Notes on 'A Code for Fiscal Stability'

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Abstract

This note comments on two central issues for fiscal policy design in the UK, highlighted in the recent 'Code for Fiscal Stability' proposed by the new Labour government. The first concerns the merits of the so-called 'golden rule of public sector investment' -- the proposition that, over the cycle, government borrowing should not exceed government (net) capital formation. The second concerns the case for attempting to construct a more comprehensive balance sheet of public sector assets and liabilities, including tangible public sector assets and certain contingent claims.

The two main conclusions are that the golden rule is without merit but that, subject to some important caveats, the construction of a more comprehensive government balance sheet is a worthwhile enterprise.

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1. Introduction

This note comments on two issues addressed in three recent UK Treasury publications ('A Code for Fiscal Stability' (H.M. Treasury [1997a]), Section 2 of the 'Pre-Budget Report' (H.M. Treasury [1997b]) , and the Pre-Budget Report Publication, 'The Public Sector Balance Sheet' (H.M. Treasury [1997c])). They are likely to play a central role in the design of future fiscal policy in the UK. The first issue concerns the merits of the so-called golden rule of public sector borrowing. This is the proposition that, over the cycle, government borrowing should not exceed government capital formation. The second issue concerns the desirability of constructing a more comprehensive balance sheet of public sector assets and liabilities[1.]

The note does not address the logically prior issue of whether and why certain forms of capital formation should be undertaken by the public sector. Publicly owned and managed capital is utilised in the production of private goods and services. Likewise, privately owned and managed capital is utilised in the production of public goods and services. In recent years, there has been a growing consensus that private provision of public goods and services is often a viable if not a clearly superior alternative to public provision. Like all conventional wisdom, this new consensus may well be driven as much by fashion as by convincing theoretical reasoning and careful empirical observation. With private provision, efficiency and/or equity considerations may require both public funding (partial or full) and, in the case of natural monopolies, public regulation.

1 Many of the technical and conceptual issues are discussed at greater length in a number of earlier publications of mine (Buiter [1983a, b; 1985; 1990, 1993, 1995, 1997a, b]).

2. The Government Budget Identity and Solvency Constraint

We introduce the following notation:

B : government interest-bearing debt, assumed to have a fixed nominal market value and zero maturity.
i : short nominal interest rate.
P : general price level.
G^C : real government consumption spending
G^I : real government gross investment
q : gross real rate of return (cash) on public sector capital
K^G : real public sector capital stock
T : real taxes net of transfers
δ : depreciation rate on public sector capital
p : rate of inflation ($p \equiv \dot{P}/P$).
r : short real rate of interest ($r \equiv i - p$)
Y : real GDP
n : growth rate of real GDP ($n \equiv \dot{Y}/Y$)
L : nominal value of net tangible liabilities of the government, with public sector capital valued at current reproduction or replacement cost ($L \equiv B - PK^G$).
$\tilde{L}$: nominal value of net tangible liabilities of the government, with public sector capital valued at the present discounted value of future net cash flows ($\tilde{L} \equiv B - P_{K^G} K^G$)
b : debt-GDP ratio ($b \equiv B/(PY)$)
b^M : ceiling on the debt-GDP ratio.
d : government deficit-GDP ratio ($d \equiv \dot{B}/(PY)$).
d^M : ceiling on government deficit-GDP ratio.
g^c : ratio of government consumption spending to GDP ($g^c \equiv G^C/(PY)$)
g^I : ratio of government gross investment spending to GDP ($g^I \equiv G^I/(PY)$)
k^g : ratio of public sector capital stock to GDP ($k^g \equiv K^G/Y$)
τ : ratio of taxes net of transfers to GDP ($t \equiv T/Y$)
P_{K^G} : imputed value of a unit of public sector capital
Steady-state values of variables are denoted by overbars.

The starting point is the stylised budget identity of the general government sector given in equation (1).

$$\dot{B} \equiv iB + P(G^C + G^I - qK^G - T) \qquad (1)$$

The central bank is not included in the general government sector so government

borrowing includes borrowing from the central bank. [2] For simplicity, all government debt is assumed to be zero maturity, fixed nominal market value, variable interest rate debt. A more interesting maturity structure, index-linked debt, foreign currency denominated securities and any number of contingent claims could be added without affecting the key conclusions, as could sales and purchases of existing tangible assets by the government (privatisations or nationalisations). Governments spend on consumption and investment, raise taxes, earn a cash return on the public sector capital stock and borrow to finance any excess of outlays over revenues.

If Ponzi-finance is ruled out the following intertemporal budget constraints applies for the government[3,]

$$B(t) = \int_t^{\infty} P(s)\left[T(s) - G^C(s) - \left(G^I(s) - q(s)K^G(s)\right)\right] e^{-\int_t^s i(u)du} ds \qquad (2)$$

Equation (2) states that the present discounted value of current and future primary (non-interest) surpluses should equal the value of the outstanding public debt. Government investment weakens (strengthens) the government's solvency if the present discounted value of current and future gross investment, G^I, exceeds (falls short of) the present discounted value of the future cash returns the government earns, directly or indirectly, on the public sector capital stock, qK^G.

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2 It would be very easy to rewrite the budget identities to refer to the consolidated general government and central bank, or to the consolidated general government, central bank and state enterprise sector.

3 Ponzi finance is ruled out if the present discounted value of the terminal public debt goes to zero, that is, if the long-run growth rate of the public debt is less than the long-run interest rate.

$$\lim_{s\to\infty} e^{-\int_t^s i(u)du} B(s) = 0$$

When the initial stock of debt is positive, this implies that it is not possible to service the debt forever just by rolling it over. At some point primary (non-interest) surpluses will have to be generated.

4 If the present discounted value of current and future gross investment exceeds the present discounted value of the future cash returns the government earns on the public sector capital stock, future taxes will have to be raised, or future public consumption will have to be cut, to make up the shortfall.

Another way of making the same point is to consider the behaviour of the *net tangible liabilities* of the government, $L \equiv B - PK^G$, public debt minus the value of the capital stock (valued here at current reproduction costs[5]). Note that, since

$$\dot{K}^G \equiv G^I - \delta K^G \tag{3}$$

the rate of change of the net tangible liabilities of the general government is given by

$$\dot{L} \equiv iL + P(G - T) + [r - (q - \delta)]PK^G \tag{4}$$

Thus, if one wants to *net out* public sector assets against public sector liabilities, one should allow for any differences between the government's real cost of borrowing, r, and the net real cash rate of return on public sector capital, $q - \delta$

The government's intertemporal budget constraint can, using (3) and (4), be rewritten as

$$\begin{aligned} L(t) = &\int_t^\infty P(s)[T(s) - G(s)]\, e^{-\int_t^s i(u)du}\, ds \\ &+ \int_t^\infty [r(s) - (q(s) - \delta)]P(s)K^G(s)\, e^{-\int_t^s i(u)du}\, ds \end{aligned} \tag{5}$$

The value of the government's net liabilities should equal the present discounted value of

4 As note before, the cash returns, qK^G, include not only user charges and other revenues obtained by extracting fees from the private beneficiaries of the services provided by the public sector capital stock, but also any additions to tax revenues resulting from positive effects of the public sector capital stock on the tax base.

5 For simplicity, I assume that the price index of investment goods producers is the same as the GDP deflator.

current and future *primary current* surpluses if the cash rate of return on public sector capital equals the government's cost of borrowing. If the government's cost of borrowing exceeds (falls short of) the cash rate of return on public sector capital, future primary current surpluses will have to be correspondingly higher (lower).

3. The Golden Rule of Investment

"...over the economic cycle, the Government will only borrow to invest..."(H.M. Treasury [1997a, p.1]).

The distinction between current expenditure (or consumption) and capital expenditure (or investment) is central to both positive and normative economic analysis. Public consumption benefits are exhausted within the accounting or reporting period. Public capital spending yields an (uncertain) stream of future returns beyond the current accounting or reporting period. These returns can take the form of direct or indirect pecuniary (or cash) returns; they could consists of a stream of future public producer services or public consumption services that do not, directly or indirectly, bring a positive net cash flow to the government. In practice, the distinction between current and capital expenditures is fraught with ambiguities. How, for instance, are 'current' expenditures on health and education to be treated? Despite the scope for window dressing this creates, the distinction between current and capital expenditure is a fundamental one, and supports the usefulness of having distinct current and a capital budgets.

3.1 The Golden Rule as a Constraint on Consumption Smoothing

A central message of optimising dynamic economic theory is that the rationale for of borrowing is consumption smoothing *over time*. This is conceptually distinct from the use of financial instruments for smoothing consumption *across states of nature*, that is, for insurance

purposes, as the latter does not, in principle, require any *net* borrowing or lending. In practice, of course, trades over time and trades across states of nature are frequently bundled in a single, compound financial instrument.

Ultimately, all loans are consumption loans. One borrows (or runs down financial assets) when current income is below permanent income; one repays debt (or accumulates financial assets) when permanent income exceeds current income[6.] This applies to households and to their agents, the enterprises they own. It also applies to the government, which, from a normative point of view, is to be viewed as an agent of the household sector.

Government borrowing should facilitate private and public consumption smoothing. Government borrowing, and the use of the government's tax-transfer instrumentarium may permit liquidity-constrained households and firms to borrow on better terms than are available in the market. This is the rationale for counter-cyclical, Keynesian, deficit policies, as implemented through the automatic fiscal stabilisers and, at times, through discretionary fiscal measures to

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6 Let a denote real financial wealth, w real non-asset income, r the short real interest rate and c consumption. It follows that net borrowing, $-\dot{a}$, is given by

$$\dot{a} \equiv y - c$$

where $y = ra + w$ is current disposable income.
Human wealth, h is defined as

$$h(t) \equiv \int_t^{\infty} e^{-\int_t^s r(u)du} w(s)ds$$

and the long real rate of interest, r_L , is defined as

$$r_L(t) \equiv \left(\int_t^{\infty} e^{-\int_t^s r(u)du} ds \right)^{-1}$$

Permanent income, y_p , is defined as

$$y_p(t) \equiv r_L(t)[a(t) + h(t)]$$

The simplest example of consumption smoothing is where consumption equals permanent income, $c = y_p$. This will *e.g.* be the case for a representative, infinite-lived competitive consumer with a time-additive objective functional defined over consumption sequences and a constant pure rate of time preference, whose intertemporal elasticity of substitution is zero. In that case.

$$\dot{a} \equiv y - y_p$$

boost or curtail government borrowing. The three Treasury documents all recognise the countercyclical role of government budget deficits. It could, however, be interpreted more broadly, by recognising a role for government borrowing and lending not just during the conventional business cycle, but in response to any shocks causing a gap between permanent and current government income.

The neoclassical 'tax smoothing' argument for unbalancing the government deficit also has consumption smoothing as its ultimate rationale. This argument for unbalanced budgets applies even when private agents operate in perfect financial markets and there is no reason for the government to borrow 'on behalf of' liquidity-constrained private agents. By smoothing distortionary taxes over time, the excess burden of taxation is minimised and private and public consumption smoothing are facilitated.

Government borrowing means postponing either taxes or public spending cuts. This tends to redistribute resources among generations from the young to the old and from generations currently alive to generations yet to be born. Thus consumption smoothing across generations can be facilitated, although it has to be put in the context of all the government's policies affecting intergenerational distribution (see Buiter [1997b]). The time horizon for this kind of consumption smoothing can of course be much longer than the 'economic cycle' referred to in the Treasury documents.

Businesses and households invest to enhance consumption smoothing by transferring real resources over time. Household investment (in housing and consumer durables) tends to yield its return directly in a future flow of consumer services (the imputed rental of owner-occupied housing and the service flow from the stock of consumer durables). Businesses invest in anticipation of future pecuniary or cash returns. If the investment is successful, the cash return on the investment exceeds the firm's cost of capital. The returns ultimately accrue to households

(the owners of the firms) and thus enhance their scope for consumption smoothing.

Government investment is undertaken in anticipation of future social returns, that may or may not take the form of a stream of cash payments. When the social rate of return exceeds the social opportunity cost of government funds (the government's analogue of the firm's cost of capital), the investment is worth undertaking. The social opportunity cost includes the cost of using distortionary future taxes to service any debt incurred to finance the investment.

Some public investment may yield *direct* cash returns in excess of the government's cost of borrowing. Toll roads are an example. *Indirect* cash returns accrue to a public investment project if the project augments the tax base and higher tax revenues are generated with an unchanged set of tax instruments and an unchanged rate structure. User fees and charges for the private use of public infrastructure may or may not cover, in present value terms, the cost of the infrastructure investment. Indeed there are public sector capital services for which it would be inefficient to charge user fees that cover the full cost of the project, because the public projects are subject to increasing returns to scale. Commuter transport services are an example. Covering the social cost of capital through user fees would result in a lower social rate of return (through increased congestion etc.).

The government also invests in public consumer durables, such as parks, museums, and public broadcasting, for which it may be inefficient to recover the full cost through user fees, either because the consumption of these services is non-rival (up to the point where congestion sets in) or because it is non-excludable. Some public sector investment projects may yield a negative cash flow throughout the life of the projects. This does not mean that one should not borrow to finance such projects. What it means is that future taxes have to be raised, or future transfer payments and future public consumption expenditure have to be cut, by an amount equal, in present value terms, to the initial cost of the investment minus the present value of any future

net cash flows generated by the project.

The preceding argument for the flexible use of public borrowing and lending to facilitate consumption smoothing in response to exogenous shocks, assumes that the private sector consists of rational, intertemporally optimising agents who respond to fundamentals only. Instead, the private sector could itself be the source of shocks. An example would be rational (or irrational) asset market bubbles and associated excessive swings in private consumption and investment. Fiscal policy could be used to smooth private spending in this case too. Again, a golden rule constraint may prevent the fiscal authorities from acting appropriately, thus throwing too much of the burden of stabilising the economy onto monetary policy.[7]borrowing to facilitate

From the point of view of government solvency and the sustainability of the fiscal-financial programme (equations (2) or (5)), if the gross cash rate of return were to equal zero, public sector investment is just like public sector consumption. As indicated earlier, it is not hard to think of (socially useful) projects, for which the gross cash rate of return is negative.

Thus it is not necessarily *prudent* for the government to borrow to finance investment[8], since public sector capital formation may rationally be undertaken without any expectation of future cash returns that are at least equal to the cost of financing the investment. Of course, with risky returns to investment, even private investment projects may fail, *ex-post*, to realise a rate of return at least equal to the private cost of capital. *Ex-ante*, however, a private investment project will be expected to have positive net present discounted value. It is intended, to cover the cost of capital. The public sector, like the private sector, is subject to risk, and may fail to generate the cash returns on its investments that were anticipated when the investment was undertaken.

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7 I am indebted to an anonymous referee for making this point.

8 Of course, the Code for Fiscal Stability only sets an upper bound on the amount the government can borrow. Investment can be, but does not need to be, financed by borrowing.

In addition, there are occasions when the government invests in full knowledge of the fact that the investment will never pay in financial terms. This will happen when the returns either are non-pecuniary or pecuniary but non-rival and/or non-appropriable by the government. In that case future current primary surpluses will have to be generated to meet the excess of the cost of the investment over the present discounted value of the future cash flows it generates, directly or indirectly, for the government.

Thus, while one problem with the golden rule is that it could become a binding constraint on a socially optimal public sector investment programme, resulting in a suboptimal volume of public sector investment, another potential problem is that its mechanical application (-borrowing for investment is prudent-) could lead to excessive borrowing and public sector capital formation.

The belief that borrowing (over the cycle) to finance consumption is imprudent while borrowing to finance investment is prudent, rests on the *observation* that the act of consuming does not add to the consumer's capacity to service debt and on the *assumption* that the act of investing does add (or is expected to add) to the investor's capacity to service debt. The assumption is not necessarily correct for the public sector. The observation about consumption is correct (ignoring efficiency wage arguments for consumers near subsistence). The assumption about investment is not necessarily correct, since, as argued earlier, the returns to the investment may not enhance the borrower's capacity to service debt. Even where it does, capacity to pay and willingness to pay are not the same thing. Developments that enhance an individual's or a government's ability to service debt may actually reduce the likelihood that the debt will be serviced on the terms of the original debt contract.[9]

9 In an international context, a country that borrows overseas in order to enhance the flexibility of its domestic production structure, may reduce its susceptibility tot external sanctions. This may reduce the likelihood of the external debt being honoured in full.

3.2. The Golden Rule and Intergenerational Fairness

The Treasury documents claim that "*...worthwhile capital spending by government provides benefits for both current and future generations.*" and that "*By aiming to match over time the costs and benefits of public expenditure, the golden rule is consistent with the principle of fairness between generations.*" (H.M. Treasury [1997b, p. 16]). The first quote is obviously correct. The validity of the second is debatable. Intergenerational fairness is defined ultimately in terms of the lifetime consumption of both public and private goods and services by current and future generations. The budget impacts on this in many ways.

First, the direct effect of the tax and transfer side of the budget (and of public sector borrowing) can be captured through the generational accounts, which show what each generation contributes, over its remaining lifetime, in present value terms to the government (see Auerbach and Kotlikoff [1987], Auerbach, Gokhale and Kotlikoff [1991] and Buiter [1997b]). One cannot excise a particular lump of government borrowing and investment and determine how it contributes to intergenerational fairness. It can only be assessed in the context of the complete generational accounts. A public sector investment project that appears to be intergenerationally unfair in isolation, may enhance the intergenerational fairness of the budget as a whole, because it compensated for other intergenerational unfairness elsewhere in the generational accounts.

Second, even the generational accounts provide only a partial (and possibly misleading) picture of the effect of the budget on the intergenerational distribution of private and public consumption. The public sector consumption programme (both non-durable public consumption and services and the consumer services derived from the public sector capital stock) is not included in the generational accounts. The intergenerational distribution of the tax burden may

be different from the intergenerational distribution of the public consumption benefits (see Buiter [1997b]).

Third, all items in the budget (taxes, transfer payments and public consumption and investment) affect the before-tax incomes of all generations through their effect on the demand for and supply of labour, on private saving behaviour and portfolio choice and on and private capital formation. These general equilibrium or incidence effects may counteract or re-enforce the direct effects of these measures (at given prices and quantities). The generational accounts do not capture these general equilibrium repercussions on intergenerational distribution (see Buiter [1997b]).

3.3. The Golden Rule and Intertemporal Allocative Efficiency

"The golden rule is also consistent with the principle of efficiency because it means that growth-enhancing public investment will not be sacrificed for current spending or lower taxation" (H.M. Treasury [1997b, p. 16]).

The quote contains a non-sequitur. A public investment project should be undertaken if the social rate of return at least equals the social opportunity cost of the resources allocated to it. As stated earlier, the cost-benefit analysis should allow for the dead-weight losses associated with the possible future use of distortionary taxes if the cash returns on the investment are less, in present value terms, than the cost of the investment.

The criterion that the social rate of return should not be below the social opportunity cost of the project says nothing about the choice of financing for the investment project[10]. If the tax

10 The emphasis on growth as a measure of returns is also rather unfortunate. It is not hard to visualise eminently worthwhile public investment projects that do nothing to raise the growth rate, or that may even lower it.

bases are temporarily buoyant (the government's current income exceeds its permanent income), it may make sense to finance the investment out of current revenues. Again, the optimal borrowing strategy can only be determined by considering the totality of the government's spending programme and revenue raising capacity, now and in the future. Earmarking a particular financing mode for a particular outlay makes no sense as a general principle.

3.4. The Golden Rule and the Public Debt-GDP ratio

The second strict fiscal rule the government proposes to adopt is that "*over the economic cycle, the Government will ensure the level of public debt as a proportion of national income is held at a stable and prudent level"* (H.M. Treasury, [1997a, p. 1]). This raises two issues. First, what is a prudent level of the public debt? Second, is a stable debt-GDP ratio (interpreted as a debt-GDP ratio that is constant over the cycle) consistent with the golden rule?

As I have argued on a number of occasions (see e.g. Buiter, Corsetti and Roubini [1993] and Buiter [1997a]), what constitutes a prudent (or more generally, a desirable) level of the debt-GDP ratio depends on many structural features of the economy and its international environment, and on the inherited initial conditions, or history. In the immediate aftermath of World War II, a debt-GDP ratio of 272 % could not be considered imprudent (the same holds presumably for the 288% figure registered in 1821 in the aftermath of the Napoleonic wars). Private saving propensities can make a public debt-GDP ratio of 60% prudent or unsustainable. The degree of financial development of the economy will affect the inflationary implications of general government borrowing from the central bank. Demographic developments are a key determinant of what is a safe public debt-GDP ratio as are the growth rate of productivity, the government's ability to raise tax rates and expand the tax base or to compress the share of public spending in

GDP. A one-size-fits-all figure such as the 60% ceiling of the Maastricht Treaty makes no sense at all.

As regards the consistency of the golden rule with the achievement of a stable public debt ratio, it is convenient to proceed by assuming the cycle away completely. Real output is assumed to grow at the constant rate *n*.

The behaviour of the debt-GDP ratio is given by

$$\dot{b} \equiv (r - n)b + g^c + g^I - q k^g - t \tag{6}$$

or, letting $d \equiv \frac{\dot{B}}{P Y}$ denote the public sector financial deficit as a fraction of GDP,

$$\dot{b} \equiv d - (p + n)b \tag{7}$$

If borrowing is constrained not to exceed *gross* investment (presumably against the spirit of the government's plans, since capital consumption is current expenditure),

$$\dot{B} \leq P G^I \tag{8}$$

or

$$d \leq g^I \tag{9}$$

the debt-GDP ratio evolves as in (10)

$$\dot{b} \leq g^I - (p + n)b \tag{10}$$

Taxes, net of transfers, as a fraction of GDP are then given by

$$t \geq g^c - q k^g + i b \tag{11}$$

If, in addition to being constrained by the requirement that borrowing not exceed gross capital formation, the government is also up against an externally imposed ceiling on the general government financial deficit as a function of GDP ($d \leq d^M$), the bond-financed component of investment as a fraction of GDP could not exceed d^M. The Maastricht Treaty, which sets

$d^M = 0.03$, would therefore constrain borrowing to finance government investment not to exceed 3 percent of GDP [11.] When both the golden rule and the Maastricht deficit criterion are in effect, government borrowing is constrained by (12):

$$d \leq \min\{g^I, d^M\} \tag{12}$$

If borrowing is constrained not to exceed *net* investment (more in the spirit of the government's plans),

$$\dot{B} \leq P(G^I - \delta K^G) \tag{13}$$

or

$$d \leq g^I - \delta k^G \tag{14}$$

the debt-GDP ratio evolves as in (15)

$$\dot{b} \leq g^I - \delta k^g - (p + n)b \tag{15}$$

while taxes, net of transfers, as a fraction of GDP are given by

$$t \geq g^c + (\delta - \rho)k^g + ib \tag{16}$$

Equations (11) and (16) bring out the fact that, *cet. par.*, lower cash returns on the public sector capital stock imply a higher tax burden (or lower public consumption spending), as does a higher debt-GDP ratio.

Gross general government debt in the UK was 54.5 percent of annual GDP at the end of march 1997. The net general government debt-GDP ratio was about 10 percentage points lower. The growth rate of nominal GDP in 1997 was about 6.0 percent. If the investment-GDP ratio exceeds (is below) 2.7 percent (for gross investment if (10) applies, for net investment if (15)

11 Of course, the Maastricht criteria, or the restrictions of the Stability and Growth Pact, do not impose any restrictions on government investment itself. By restricting the financing options for public sector investment, they are, however, likely to depress the volume of public sector capital formation.

applies), the debt-GDP ratio will be rising (falling), if all investment is financed by borrowing (equations (10) and (15) hold with equality).

Unless the share of government investment in GDP happens to equal the product of the growth rate of nominal GDP and the outstanding debt-GDP ratio, the golden rule (holding strictly, that is, as an equality) will be inconsistent with a constant debt-GDP ratio. It is to be hoped that the references, in the Treasury documents, to a stable public debt-GDP ratio are not intended to mean a debt-GDP ratio that is constant (or constant over the cycle), at its historical value at the moment the golden rule is adopted. That inherited value is arbitrary, a historical accident. While it will inevitably influence and constrain current and future government actions, it has no normative significance and should not serve as a target.

When the Maastricht deficit constraint is not binding under the gross version of the golden rule, holding strictly, (and is therefore also non-binding under the net version, holding strictly), ($d < d^M$), the gross investment version of the golden rule ($d \leq g^I$) permits a larger amount of borrowing than the net investment version of the golden rule ($d \leq g^I - dk^g$).

When the Maastricht deficit constraint is binding under the net version of the golden rule, holding strictly, (and therefore also under the gross version, holding strictly), the gross investment version of the golden rule ($g^I > d^M$) implies that the excess of gross investment over the Maastricht deficit ceiling will have to be financed through higher current revenues or lower public spending. In this case, under the net version of the golden rule ($g^I > d^M + dk^g$), the excess of net investment over the Maastricht deficit ceiling also will have to be financed out of higher primary surpluses. The 'current balance' under the gross investment version of the golden rule exceeds the 'current balance' under the net investment version of the golden rule by the amount of capital depreciation (compare equations (11) and (16)). The implications for taxes, current

spending, investment (gross and net) and borrowing are therefore the same when the Maastricht deficit ceiling binds under the net investment version of the golden rule as when it binds under the gross investment version.

When the Maastricht deficit ceiling binds under the gross investment version of the golden rule, holding strictly, but not under the net investment version, holding strictly, that is ($d^M < g^I < d^M + dk^g$), a smaller amount of borrowing is permitted under the net investment version.

Note that

$$\dot{k} \equiv g^I - (d + n)k^g \qquad (17)$$

Consider the case where all investment (gross or net, depending on which version of the golden rule applies) is financed by borrowing. For a given real growth rate, n, inflation rate, p, depreciation rate, d, and share of gross government investment in GDP, g^I, the system describing the behaviour of the public debt-GDP ratio and the public sector capital-GDP ratio (equations (10), holding with equality and (17), or equations (15), holding with equality, and (17) is stable.[12.]

The steady-state public sector capital-GDP ratio, $\bar{k}^g$, is given by (18) under either the gross or the net version of the golden rule.

$$\bar{k}^g = \frac{\bar{g}^I}{\bar{n} + \bar{d}} \qquad (18)$$

If government borrowing equals gross investment, the steady-state debt-GDP ratio, $\bar{b}$, is

$$\bar{b} = \frac{\bar{g}^I}{\bar{p} + \bar{n}} \qquad (19)$$

12 We also require $p + n$ and $d + n$ to be positive.

If government borrowing equals net investment, the steady-state debt-GDP ratio is

$$\bar{b} = \frac{\bar{g}^{I} - d\bar{k}^{g}}{\bar{p} + \bar{n}} = \frac{\left(\frac{\bar{n}}{\bar{n} + d}\right)\bar{g}^{I}}{\bar{p} + \bar{n}} \tag{20}$$

Consider the case where the long-run growth rate of nominal GDP is 5 percent per annum (the sum of the UK government's inflation target of 2.5 percent per annum and a reasonable estimate of the trend growth rate of real GDP in the UK). Assume also that the annual depreciation rate of general government capital is 5 percent (implying a half-life of 14 years). Then, under the gross investment version of the golden rule, the Maastricht general government debt ceiling of 60 percent of annual GDP ($b \leq b^{M} = 0.60$), applied to *net* public debt, would be satisfied only if the general government's gross investment-GDP ratio were less than or equal to 3 percent in steady state. Under the net investment version of the golden rule, general government gross investment could not exceed 9 percent of GDP in steady state. This assumes, of course, that all investment is financed by borrowing.

In fact, the Maastricht criteria are set in terms of *gross* general government debt (for reasons known only to the authors of the Treaty, and possibly not even to them). As was noted earlier, in the UK the gross debt of the general government is about ten percentage points of GDP higher than the net debt. If this relationship between gross and net debt-GDP ratios were to continue, the ceiling on the net debt-GDP ratio would be about 50 percent. With a growth rate of nominal GDP of 5 percent per annum, general government gross investment could not exceed 2.5 percent of GDP under the gross investment version of the golden rule. Under the net investment version of the golden rule, general government gross investment could not exceed 7.5 percent of GDP in steady state [13] Again, it is assumed that all investment is financed by

13 Gross fixed capital formation by the central government and local authorities in the UK fell

borrowing.

If the Maastricht deficit constraint is binding (and all investment is financed by borrowing), steady state gross investment as a fraction of GDP under the *gross* version of the golden rule is (trivially) given by

$$\bar{g}^{I} = \bar{d} = d^{M} \tag{21}$$

If the Maastricht deficit constraint is binding (and all investment is financed by borrowing), steady state gross investment as a fraction of GDP under the *net* version of the golden rule is, from (15) and (18), given by

$$\bar{g}^{I} = \left(\frac{\bar{n} + d}{\bar{n}} \right) \bar{d} = \left(\frac{\bar{n} + d}{\bar{n}} \right) d^{M} \tag{22}$$

Using the earlier numerical values ($d^{M} = 0.030$; $n = 0.025$ and $d = 0.050$), this would constraint government gross investment not to exceed nine percent of GDP [14] in steady state.

3.5 The Golden Rule as Political Economy and the Role of the Policy Adviser

The political economy argument for the golden rule is that it is a desirable, nay essential, straight-jacket that the polity, in a one-off against public profligacy. In the absence of this constraint, public sector consumption spending (and public sector transfers and subsidies to favoured sectional interests) would be higher than optimal. The argument that there is likely to

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from 4.7% of GDP in 1975 to 1.4% of GDP in 1996 (source: Central Statistical Office, National Income and Expenditure, 1997). This decline cannot be accounted for by the privatisation of many nationalised industries since 1979, as these were never included in the general government sector. Part of the decline is due to the reduction is local authority housing construction, which accompanied the privatisation of much of the council housing stock since the 1980s.

14 Note that the GDP growth rate assumption and the inflation assumption are such as to allow both the debt ceiling and the deficit ceiling to bind in steady state. The nine percent of GDP figure assumes that gross public debt (which characterises the Maastricht debt ceiling

be a tendency towards 'excessive' government deficits is, however, by no means straightforward. It is quite distinct from the argument that the public sector (as measured, say, by the size of the public sector consumption programme, or by total public spending, or by public sector employment) is likely to be suboptimally large. That kind of proposition is fairly easy to generate from the assumptions of an unequal distribution of pre-tax and transfer wealth, distortionary taxation and majoritarian and therefore redistributional decision making.

The argument that public deficits are likely to be too large must be an intertemporal argument. The poor, after all, are likely to vote for redistribution today *and* tomorrow. Myopia in its most extreme form, that is, a failure to recognise the intertemporal budget constraint of the government, can produce an excessive deficit bias. Without myopia, and with rational expectations, an excessive deficit bias requires the government to be more impatient than the private sector. There are at least two features of the political-economic mechanism that could produce such a bias. The first is that the government, although benevolent, is incapable of credible precommitment to a programme of spending, borrowing and distortionary taxation[15]. The second is that the political-economic mechanism produces a situation under which by postponing taxes, the tax burden is more likely to be shifted towards those who have a smaller weight in the partisan or sectional government's welfare function than in a textbook benevolent utilitarian or Rawlesian social welfare function. While there are models that generate this kind of outcome (war of attrition models with partisan governments (see Alesina and Drazen [1991]) or models with random election outcomes and partisan governments (see Alesina and Perotti [1995], Alesina and Rosenthal [1995] and Alesina and Roubini [1997]) are examples), these tend to suffer from the deficiency shared by most formal political economy models (a deficiency due

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criterion) and net public debt (which corresponds to *d*) coincide.

15 Lack of precommitment alone can produce either an excessive or an inadequate deficit

to the inherent difficulty of putting together an interesting economic system and a recognisable political governance structure): simplistic or even naïve political games are superimposed on rudimentary or even trivial economic models.

Whatever the merits of the theory and empirics of an excessive government deficit bias, there can be little doubt that central bankers, finance ministry officials and designers of fiscal constitutions tend to believe that such a bias exists. That belief has found expression in the excessive deficit procedures of the Maastricht Treaty and in the Stability and Growth Pact. The former restricts the general government financial deficit not to exceed three percent of GDP and the general government gross debt not to exceed sixty percent of annual GDP[16.] The latter goes further and comes close to insisting that the general government financial deficit be balanced over the cycle.

If one does not share the view that, unconstrained by externally imposed ceilings, government deficits are likely to be excessive, the golden rule, which only requires the *current* budget to be balanced over the cycle, could be viewed as a lesser evil than the Stability and Growth Pact, which requires the government not to borrow over the cycle at all. Even if one might opt for the golden rule over the Stability and Growth Pact if these were the only two choices available, it does seem unwise to accept such severe and arbitrary restrictions on the domain over which choice over fiscal rules can be exercised. Even a hard-nosed pragmatist could conclude that, while the best may be the enemy of the good, the golden rule just is not good enough.

My objections to the proposition that one should not attack or criticise a flawed rule, like the golden rule, for fear of ending up with something worse (an exogenous PSBR constraint, cash

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bias.

16 There are many qualifications and exceptions. For a detailed discussion see Buiter,

limits or the Maastricht/Stability and Growth Pact criteria) are however, more fundamental.

While it is true that the best may be the enemy of the good, I do not believe it to be the task of the academic economist to convince policy makers to do the right things for the wrong reasons. This belief reflects partly an *a-priori* ethical position and partly a pragmatic, instrumental view of the likely consequences of the opportunistic use of white lies and half-truths by expert policy advisers. As regards the former, the scholar as policy adviser or analyst should only ever tell the truth as he sees it - the whole truth and nothing but the truth. As regards the latter, it is based on the judgement that, in the longer run, the uninformed policy maker is likely to do more damage by pursuing a rule about whose true operating characteristics and consequences he has been misled, either deliberately or by a conspiracy of silence among the well-informed [17]. This is true even if, in the short run, the policy maker may make a better choice, prompted by the opportunistic white lies/half-truths of his advisers, than he would have made had he been apprised of all relevant information. Note that this is not a call for making first-best policy recommendations in an N^{th}-best world, but rather for not pretending that N^{th}-best is really first-best.

4. A More Comprehensive Public Sector Balance Sheet

The proposal to produce, on a regular and systematic basis, a more comprehensive balance sheet of the financial liabilities and assets and of the tangible non-financial assets of the public sector (see H.M. Treasury [1997a, c]) is a step towards greater transparency and enhanced accountability. As argued in Buiter [1983a, b; 1985], this balance sheet of contractual obligations

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Corsetti and Roubini [1993].

17 I am referring to the characterisation of the golden rule as "efficient", "prudent", and "intergenerationally fair". These statements are simply untrue.

and claims and tangible, real assets, has to be combined with a forward-looking comprehensive projection of the governments non-contractual outlays and revenues, in order to be able to think systematically about the solvency of the government, the sustainability over various horizons of its fiscal-financial-monetary programme and its intergenerational distributional implications [18.] When such a truly comprehensive balance sheet is constructed correctly, it is quite proper to value the tangible assets at current reproduction or replacement costs. The reason is that any discrepancy between the current reproduction costs of the asset and the present value of the future cash flows it generates is allowed for (along the lines of equations (2) or (5)) in the streams of future non-contractual payments or receipts whose present discounted value is set against the financial liabilities and the tangible assets (valued at reproduction costs).

The more comprehensive balance sheet of financial assets and liabilities and tangible assets proposed by the government is valuable because and to the extent that it is viewed as a key component of the government's intertemporal budget constraint. As a fully comprehensive integration of the balance sheet of contractual financial claims and obligations and the discounted stream of future non-contractual cash flows is probably too ambitious in the short term, it is essential to construct the balance sheet of financial claims and obligations and tangible assets in terms of their (default risk-free) market values or imputed forward-looking valuations. Continuing the simple example of equation (1), the net, 'marked-to-market' financial liabilities and tangible liabilities of the government would be $\tilde{L}$, where

$$\tilde{L} \equiv B - P_{K^G} K^G \tag{23}$$

The imputed value of the public sector capital stock, P_{K^G} , is the present discounted value

18 Such a truly comprehensive, forward-looking balance sheet is also an essential input into the construction of generational accounts.

of its future cash flows [19].

$$P_{K^G}(t) = \int_t^{\infty} P(s)[q(s) - d]\, e^{-\int_t^s i(u)du}\, ds \tag{24}$$

From (24), (23), (17) and (1), it follows that

$$\frac{d}{dt}\dot{L} \equiv i\dot{L} + P(G^C - T) + (P - P_{K^G})\dot{K}^G \tag{25}$$

The government's solvency constraint can now be written as

$$\begin{aligned}\dot{L}(t) = &\int_t^{\infty} P(s)[T(s) - G(s)]\, e^{-\int_t^s i(u)du}\, ds \\ &+ \int_t^{\infty} [P(s) - P_{K^G}(s)]\dot{K}^G(s)\, e^{-\int_t^s i(u)du}\, ds\end{aligned} \tag{26}$$

The value of the government's net financial liabilities minus the value of its tangible assets (valued now in terms of the present value of their future cash flows) equals the present value of the future primary *current account* surpluses plus the present value of the government's future net public sector capital formation, valued at the excess of the future reproduction cost of capital over its future imputed value. For instance, if $P(s) > P_{K^G}(s)$, for some future time interval, and if the government plans to engage in positive net capital formation during that future time interval, then the value of its liabilities increases, since what it has to give up in the future to acquire an additional unit of capital, *P*, is worth less than the present value of the future cash flows that will

19 Equation (24) assumes that the public sector capital stock remains in the public sector forever, that is, it is never privatised. If privatisation, at a price of, is an option, the value of a unit of public sector capital is, in discrete time and under risk neutrality, determined from the following recursion

$$P_{K^G}(t) = P(t)[q(t) - d] + \frac{1}{1 + i_{t,t+1}} E_t \max\{P_{K^G}(t+1), P_{K^P}(t+1)\}$$

where $i_{t,\,t+1}$ is the riskless one-period nominal interest rate in period t and E_t is the expectation

be generated by that additional unit of capital, P_{K^G}.

The integration of the balance sheet of financial asset and liabilities and of tangible assets valued in terms of the present value of their future cash flows, and current and future con-contractual cash flows of the government therefore requires that all cash flows derived from these tangible assets be deleted from the non-contractual cash flows. Gross capital formation is also omitted, but the 'excess value' of the future capital formation programme of the government has to be added in.

While the representation in (26) is equivalent to those in (2) or (5), I believe that if the truly comprehensive balance sheet (or intertemporal budget constraint) cannot be constructed, it is much safer to construct the balance sheet of financial claims and tangible assets using market values or imputed forward-looking valuations rather than current reproduction or replacement costs [20,] because for many tangible general government assets the replacement costs are likely to be significantly in excess of the present value of the future cash flows they can be expected to generate. Excessive optimism about the long-run health of the public sector finances would be encouraged.

Contingent claims.

Many government assets and liabilities have uncertain future cash flows associated with them. They are contingent claims. The first rule has to be that everything is 'on-budget' and 'on balance sheet'. The valuation of such contingent claims in simple in principle and a nightmare in practice. Loan guarantees for instance, can be priced using option pricing methods. Risk-neutral valuations would probably appropriate when the government is the guarantor. Often, however,

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operator conditional on information available at the beginning of period *t*.
20 There is never a case for using historic cost or book values.

there are no markets from which to take guidance for the valuation of the government's contingent assets and liabilities, nor is there a long enough and stable enough historical track record from which to derive frequentist probabilities to quantify the risk. Uncertainty also attaches to the non-contractual future outlays and receipts of the government. The likely future outlays associated with *de-facto* or *de-iure* deposit insurance is a case in point. Compensation for victims of contaminated blood transfusions is another. The risk of future BSE-like calamities is a third. Future tax bases are uncertain, as are long-run demographic developments. There is uncertainty about the discretionary budgetary decisions of successor governments and even of the incumbent government itself. How to deal with this in practice is by no means obvious. The simulation of the government's intertemporal budget constraint under a range of possible and plausible scenarios is one possibility. Application of the insights from 'value-at-risk' methodologies developed for the private sector are another option worth investigating, especially if there are identifiable low-probability calamities for which it would be helpful to make some budgetary allowances in advance.

4. Conclusion

The implementation of the proposal in the Code for Fiscal Stability for the regular construction and publication of a more comprehensive public sector balance sheet including contingent claims and liabilities and attempting a valuation of the government's tangible, physical assets, will enhance the transparency of the governments accounts and encourage more informed policy debate. The conceptual and practical problems involved should not be underestimated, however.

The proposed 'golden rule for public sector borrowing', under which, over the cycle, the government borrows only to finance (net) public sector capital formation, cannot be easily rationalised in terms of generally accepted economic principles. At worst, it could become a straight-jacket on the fiscal-financial strategy. It also risks inducing a misplaced sense of complacency about the accumulation of public investment-related public debt. Debt must be serviced through future higher current revenues or lower public spending, regardless of what motivated its issuance. Like Nebucadnezzar's dream statue, the Golden Rule has feet of clay.

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