on a rising path that is deemed unsustainable, pursuing restrictive budgetary policies is of the essence. Two alternative propositions, belonging to the tradition of naïve Keynesianism, have been analysed. According to the first one, a stimulus package may be self-financing in the sense that it generates such large increases in income and tax revenue as to balance the budget. This proposition is found to be inherently untenable within the framework of a standard Keynesian demand-led model. It is also empirically implausible if one adds considerations on the supply side of the economy – such as the effects of lower taxes on work incentives (the Laffer curve) or the effects of very efficient public investment on the productive potential of the economy. To be sure, counterexamples do exist: for instance, investment projects undertaken to rebuild territories which have been damaged by natural catastrophes may have very strong effects on the productive potential of such territories, for the obvious reason that otherwise, no economic activity could take place. However, such counterexamples seem to be rare, and comparisons across countries and regions suggest that even sizable differences in the investment intensity of GDP are often not reflected in differential rates of economy growth.

A different proposition, still belonging to the realm of naïve Keynesianism, is that fiscal consolidation is counterproductive because it can lead to

increase rather than a reduction in the ratio of debt to national income. This proposition can be true in the short run, under certain conditions regarding, in particular, the multiplier (which must be high) and the feedback effects of income on tax revenue and the budget (which must also be high). However, as time passes this proposition is less likely to be true – and is certainly false in the long run. Indeed, even if the multiplier is very large, sooner or later the net subtractions to the stock of the debt caused by a smaller deficit (or a larger surplus) protracted over time must surpass the decrease in national income caused by the initial drag.

An important caveat must, however, be highlighted: it may well be the case that a restrictive fiscal package has perverse effects on the debt ratio which last for several years. This may pose a serious challenge to policymakers because markets see a rising debt and may lose confidence in the country. It may also be a problem for national cohesion, as the electorate must bear sacrifices and sees no results regarding debt stabilisation and future room for tax reductions. In such circumstances, anti-austerity movements may have an easy game in claiming that the policy of consolidation was indeed ineffective and counterproductive. In principle, measures of the cyclically adjusted or structural balance should be capable of producing the correct picture about the state of public finance. However, in practice, we know that such measures are very controversial and may not always give the correct picture. Also, markets may prefer to use a simple indicator, such as the debt ratio, to assess the sustainability of a borrower.

The implication for policy seems to be that, unless a financial catastrophe is imminent, a policy of fiscal consolidation must be implemented gradually, to avoid generating long periods in which the debt ratio rises instead of falling. There is, thus, a narrow path that ensures that consolidation takes place without causing an increase in the debt ratio, which is temporary but may nonetheless pose some serious challenges. Another possible implication is that, in periods of slack, the government should try to cut future spending (such as pension entitlements, if they are too generous, to begin with), rather than current spending.

These propositions do not seem to require much qualification when one considers horizons which are much longer than the Keynesian short run,

along with the lines that were first explored by Blinder and Solow (1973). The major added insight of such models is that in the long run, a large debt tends to crowd out either productive capital or net foreign assets, thus causing a welfare loss to future generations. Despite much initial uncertainty among economists on this issue, it cannot happen that increased government spending is self-financing because of life cycle considerations in the consumption function.

A major qualification to the above conclusions is instead suggested by the literature developed after the recent crisis, along with the lines of De Long and Summers (2012). This literature brings together two separate strands of research that have been motivated by the crisis. The first one regards the size of the multipliers which are estimated to be considerably larger in times of recession. The other concerns the so-called 'hysteresis', i.e. permanent effects of a long and deep recession on future potential output. The core argument of this literature is that there are good reasons to use fiscal policy for the purpose of stabilising the economy in times of deep recessions.

This conclusion is at variance with the old, pre-crisis views according to which activist fiscal policy is seen with great suspicion, because of the risk of it being pro-cyclical and very much intertwined with political cycles. This being said, two points should be made clear about this 'new view'.

The first one is that it applies to rare situations, such as the deep recession of 2008-2009. The second one is that this view justifies only temporary fiscal stimuli. A higher deficit is justified for a year or more, but once the recession is over it should be reined in. Sometimes, proponents of this new view state that deficits are 'self-financing'. This expression may be misleading or in any case, needs clarification. The theory, as well as the ensuing empirical evidence, suggest that only the interest rate cost legacy of the debt accumulated during a recession is covered by the higher taxes generated by hysteresis effects on long-run potential output. It should then be clear that a fiscal expansion today implies a restriction sometimes in the future. This, in turn, implies that a policy-induced higher income today should be followed by a policy-induced lower income sometimes in the future, whose intensity depends on the current and future state of the economic cycle.

Overall, the great recession has changed our view of the role of activist

fiscal policy, in the sense that exceptional policy tools must be used during exceptional times. However, in normal times old theories and the old accumulated wisdom are still fundamentally valid.

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Appendix: the arithmetic of Blinder and Solow (1972)

This appendix contains a little algebra we found useful in order to clarify the discussion of section 6 above.

Consider the following model, which replicates Blinder and Solow (1972) except for the fact that we consider an open economy with perfect capital mobility and perfect asset substitutability. As in BS, we abstract from interest payments (or assume that the internationally given interest rate is equal to zero):

- | | | |
|-------|---|---|
| (A.1) | $\dot{W} = [Y - T(Y)] - C[Y - T(Y), W]$ | Wealth accumulation |
| (A.2) | $\dot{B} = G - T(Y)$ | Government budget with no money financing |
| (A.3) | $Y = C + G + X - M(Y)$ | National income |
| (A.4) | $\dot{F} = X - M(Y)$ | Accumulation of net foreign assets of the country |
| (A.5) | $W = F^d + B^d$ | Wealth invested in net foreign assets or debt |
| (A.6) | $F = F^d - (B - B^d)$ | Composition of net foreign asset of the country |

As in BS, a dot over a variable indicates derivative with respect to time. Variables have the following meaning:

- W is net wealth of the private sector;
- Y is national income;
- $T(Y)$ is tax revenue as a function of national income;
- $C[\cdot]$ is the consumption function;
- B is government bonds;
- G is government spending;
- X is exports;
- $M(Y)$ is the import function;
- F is net foreign assets of the country;
- F^d stands for net foreign assets of the private sector;
- B^d stands for public debt held by the domestic private sector.

Note that equation A.6 states that country net foreign assets are equal to net foreign assets held by private sector residents (F^d), minus the public debt held by non-residents – which in turn is equal to the total debt (B), minus the debt held by residents (B^d). In this model the composition of wealth between foreign assets and debt is a matter of indifference, since assets are supposed to be perfect substitutes. Using equations A.5 and A.6, total wealth of the private sector can be written as the sum of net foreign assets of the country, plus the entire public debt, i.e.

$$W = F + B \quad (\text{A.7})$$

This expression is probably more familiar than equation A.5, although in this context it is a little misleading since it seems to suggest that the entire public debt must be held by residents. Still, this is not the case: the public debt could be held entirely by non-residents ($B^d = 0$), in which case, of course, residents would hold a larger amount of foreign assets.

It should be immediately obvious from this set-up that the bonds issue has no effect on saving decisions of the private sector, and hence on consumption and income. To further clarify, consider again the thought experiment in which consumers are content with the stock of wealth they have accumulated, while the government continues to issue bonds in order to finance the deficit. From equation A.1, we have that consumption is equal to disposable income, i.e.

$$C[\cdot] = [Y - T(Y)] \quad (\text{A.8})$$

Using this expression in the income identity, we get

$$X - M = -(G - T) \quad (\text{A.9})$$

Equation A.9 tells that the budget deficit is equal to deficit of the current account of the balance of payments. This implies that

$$\dot{F} = -\dot{B} \quad (\text{A.10})$$

The new debt crowds out net foreign assets, either because it is bought by non-residents or because it is bought by residents who, in turn, sell foreign assets.

This is an extreme example, but the point is a general one. The issuing of public bonds does not necessarily feed into the consumption of residents, even in a model in which such bonds are considered net wealth. Note that this does not imply that an increase in spending does not have an impact on saving by the private sector. An increase in spending does generate an increase in income through the goods market equilibrium condition, leading to a positive impact on private saving. So, we are not 'resuscitating' some kind of Say's law. What we are simply stating is that the bond issue, which follows the initial creation of a deficit, does not have a direct impact on saving and income.

The same conclusion holds in a model that take into account the capital stock, regardless of whether assets are perfect or imperfect substitute. The general principle is that the debt is not a manna that falls from heaven into the consumption function. There must be a reason for consumers to be willing to hold additional debt in their portfolio. This reason may have to do with the interest rate promised on the debt in relation to other assets. Depending on asset substitutability, the increase in the debt may crowd out real capital or foreign assets. In both cases, as in above cited statement by Janet Yellen, it reduces future income of the community.

For the limited scope of this paper, it is thus clear that considering wealth effects in the consumption function is not a road towards a free lunch. An increase in the deficit cannot be self-financing. Sooner or later, the process of debt accumulation must come to a halt and this requires restrictive, not expansionary, budgetary policies.

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