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Briefing Note

IS PUBLIC BORROWING JUSTIFIED IF FOR INVESTMENT ONLY?

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1. INTRODUCTION

The case for public sector borrowing for investment, as differentiated from borrowing to fund current expenditure, has been made regularly in the last two decades. The general case, in the UK context at least, probably dates back to the late 90's in the form of the 'golden rule' propagated by the then Labour Chancellor, Gordon Brown. That required a balance between revenue and current expenditure over the cycle. The associated 'public debt' rule allowed a limited level of deficit to fund 'sustainable' investment, while holding the debt close to 40% of GDP. These rules have been revived recently by the Labour Party and also endorsed, to a greater or lesser extent, by the Liberal Democrats.

The justification for such treatment of borrowing for investment is however seldom made explicit and may rest on little more than the intuitive plausibility of the idea that spending for investment must, somehow, be different from current spending. A justification may after all be found in the conventional wisdom of the private economy. Major investment projects are not normally expected

to be funded from current revenue, even when that may be possible. Yet borrowing for investment may have the additional characteristic of paying for itself through more economic growth. That aspect may rest on some intuitive version of the 'multiplier', another bit of conventional wisdom. That is the effect of government expenditure generating higher incomes and hence more tax revenues, so as to offset the cost of the investment and possibly even *reduce* the deficit.

The idea has received renewed interest in the current election campaign and in the context of the ongoing deficit/debt reduction debate. Indicatively, the views of the main political parties in this regard were juxtaposed at a radio interview with David Gauke and Chris Leslie as spokesmen for the Conservatives and Labour respectively.[1] For the Liberal Democrats Vince Cable has recently criticised the 'archaic way' in which the Treasury fails to make sufficient distinction between growth enhancing capital investment and other public spending.[2] A degree of belief in the self-financing properties of investment spending is probably shared by all those who view austerity-induced low growth or recession as a more urgent issue than the debt/deficit, if not the cause of limited progress towards debt/deficit reduction.

This paper argues that a) public spending for investment is no different from current, as regards its multiplier properties and that b) any increase in public spending can only be partially self-financing, depending on the size of the multiplier. The discussion points to the need to target the budget as a whole and with full consideration of the balance sheet of public assets and liabilities.

2. THE CASE ASSESSED

Investment costs are normally recovered through the prices of the resulting goods or services. But that does not apply to much public infrastructure investment, to the extent that the resulting goods or services are *selected for 'free' provision*, i.e. without charge. For such goods will not, by definition, generate more revenues and the investment will then not pay for itself. Infrastructure investment of course normally yields economic benefits, *but not necessarily more government revenues.*

Any recovery of the costs of investment can then only be through the multiplier effects. Such effects would indeed follow, but from *any autonomous increase in expenditure*, public or private, including 'current'. Reflecting this, macroeconomic models generally show *all* government expenditure as '*G*', undifferentiated as between current and investment spending.

Furthermore, such multiplier-induced increases in tax revenue *cannot recoup more than a fraction* of the cost of the extra (investment or current) spending. In the absence of additional, dedicated measures to fill the gap, that would simply become an addition to the deficit, and hence, to public debt.

The following basic reduced- form goods and services (IS) model can be used to illustrate these propositions

[1] BBC Radio 4 World at One, Interview, 11 Dec, 2014.
[2] As reported in The Times, 6 March, 2015.

$Y = C + I + G$

where Y is income, C is consumption, I is investment and G is government expenditure.

$C = a + b(Y-T)$

where a is autonomous consumption, b is the marginal propensity to consume and T is tax receipts determined endogenously by

$T = tY$

where t is the rate of tax (proportional only).

At equilibrium $Y = \dfrac{a + I + G}{1 - b + bt}$ (1)

Then $\Delta Y = \dfrac{1}{1 - b + bt}\Delta G$ (2)

where ΔG is financed by borrowing. (For simplicity interest is ignored).

The *multiplier is however the same* for ΔG, as for ΔI or Δa, and *whether G represents current or investment expenditure.*

Now $\Delta T = t\Delta Y = \dfrac{t}{1 - b + bt}\Delta G$ (3)

For $\Delta T = \Delta G$ we would need $\dfrac{t}{1 - b + bt} = 1$, or $t = 1$, an implausible tax rate. Or else, equally implausibly, $b = 1$.

For plausible values of $0 < b < 1$, $0 < t < 1$ and $t < b$, the denominator of (3) will be larger than the numerator, hence $\Delta T < \Delta G$. *The extra tax revenue will not fully cover the extra spending.*

As an example, a very high b of 0.7 and a t of 0.3 would produce a multiplier of 2.56, much higher than the IMF's estimate of a multiplier of between 0.9 and 1.8, but still not enough to equate ΔT with ΔG in (3). For a t of 0.3 the multiplier would need to be just over 3.3 to produce a ΔT to match ΔG.

The gap would become larger if we expanded the model to include exogenous exports X and an import function such as $M = h + m(Y - T)$ where M is imports, h the autonomous component of import spending and m the marginal propensity to import.

That has an equilibrium income of $Y = \frac{a + I + G + X - h}{1 - b + bt + m - mt}$ and an even smaller multiplier $\frac{1}{1 - b + bt + m - mt}$.

The increase in G would also widen the current account deficit, if there were one to start with.

Alternatively, or in addition, we could incorporate the monetary interface through an LM curve. This would, in 'normal circumstances' offset, partially at least, some of the positive effects of the fiscal expansion, again reducing the size of the fiscal multiplier and lending further support to the present argument. In recognition, however of the 'liquidity trap' effects of current record low interest rates, emphasised by the advocates of expansion, the discussion is not extended in that direction, although this theme is touched on briefly in section 3.

2.1 Does public investment automatically reduce the deficit?

Since the tax revenue cannot fully recoup the investment, as shown above, it would, *a fortiori*, fail to produce a surplus and deficit reduction. Again, in terms of the basic model, and starting from the equilibrium of (1), we define the deficit (or surplus) as:

$$D = G - T = G - tY = G - t\frac{a + I + G}{1 - b + bt} \qquad (4)$$

with $D > 0$, or $D < 0$

For a reduction we would need $\frac{dD}{dG} < 0$

From (4) we have:

$$\frac{dD}{dG} = 1 - \frac{t}{1 - b - bt} \qquad (5)$$

As long as $0 < 1 - b + bt < 1$ the second term is also between 0 and 1.

Therefore $\frac{dD}{dG} > 0$ and deficit *increases* (or surplus decreases)

2.2 Is the deficit reduced as a % of GDP?

This is clearly a lesser claim than the one of the previous subsection. It is perhaps in this sense that the case for investment spending to support a growth orientated agenda will most often be made.

Now define the deficit as a proportion of Y as:

$$R = \frac{D}{Y} = \frac{G}{Y} - \frac{T}{Y} = \frac{G}{Y} - t = \frac{G}{\frac{a+I+G}{1-b+bt}} - t = \frac{G(1-b+bt)}{a+I+G} - t \qquad (6)$$

For a reduction we would need $\frac{dR}{dG} < 0$

From (6) we have

$$\frac{dR}{dG} = \frac{(1-b+bt)(a+I+G) - G(1-b+bt)}{(a+I+G)^2} =$$
$$= \frac{(a+I)(1-b+bt) + G(1-b+bt) - G(1-b+bt)}{(a+I+G)^2} = \frac{(a+I)(1-b+bt)}{(a+I+G)^2} \qquad (7)$$

From (7) dR/dG is clearly > 0, as long as $1 - b + bt > 0$

Therefore, once again, the deficit *increases* (or surplus decreases), this time as a % of GDP.

2.3 Does the rate of growth play a part?

The foregoing analysis, being 'static', arguably does not capture adequately the effect of GDP growth. Rather than being represented by the multiplier, the rate of growth may thus need to figure explicitly in the analysis.

The following recasts the argument in terms of a simple version of the steady-state Harrod Domar growth model.

Denote by s the marginal, and for simplicity also the average, propensity to save. Denote by c the average (and also marginal) capital /output ratio (or accelerator). Equilibrium requires that savings S equal investment I. If $S = sY$ and $I = c\Delta Y$ then we have $sY = c\Delta Y$ from which the 'warranted' steady state rate of GDP growth g^* is:

$$g^* = \frac{\Delta Y}{Y} = \frac{s}{c} \qquad (8)$$

Steady state growth also requires that $S = I$ is maintained through time, that is that $\Delta S = \Delta I$.

Now $\Delta S = s\Delta Y$, hence $\Delta Y = (1/s)\,\Delta S$ or $\Delta Y = (1/s)\,\Delta I$. From the accelerator, $I = c\Delta Y$, hence $\Delta Y = (1/c)I$. Equating the two expressions for ΔY we have $(1/s)\,\Delta I = (1/c)I$, from which

$$\frac{\Delta I}{I} = \frac{s}{c} = g^* \qquad (9)$$

showing that investment (and saving) must also grow at the warranted rate of growth g^*.

Assume now, for the purposes of this argument that all government spending is for investment and that all investing in the economy is carried out by government, to produce goods or services provided, as before, for free. Then, replacing I with G in (9), we have:

$$\frac{\Delta G}{G} = \frac{s}{c} = g^* \qquad (10)$$

The question now is at what rate tax revenue would grow. But, obviously:

$$\frac{\Delta T}{T} = \frac{t\Delta Y}{tY} = \frac{\Delta Y}{Y} = \frac{\Delta G}{G} = g^* \qquad (11)$$

Tax revenue grows, that is, at the same rate g^* as all the other magnitudes, and *irrespective of the rate of tax*.

Thus, if $\Delta T\ (= t\Delta Y)$ is insufficient to match ΔG in the starting period, the gap will *not* be closed by subsequent growth in the steady state.

3. THE CONTEXT OF THE ACADEMIC DEBATE

Of the voluminous literature on Keynesian 'fiscal activism' and opposition to it, this note should ideally be placed alongside publications which address, directly or indirectly a) the purported inherent difference of investment and current spending and b) the 'self-financing' aspect of public investment, and public expenditure generally.

We take the 'Keynesian' side of the debate to be represented by J. Bradford deLong and Lawrence H Summers (2012).[3] As regards a) the ΔG of fiscal expansion in DeLong and Summers represents 'government purchases' generally and is thus, like in the present discussion, *not* differentiated as between current and investment spending. As regards b) they define 'self-financing fiscal policy', as one that improves the budget enough to *cover the extra debt interest*, while maintaining a *stable long run debt to GDP ratio.* This modest and realistic

[3] See "Fiscal Policy in a depressed Economy" *Brookings Papers in Economic Activity*, Spring (2) 2012, pp 233-297. The simple analytics presented here essentially follows the same methodology as the DeLong and Summers opening model (pp 237- 241), although theirs is a more in depth treatment.

definition contrasts rather sharply with some of the implied claims discussed here, which look to recover through tax-and- transfer *most or all of* ΔG, not just the interest on it.

The Delong and Summers model also features interest rates and hysteresis effects. With these it is shown that, in recession and under favourable values of the relevant parameters, fiscal policy can be self-financing, and indeed may leave a net fiscal dividend, to reduce the debt over time. These results seem reasonable. It should nevertheless be emphasised that the debt *must increase in the first place*, by ΔG minus net tax and transfers, before it is held stable (at the higher level), or possibly reduced. To that extent, *mutatis mutandis*, our conclusions so far are confirmed.

The 'pro austerity' view may well be represented by a very recent paper by Congdon (2015).[4] This, although not addressing directly the two aspects of concern in the present discussion, does undertake a useful review of the effects on the output gap of periods of fiscal expansion/contraction in US and UK since 1980. The finding is that periods of fiscal contraction tend to be *positively* associated with reductions in the output gap, essentially with growth out of recessionary episodes. That is of course contrary to what would have been expected from the conventional Keynesian stance. The paper's approach is appropriately characterised by the term 'expansionary, fiscal contraction', a term, incidentally, dismissed as 'oxymoronic' by Summers.

4. REDEFINING THE MULTIPLIER?

Apart from being a very rough proxy for the growth rate, the 'conventional' multiplier used at the outset may fail to capture other effects of investment spending. That will be the case if infrastructure or innovation spending has positive 'externalities' in reducing private agents' production costs. Such reductions might be due to zero charge provision of e.g. more roads, broadband connections, better health, education or environmental services. Lower production costs will lead to more production of *other* goods, hence a bigger ΔY than indicated by the multiplier. To that extent the multiplier, as usually defined, will underestimate overall growth and hence the growth of tax revenue.

Even within the confines of the static model, the multiplier may then need to be *redefined* to encompass such effects. Call these effects 'microeconomic', or 'secondary' for lack of a better name. If they were large enough they would boost the multiplier to potentially reverse the conclusions of the previous sections. In terms of the earlier model, to achieve $\Delta T = \Delta G$, the multiplier would need to be 'enhanced' by a 'factor x' such that:

$\frac{(1+x)t}{1-b+bt} = 1$. This requires a tax rate $t = \frac{1-b}{1-b+x}$, this time plausibly < 1.

Alternatively, given t we would need a 'factor x' of $x = \frac{1-b+bt}{t} - 1$ (8)

[4] "In praise of expansionary fiscal contraction". *Economic Affairs*, Vol 35, Issue 1, pp 21-34, February.

It should be noted however, that for plausible values of *b* and *t*, the required enhancing factor *x* can be quite large. E.g. for $b = 0.6$ and $t = 0.3$, x would need to be 0.93 or 93%. That would only recover the original investment in taxes. If we were aiming to exceed it, thus reducing the deficit, clearly we need an even larger x. These secondary/microeconomic effects are therefore unlikely to be of the required order of magnitude to reverse our earlier conclusions.

5. A 'WHOLE BUDGET' APPROACH?

It seems clear that, rather than the separation of current and investment budgets, more 'whole budget' thinking is needed. The Coalition's plan is to achieve an *overall* surplus by 2020, although the size of the targeted surplus is somewhat uncertain. This surplus is not only needed for debt reduction but as a provision to be made in the 'good times' for a 'rainy day'.[5] Given the limited self-financing potential of infrastructure spending interest must turn towards the *revenue generating potential* of the infrastructure/innovation *assets* created through public investment. Assets would then be identified as having high/low user charge potential, with/without alternative uses, rising/falling disposal values etc. Such potential would need to be drawn upon to supplement the increased tax revenues of expansion, so that we did not rely on the multiplier alone to offset the borrowing. That in turn means that, generally and as in private sector accountancy, we need to pay more attention to the public *balance sheet* of assets and liabilities, especially the asset side, alongside the revenue and expenditure account.

However another issue arises here. The Coalition's plan envisages not only deficit but also *debt* reduction as a % of GDP. This however is to be achieved partly by the disposing of publicly owned assets such as the shares of banks bailed out in the financial crisis of 2008. The revenue foregone from the assets sold would weaken future budgets and, to that extent, *add* to the debt in future. This suggests the need for all political parties to develop more systematic approaches for managing the public balance sheet. The debt side of the balance sheet either does not make sense alone, or needs to incorporate fully the effects of revenues gained or foregone through the management of assets.

6. CONCLUSION

This paper has addressed fairly established and currently reiterated views regarding the purported differences between current and investment government spending, especially the self-financing properties of the latter. Currently voiced claims in this area have been shown to be exaggerated, if interpreted to mean full recovery through tax of the investment cost, rather than recovery of only the interest cost of the additional debt burden. The analysis has been used to trace formally the effects on the deficit in absolute terms and as a percentage of GDP, showing that reductions in either sense do not follow automatically from investment spending. Possibilities have been explored for including favourable externality effects of public investment in simple multiplier analysis, resulting in larger multiplier values and hence more growth and a greater impact on the deficit. A case has also been made for a more comprehensive approach to the budget to recognise the interface between current revenues and costs and capital transactions, leading to more meaningful debt reduction targets.

[5] Mentioned again in the Budget Statement of March 18, 2015.

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