INFLATION-ADJUSTING THE PUBLIC SECTOR FINANCIAL DEFICIT : MEASUREMENT AND IMPLICATIONS FOR POLICY

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INTRODUCTION

Current macroeconomic policy differs from conventional Keynesian demand management in two major respects, namely in the announced objectives of policy and in the means chosen to pursue them.

Early in its period of office the present Government indicated[1] that it did not endorse the conventional list of objectives (namely low unemployment, low inflation, positive growth and "external balance"): in committing itself only "to reduce inflation and to create conditions in which sustainable economic growth can be achieved", it implicitly abandoned the level of unemployment and external balance as objectives. /In addition, however, the Chancellor announced that "the Government intend to restore a broad balance of power in the framework for collective bargaining"./

In pursuing these aims the Government decided that there was no place for incomes policies (which "had failed in the past and had led to distortions in the labour market") and that the instrument of monetary and fiscal policy should be constrained by a Medium Term Financial Strategy to achieve an explicit intermediate target for the rate of growth of a broad monetary aggregate. The initial target ranges for monetary growth (for £M3) and the projected path for the Public Sector Borrowing Requirement (PSBR) as a percent of output are shown in Figure 1, which is reproduced from the proceedings of the Treasury Committee (1981a).

Thus the rate of wage and price inflation was to be determined by market forces, operating within the framework of this Medium Term Financial Strategy targetted on achieving a nominal objective (monetary growth) announced in advance; the operation of these market forces to be assisted by policies to encourage the efficiency of the economy by reducing direct taxation, Government spending and the legal powers of organised labour.

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[1] See the letter from the Chancellor of the Exchequer in February 1980, Treasury and Civil Service Committee (1980), from which the quotations in this and the next paragraph are taken.

In an interesting survey of this experiment in macroeconomic policy, which he compared unfavourably with that pursued in France in the 1920s, T Sargent (1981) argues that

"the large government deficits that have accompanied the government's medium-term financial strategy raise serious questions about whether the plan has the logical coherence that is necessary for the plan to be credible to the public". Moreover "at the same time that the government has touted its determination to bring inflation permanently down through monetary restraint, the substantial government deficits have been financed by issuing large amounts of non-indexed long-term debt at nominal yields to maturity ranging 13 and 14 percent", which in his view "raises suspicions about the current and future governments' commitment permanently to lower the inflation".

Sargent was at pains to emphasise that "in the rational expectations view, these matters of coherence and credibility are very important in determining the likely effects of a program on real variables such as output and employment. If a program is constructed in such a fashion that makes private agents believe that its execution is uncertain, then, even if preannounced, restrictive monetary policy actions can easily produce substantial reductions in output and employment".

In an earlier paper, Miller (1981), it was argued that one could detect a logical principle underlying the medium term plans for co-ordinating monetary and fiscal policy. On the (heroic) assumption that the announced targets for monetary growth would control inflation, then the fiscal plans could be interpreted as a strategy for balancing the inflation adjusted budget. Current fiscal policy could, it was argued, thus be seen as the "inflation adjusted" equivalent of the Treasury View which prevailed before Keynesian demand management became the orthodoxy!

If this argument is correct, then Sargent's criticisms are misplaced, being based apparently on a failure to adjust deficits for inflation. In the next section the notion of balancing the "inflation adjusted" deficit is discussed in more detail (and a distinction drawn between adjusting for actual and planned inflation). In Section 2 it is shown how the same basic principles of inflation

adjustment can be applied to assets whose capital values are not certain. The methods discussed are then applied to UK data. In section 3 it is noted that, despite the sharp rise in unemployment under current policy, the Government has nevertheless broadly succeeded in running an inflation-adjusted surplus. The plans announced in the 1982 Budget FSBR (1982) and the associated Public Expenditure White Paper (Cmnd 8494) indicate that this policy is to be continued into the future.

We conclude therefore that Sargent is wrong to attribute the high unemployment costs of the current anti-inflationary policy primarily to a lack of credibility stemming from an excessively expansionary fiscal policy. The plans for fiscal policy appear logically designed to reinforce the anti-inflationary stance of announced monetary policy and continue to operate in this way (even when the objectives for monetary growth have been increasingly over-ridden by exchange rate targets). It has been argued elsewhere, Buiter and Miller (1981), that the high output and employment costs are attributable rather to the failure of macroeconomic policy (directed principally at controlling the growth of a relatively meaningless monetary aggregate) efficiently to identify and to counteract those forces in factor and product markets which directly create and sustain inflation in the UK.

1 On Measuring the "real" deficit and on policies to control it

In this section we discuss the idea of "inflation-adjusting" the deficit in a context where the Public Sector is assumed to issue nominally capital-certain interest-bearing debt. (We refer to this debt as Treasury Bills though it could more accurately be taken to be transferable interest-bearing deposits - at the Central Bank).

First we introduce the notation used in this section:

PSFD	Public Sector Financial Deficit in nominal terms
G	Public Sector expenditure (excluding interest payments) in nominal terms
T	Public Sector tax receipts in nominal terms
r	the nominal Treasury bill rate
b	the nominal stock of Treasury Bills
p	an index of the price level
W	nominal value of Public Sector Debt
w	real value of Public Sector Debt $w \equiv W/p$
s	the real short interest rate
Y	nominal income
Dp/p	inflation
π	"planned" inflation
D	is the differential operator, so $Dx = \frac{dx}{dt}$

Let the nominal Public Sector Financial Deficit be composed of non-interest and interest compnents as follows:

$$(1) \quad PSFD = G-T + rb$$

where rb is the interest (gross of tax) paid on the stock of the Treasury bills. Since for present purposes we assume

$$(2) \quad W = b$$

we can rewrite (1) as

(3) $PSFD = G - T + rW$

Hence, on deflating by the price level, we obtain the "constant price" PSFD

(4) $\frac{PSFD}{p} = \frac{G-T}{p} + rw$

It is important to point out that this constant price PSFD is not the same as the PSFD "adjusted for inflation" (or as Taylor and Threadgold (1979) would put it, the real PSFD is by no means the same as the "real" PSFD).

The latter is measured at current prices and is obtained by replacing the nominal interest rate, r, in equation (1) by the real interest rate, s, where

(5) $r = s + \frac{Dp}{p}$

Thus we find

(6) $PSFD = G-T + sW + \frac{Dp}{p} W$

ie
Nominal PSFD = "Real" PSFD plus Adjustment for Inflation

where the inflation adjustment is simply the inflation rate times the cash value of outstanding public sector debt.

If this expression is deflated by the price level we find the relationship between the real PSFD (ie the constant price deficit) and the "real" PSFD (ie the inflation adjusted deficit) is simply

(7) $\frac{PSFD}{p} = \frac{G-T + sW}{p} + \frac{Dp}{p} w$

ie
$$\text{Real PSFD} = \frac{\text{"Real" PSFD}}{\text{Price index}} + \frac{\text{Adjustment for Inflation}}{\text{Price Index}}$$

Since the PSFD increases the stock of outstanding debt in nominal terms, ie

(8) $\quad PSFD = DW$

we find that

$$(9) \quad Dw = D(w/p) = \frac{DW}{P} - \frac{Dp}{p}\frac{W}{p}$$

$$= \text{Real PSFD} - \frac{Dp}{p} w$$

$$= \frac{\text{"Real" PSFD}}{p}$$

ie the change in the real value of outstanding debt is measured by the "Real" deficit, measured at constant prices.

Setting the "real" deficit to zero will therefore keep the real value of outstanding debt constant. /Note that we are here ignoring transactions in existing assets which enter the PSBR and not the PSFD and can also lead to changes in the outstanding volume of debt./ It is clear from equation (6) that a "Real" PSFD of zero implies first that the surplus of taxes over non-interest expenditure must equal the "real" cost of debt service, ie

(10) $\quad T-G = sW$

and second that the measured nominal deficit must be simply equal to the inflation adjustment, ie

$$(11) \quad PSFD = \frac{Dp}{p} W$$

The reason why it appears reasonably plausible that the authorities were planning to balance the budget in 'real' terms becomes more evident when this expression is deflated by income, to give

$$(12) \quad \frac{PSFD}{Y} = \frac{Dp}{p}\left(\frac{W}{Y}\right)$$

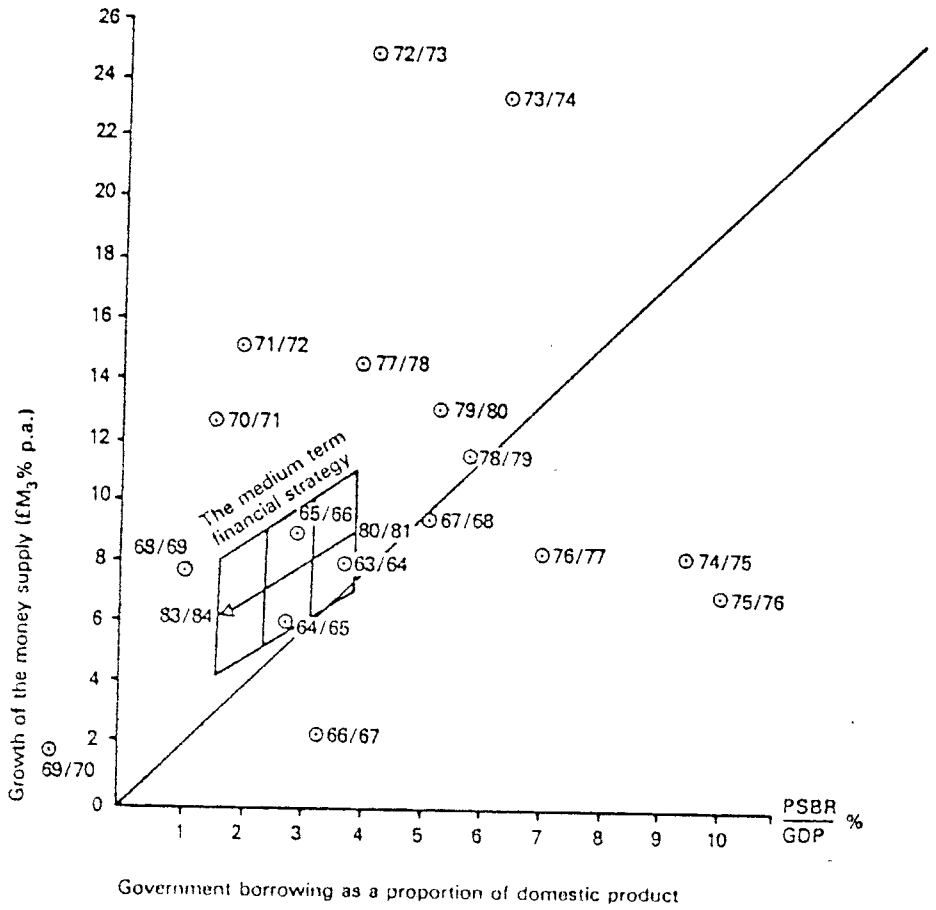

FIGURE 1. Monetary growth and PSBR/GDP initial plans and past performance

so balancing the "real" deficit implies that the nominal deficit as a percent of GDP would equal the rate of inflation times the debt/income ratio. (We return now to Figure 1, which is in terms of the PSBR instead of the PSFD - a distinction we are ignoring for present purposes.)

In Figure 1 we include a line showing where the nominal PSBR as a percent of income is half the rate of monetary growth. Assuming (as the Government was likely to) that inflation was to evolve in line with monetary growth and that debt was roughly half of income (see Table 1 below), this line would show the relationship between monetary growth and the PSBR which would be required to balance the "inflation adjusted" PSBR. As can be seen the line shown is close to the arrow illustrating the "thrust" of the Medium Term Financial Strategy (MTFS)- which led to the notion that a possible rationalisation for the MTFS was that of balancing the inflation adjusted PSBR. For further discussion of this interpretation see Miller (1981); but see also the negative response of the Treasury to questions on this point in Treasury Committee (1981 b, pp16, 44).

In the earlier article referred to it was suggested that the Government was planning to balance the "inflation adjusted" deficit. But now I think it would be more accurate to argue that the aim was to balance the budget adjusted for <u>planned</u> inflation: so if inflation turned out higher than planned then the result would be a "real" surplus. For if one assumes

$$(13)\quad PSFD - \pi W = 0 \quad \text{and so} \quad \frac{PSFD}{Y} = \pi\left(\frac{W}{Y}\right)$$

where π is the rate of 'planned' inflation allowed under the MTFS, then the actual "Real" PSFD would be

$$(14)\quad \text{"Real" PSFD} \equiv PSFD - \frac{Dp}{p} W = \pi W - \frac{Dp}{p} W = \left(\pi - \frac{Dp}{p}\right) W.$$

The interesting implication is of course that, by announcing a set of plans for the nominal deficit, see (13), the government is able to ensure an automatic tightening of the stance of fiscal policy (as measured by the "real" deficit) as and when inflation exceeds targetted levels.

We have already mentioned that the present administration has emphasised the need to check inflation and has implicitly dropped high employment as an objective. This shift of emphasis is borne out by the design of fiscal policy described above. This point may be made more explicitly by assuming that nominal taxes depend linearly on nominal income and interest payments, so

$$(15) \quad T = t\,(Y + rW) = tY + tsW + t\,\frac{Dp}{p}\,W$$

In these circumstances balancing the deficit adjusted for "planned" inflation becomes

$$(16) \quad PSFD - \bar{\pi}W = G - tY + (1-t)\,sW + \left((1-t)\,\frac{Dp}{p} - \pi\right)W$$

which, for a given tax rate, t, means that Government spending in nominal terms is

$$(17) \quad G = tY - (1-t)\,sW - \left((1-t)\,\frac{Dp}{p} - \bar{\pi}\right)W$$

or in constant price terms

$$(18) \quad \frac{G}{p} = t\frac{Y}{p} - (1-t)sw - \left((1-t)\,\frac{Dp}{p} - \pi\right)w$$

Thus real public expenditure (excluding interest) will have to move procyclically to offset changes in the level of taxes as the level of output varies: this is shown by the positive "feedback" of real spending on real output; but real spending must be reduced as the rate of inflation (<u>times</u> 1-t) exceeds the "planned" rate π. We see that under such a policy spending must be altered by discretionary action to offset the automatic stabilisers (tax and transfer programmes) from generating real deficits when <u>output</u> falls, such deficits only being permitted when <u>inflation</u> falls faster than planned.

In short such a design for fiscal policy means that the automatic stabilisation of output characteristic of Keynesian demand management has been replaced by an automatic link between "real" deficits and inflation, with fiscal policy contracting when inflation increases.

SECTION 2

So far it has been convenient to assume that the public sector deficit is financed by capital-certain assets. In this section we first consider how to proceed when the public sector debt includes assets whose value is market-determined and then we report the results of applying these procedures to UK data.[1]

With capital-certain assets we found that the "real" deficit could be obtained by subtracting an "inflation adjustment" from current interest income, where the adjustment was simply the rate of inflation times the nominal value of the debt. With marketable debt, however, we argue that it is necessary first to impute income to cover anticipated capital gains and second to subtract the rate of inflation times the current market value of such debt.

Holders of government debt are free to chose between assets which provide only cash income and those which provide expected capital gains in addition; but only the cash income (interest and coupon payments) are included in the public sector deficit, hence the need to impute income in the form of anticipated capital gains.

Assuming that marketable debt is priced at the present discounted value of future coupons (using current and forecast future short rates for discounting) we argue in Annex 2 that the current short rate is an adequate proxy for the total ex ante income on marketable assets[2]. The argument is simply that if one is free to arbitrage between bills and bonds, then the current bill rate will equal the bond yield and the expected capital gain on bonds! /No account is taken here of risk premia./

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2 Specifically it is shown that the ex post change in consol prices may be written:

$$\frac{DR}{R} = R - r + n_1$$

where R denotes the consol yield and n_1 the effect of positive revisions to the expected path of future short rates.

Hence ex ante income is $R - \frac{DR}{R} - n_1 = r$.

1 The treatment of notes and coin (capital certain but non-interest bearing) is briefly discussed in Annex 1.

The resulting estimated total of "income" on public sector debt will be simply what one would earn if one sold one's holdings of debt and bought Treasury bills, (or put the resulting sum on interest-bearing deposit account at the Central Bank). It follows immediately that the appropriate adjustment for inflation should be the rate of inflation times the market value of government debt, as the market value of debt measures how many Treasury bills (or deposits) one could acquire.

The result of including imputed income and subtracting inflation will be to provide an estimate of the ex ante "real" cost of debt service which is directly comparable to what we calculated for the case where all assets were capital-certain. /This ex ante "real" cost may be represented as before by

$$sW = (r - \frac{Dp}{p})\ W = rW - \frac{Dp}{p}\ W$$

where W represents the current market value of public sector debt./

These procedures are applied to UK data for 1967-81 with results to be found in Table 1. (Details of sources and methods are given in footnotes to the Table.) From the market value of Public Sector debt (at end March) shown in line 2, and the "real" rate of interest in line 6, one obtains the 'real' cost of debt service in line 7. By subtracting this series from the measured cost of debt service shown in line 8, one obtains the appropriate adjustment shown in line 9. This adjustment gives the net effect of first including expected imputed income omitted from the measured interest cost and then subtracting the rate of inflation times the market value of debt (and it can be used to 'inflation adjust' the PSFD on line 12 or the PSBR in line 13 with results we discuss below).

In line 10 we include for comparison the series of 'inflation adjustments' published by the Bank of England, based on the procedures proposed by Taylor and Threadgold (1979). Basically these are obtained by multiplying the nominal (or redemption) value of public sector debt in line 1 by the rate of inflation (line 5) (together with some allowance for the change in value of (net) foreign exchange reserves). Though derived in a rather different fashion, the Taylor-Threadgold series is quite similar to the series described above.

TABLE 1

PUBLIC SECTOR DEBT AND THE "REAL" COST OF DEBT SERVICE: PAST FIGURES AND BUDGET FORECASTS

£ billion cash

1967-1981 Calendar Years 1981/82-1984/85 Fiscal Years	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1981/82	1982/83	1983/84	1984/85
1 Public Sector Debt NV (Mid-year)	36.5	38.4	38.9	38.0	39.1	40.8	42.5	45.7	52.9	63.8	72.5	78.2	85.8	95.4	108.5	[110.1]	[120.8]	[129.8]	[137.3]
2 Public Sector Debt MV (Mid-year)	32.5	33.6	32.8	34.1	33.7	36.5	35.7	35.3	43.3	54.0	67.0	73.0	81.3	82.2	99.2				
3 Public Sector Debt MV/GDP %	81	77	70	67	59	58	49	43	41	43	47	44	42	36	38	43	43	42	41
																	NV/GDP %		
4 TB Rates (annual average)	5.7	7.2	7.7	7.1	5.7	5.4	9.6	11.7	10.6	11.5	7.9	10.7	13.0	15.8	13.9				
5 Inflation (CED Q4/Q4) %	1.9	5.7	5.2	7.2	8.0	7.9	9.6	20.2	23.4	14.1	12.3	8.2	16.1	12.8	10.9	11	8	7	6½
6 "Real" interest rate	3.8	1.5	2.5	-0.1	-2.3	-2.5	0	-8.5	-12.8	- 2.6	- 4.4	2.5	- 3.1	3.0	3.0				
7 "Real" cost = 2 x 6	1.2	0.5	0.8	0	-0.8	-0.9	0	-3.0	- 5.5	- 1.4	- 2.9	1.8	- 2.5	2.5	3.0				
8 Published interest cost (gross)	1.7	1.9	2.0	2.1	2.2	2.4	3.0	4.0	4.8	6.1	7.1	8.0	9.8	12.1	13.8	14.4	15.5	16.0	16.5
9 Adjustment (8 less 7)	0.5	1.4	1.2	2.1	3.0	3.3	3.0	7.0	10.3	7.5	10.1	6.2	12.3	9.6	10 .8				
10 Taylor/Threadgold adjustment (approx 1 times 5)	0.6	2.0	2.0	2.7	3.2	3.2	4.0	9.3	11.9	7.4	9.3	6.4	13.8	12.1	11.7	[12.2]	[9.7]	[9.1]	[8.9]
11 Alternative Adjustment (assuming long run 2% "real" rate)	(1.0)	(1.2)	(1.3)	(1.4)	(1.5)	(1.7)	(2.3)	(3.3)	(3.9)	(5.0)	(5.8)	(6.5)	(8.2)	(10.5)	(11.8)				
12 PSFD	1.5	0.9	-0.5	-0.7	0.3	1.5	2.8	4.7	7.7	8.3	5.9	8.1	8.1	9.7	7.5	7.4	6.6		
13 PSBR	1.9	1.3	-0.4	0	1.4	2.1	4.2	6.4	10.5	9.1	6.0	8.4	12.6	12.2	10.6	10.6	9.5	8.5	6.5
14 PSBR/GDP %	4.6	3.0	-1.0	0	2.4	3.2	5.8	7.7	9.9	7.3	4.2	5.1	6.6	5.4	4.1	4¼	3½	2¾	2
15 GDP (at market prices)	40	44	47	51	57	63	73	83	105	125	144	165	192	226	260	255	280	307	336

Notes to Table 1

Data description together with sources and methods.

A). 1967-1981 : Calendar years (stocks at end June).

Line 1) 1967-1980 : BEQB June, 1981, p.234 Table A. Nominal value of net monetary liabilities of Public Corporations and General Government at end June.
1981 : Bank estimate.

Line 2) Nominal values of Line 1 converted to Market Values by subtracting the difference between nominal and market-values of Market and Official holdings of Government debt in the Stock Exchange Fact Book. (Note that the value differences used were for convenience those at March end and not at end June, as would be strictly appropriate).

Line 3) Ratio of Public Sector Debt (at MV) to GDP at current market price: Line 2 divided by Line 15.

Line 4) Treasury Bill rates : Average of end month figures (for January, April, July, October) from ET.

Line 5) Percentage increase Consumers Expenditure Deflator (QIV or QIV) 1967-1980 : BEQB June 1981.

Line 6) The short run real interest rate : Line 4 less Line 5.

Line 7) The 'real' cost of debt service : Line 2 times Line 6.

Line 8) Gross interest payments by the Public Sector (i.e. Gross payments of interest by General Government plus gross payments of interest by Public Corporations to other than Central Government).
1967-1980 : NIE
1981 : FS.

Line 9) Proposed Adjustment : Line 8 less Line 7.

Line 10) 'Inflation-adjustment' calculated using the procedures proposed by Taylor and Threadgold (1979).
1967-80 : BEQB June 1981
1981 : Bank estimate.

Line 11) Alternative 'smooth' adjustment : Line 8 less Line 2 x 0.02 where 2% represents the assumed ex ante long real rate.

Line 12) Current price Public Sector Financial Deficit : ET and FS.

Line 13) Current price Public Sector Borrowing Requirement : ET and FS.

Line 14) Ratio of PSBR to market price GDP : Line 13 divided by Line 15.

Line 15) Gross Domestic Product at current market prices (on the expenditure measure) : NIE, FT.

1981/82-1984/85

B). Budget forecasts : Financial Years (stocks at end September).

Line 1) Estimated Nominal value of net monetary liabilities of Public Sector at end September. September 1981 estimated by adding 1981 Q3 PSBR to Public Sector debt for June. Series carried forward by averaging the PSBR forecasts for successive financial years in Line 13.

Line 3) Ratio of Public Sector Debt (at NV) to current market price GDP : Line 1 divided by Line 15.

Line 5) Percentage increase in GDP deflator over the financial year.
1981/2, 1982/3, Treasury Committee (1982) p.24 footnote
1983/4, 1984/5, FSBR, p.16

Line 8) Gross interest payments by the Public Sector Cmnd (8494-II) Table 4.5

Line 10) Taylor/Threadgold type adjustment (approximate) : Line 1 estimated (approximately) from Line 1 times Line 5.

Line 12) Current price PSFD : FSBR (1982) Table 20.

Line 13) Current price PSBR : FSBR (1982) Table 8.

Line 14) PSBR/GDP : " " "

Line 15) Current price GDP : " " "

/The reasons are not far to seek. First, the series for the nominal cost of debt service implicitly used in calculating line 8 (and obtained by multiplying Public Sector Debt at market value by the Treasury Bill rate)is not very different from the gross interest rate series shown in the table[1]. Second both sets of adjustments use the same measure of inflation, the increase in the consumers' expenditure deflator. Finally, the market value of Public Sector Debt has been on average not far below 90% of the redemption value over the period 1967-81./

It is perhaps reassuring that the two sets of adjustments shown in lines 9 and 10, though rather different in theory, do not differ much in practice. The reason for preferring the market-value-based measure in line 9 over the nominal-value-based measure used by Taylor and Threadgold is that the former is based on first principles which also suggest answers to criticisms recently made by the Treasury in its post-Budget Economic Report for April, 1982.

An article entitled "The Budget balance - measurement and policy" concludes the discussion of the 'real' PSBR with the observation that "There is no uniquely correct way to calculate the inflation-adjusted PSBR. The volatility of year-to-year movements in inflation makes it hard to discern underlying trends. The choice of price deflator and the definition of public sector liabilities used can substantially affect the figures. Difficult questions arise over the treatment of revaluations of the stock of liabilities due to changes in exchange rates or interest rates. All this makes it difficult to find a wholly satisfactory measure".

The volatility of movements in inflation referred to is evident from line 5 of the Table; and this is, of course, reflected directly in the adjustments so far considered. It is worth noting, however, that inflation varies by more than the Treasury bill rate and that as a result the 'real' cost of debt service is also an erratic series, see line 7. The Treasury surely have a point here, that the 'real' income series resulting from the inflation adjustments is too erratic, and would be too volatile to be a plausible basis for explaining consumer behaviour for example.

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[1] But see Annex 1 for an account of "offsetting errors" of measurement involved here.

One answer to the problem of how to smooth an erratic series for measured income (indeed his view of the way in which income should properly be defined) was provided by Professor Hicks in "Value and Capital" (1939). The Hicksian ex ante measure was defined as "the maximum amount of money which an individual can spend this week and still expect to be able to spend the same amount in real terms in each ensuing week." (p174) The ex ante Hicksian income associated with initial holdings of public sector debt is obtained, in the present context, by multiplying the market value of these holdings at the beginning of the period by the long run real rate prevailing at that time,* and it can be thought of as the number of indexed consols (each providing a constant real flow of coupons) which could be bought by holders of the public sector debt. As long run real rates are used rather than short run real rates, and as the latter vary less than the former, the required "smoothing" will be achieved.

There are, alas, no indexed consols in issue, but there are long-dated indexed stocks whose yields to maturity/ provide much the same information. However, such indexed securities have only been issued in the last few years (and only became generally available to the public in the Budget) so we do not have a series for the long run real interest rate which we can use for all the past years in the Table.

For illustrative purposes therefore we simply assume that the ex ante real rate was 2% and calculate the difference between 2% of the market value of public sector debt (the approximate ex ante Hicksian income) and the measured interest payments in line 8. This provides the series labelled "alternative adjustment" shown in line 11 of the Table. Precisely such an adjustment has been proposed in the past by John Flemming, and it is interesting to observe that it is much less erratic than either of the other two series in lines 9 and 10, which meets one of the Treasury criticisms.

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* An ex post variant is discussed below

/ Currently about 2¾%

It could still be objected that the Hicksian measure of income discussed above, being ex ante, takes inadequate account of capital gains and losses realised over the period. Professor Hicks (1979) has recently suggested a way of bringing these into account, which is easier to explain using symbols as defined in Annex 2. If we were to represent the ex ante measure, at current prices[1] by

$$Y_H^{XA} = \left(b + \frac{B}{R(0)} + p\,\frac{C}{(S(0)}\right) S(0) = \left(b + \frac{B}{R(0)}\right) S(0) + p\,C$$

where beginning of period asset prices and real long yields are used, then the ex post measure at current prices is

$$Y_H^{XP} = \left(b + \frac{B}{R(1)} + p\,\frac{C}{S(1)}\right) S(1) = \left(b + \frac{B}{R(1)}\right) S(1) + p\,C$$

where end of period asset prices and long real yield is used.*

This ex post measure shows how much the owners could have consumed of the receipts from their assets while leaving themselves in a position of being able to maintain this consumption in the future if the information determining end of period asset values had been available at the beginning. /No calculation for the adjustment required to produce this measure of income is included in the Table. It would not be difficult to produce a rough and ready series for this purpose based on a 2% long run real rate which would be similar to that in line 11./

As the sort of objections made by the Treasury can be met without much difficulty using data now readily available in financial markets, we conclude that the case for adjusting the published interest payments series stands.

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* b denotes the stock of capital certain debt (Bills)
B is the flow of coupons on consols
R is the yield on consols
pC is the flow of nominal income on indexed consols
S is the yield on indexed consols
p is the price index

S(0), R(0) denote beginning of period (ex ante) yields
S(1), R(1) denote end of period (ex post) yields

[1] Ignoring cash

SECTION 3: BUDGET FORECASTS OF 'REAL' SURPLUSES

After briefly considering the "inflation adjusted" deficits[1] over the past fifteen years, we turn to current Budget forecasts to see what they reveal of plans for the future.

From a comparison of lines 9 and 12 in the table, it is evident that over the years from 1967 to 1974 - years when unemployment was relatively low, averaging 2¾% - the "inflation adjusted" public sector deficit was in surplus for every year, except the first. Consequently, after allowing for the excess of the PSBR over the PSFD and for revaluations, the market value of public sector debt falls relative to GDP. The magnitude of the fall is dramatic, halving from 81% in June 1967 to 41% in June 1975.

In the years 1975 to 1978, when unemployment shifted to a new plateau of something over 5%, the 'real' PSFD calculated on the same basis shows a deficit in three years out of four, and the ratio of Public Sector Debt to GDP stays fairly stable over the period; from 41% of GDP in June 1975 the proportion returns to 42% in June 1979 (after rising to a 47% peak in 1977).

In calendar 1979 there was a pronounced 'real' surplus followed by a small deficit in 1980 (and the ratio of public sector debt fell to 38% by June 1981).

Budget forecasts

In the last four columns of Table 1 the various series have been carried forward wherever possible using forecasts in the latest Financial Statement and Budget Report, FSBR (1982), and the Public Expenditure White Paper (Cmnd 8494), with methods shown in the notes to the table[2].

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1 In what follows the adjustment applied to the PSFD and the PSBR will be that shown in line 9, unless this is not available in which case the Taylor/Threadgold series is used.

2 Note that the forecasts are done on a financial year basis, with the measurement of inflation etc and data at which public sector debt shifted accordingly.

As there are no forecasts of the market value of debt it was not possible to carry forward the market based adjustments of lines 9 and 11, but the estimated inflation adjustments on the Taylor/Threadgold basis are shown, starting at approximately £12 billion for 1981/82 and falling to about £9 billion in 1984/85. Over the same period the PSBR is forecast to fall from £10½ billion to £6½ billion. The PSFD is only available for 1981/2 and 1982/3 with forecasts of £7½ billion and £6½ billion respectively.

Despite the slowing down of planned inflation, these "inflation-adjustments" exceed the nominal PSBR in each year and so a fortiori exceed the PSFD. For the future therefore one must conclude that the government is planning to run a 'real' surplus on the PSFD. [The ratio of Public Sector Debt (at nominal value) relative to GNP is calculated to fall from 43% to 41% over this period as shown in line 3[1]]. Should the government adhere to the target ratios for the PSFD and PSBR relative to GNP in circumstances when inflation overshoots planned levels, then even larger 'real' surpluses would result, with high nominal interest payments "crowding out" other forms of expenditure.

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1 The figures for 1981/2 to 1984/5 are not comparable with those for earlier years which use the market values of debt.

Conclusion

It has been argued in some quarters that one reason for the failure of the current administration to slow inflation without large increases in unemployment is because anti-inflationary monetary targets were combined with large planned deficits. These planned deficits it is suggested robbed the monetary targets of their "credibility" and have consequently been responsible for the real output and employment losses under present policy.

This general line of criticism appears to be based on a failure to "inflation-adjust" the government accounts; doing so indicates that the plans initially announced were roughly-speaking for balancing the budget - adjusted for planned inflation. Present Budget forecasts indicate that, despite the record unemployment the government intends to run a 'real' surplus (after adjusting for planned inflation).

There seems little doubt that such a fiscal policy has made a substantial contribution to the loss of output and employment so far experienced (and will continue* to do so) - but by being too contractionary not too expansionary!

The lack of 'credibility' of the Medium-Term Financial Strategy is, in my view, attributable to the misplaced focus of the strategy, so far, on the behaviour of an intermediate monetary target which has neither proved easy to control nor particularly indicative of inflation, in pursuit of which the government has been encouraged to take several measures (such as raising public sector prices) which have clearly exacerbated the rate of measured inflation.

ANNEX 1

TREATMENT OF NOTES AND COIN AND OF PUBLIC SECTOR INTEREST INCOME

What we refer to in the text as Public Sector Debt, the Bank of England describe more correctly as the Net Monetary Liabilities of the Public Sector; and a significant proportion are actually in the form of non interest bearing cash. In June 1981 for example the value of notes and coin in circulation plus till money was £11.2 billion (which is 11% of the market value of the Net Monetary Liabilities on that date, estimated at £99.2 billion in Table 1, line 2).

In computing the (nominal) cost of debt service it is, of course, conventional to attribute no cost to this component of the financing of the public sector's indebtedness, see Annex 2.

In Table 1, however, where the 'real' cost of debt service is calculated by multiplying the market value of Net Monetary Liabilities (<u>including</u> notes and coin) by the excess of the Treasury Bill Rate over the inflation rate, the cost of debt service is thus, by conventional standards, overstated. This could be "corrected" by simply subtracting the bill rate times the value of cash (which gives a total of £1.6 billion in 1981). However the "gross interest cost" series used in table 1 to represent the conventional measure of costs is also overstated because no deduction has been made for interest accruing to the public sector from interest-bearing assets <u>held by</u> that sector (a total of £2.0 billion in 1981).

Since the adjustment calculated in line 8 of this table is the <u>difference</u> between the two series the failure to correct these two offsetting errors has probably not seriously affected the size of the adjustment.

ANNEX 2.

THE ARBITRAGE CONDITIONS FOR CONSOLS AND INDEXED CONSOLS

Consols (undated stock paying a constant nominal coupon)

Assume that a consol is valued by discounting its flow of coupons by a set of (forward) short rates, so that the cash value at time t for a consol paying one unit of cash period period is:

$$(1) \quad V(t) = \int_t^{\infty} e^{-\int_t^{\tau} \hat{r}(u, t)\,du} \, d\tau$$

Where $\hat{r}(\tau, t)$ is the forward short rate for τ applied at t.

Differentiating this yields:

$$(2) \quad DV = \hat{r}(t, t)V - 1 - m_1$$

$$\text{Where } m_1 = \int_t^{\infty} e^{-\int_t^{\tau} \hat{r}(u, t)\,du} \int_t^{\tau} \frac{\partial \hat{r}}{\partial t}(u, t)\,du \, d\tau.$$

The term m_1 is the present discounted value of revisions to the path of expected future short rates, and it enters with a negative sign as positive revisions will depress consol values. Assuming $\hat{r}(t, t) = r(t)$ the current short rate, (2) can be recast as:

$$(3) \quad \frac{DV}{V} = r - \frac{1}{V} - n_1$$

where $n_1 = m_1/V$.

Using the definition of the (flat) yield on the consol, namely

$$(4) \quad R = \frac{1}{V}$$

we obtain an equivalent arbitrage condition for consols:

$$(A1) \quad \frac{DR}{R} = R - r + n_1$$

where $n_1 = Rm_1$.

The term n_1, reflecting "news" about the future, enters with a positive sign as upward revisions to future rates will (by lowering consol values) raise consol yields. This is the first arbitrage condition used in the analysis.

Indexed Consols (undated stock paying a constant real coupon)

Exactly the same argument may be used to obtain an arbitrage conditions for "indexed consols", whose coupon rises with the price level, except that in this case the <u>real</u> coupon is discounted at a set of forward short <u>real</u> rates to obtain the <u>real</u> value. This real value, denoted by $V^*(t)$, is therefore:

$$V^*(t) = \int_t^{\infty} e^{-\int_t^{\tau} \hat{s}(u, t)\,du} \, d\tau$$

where $\hat{s}(\tau, t)$ is the forward short real rate for τ applied at t.

Going through the same steps we obtain the result:

$$(A2) \quad \frac{DS}{S} = S - s + n_2$$

where $S = \frac{1}{V^*}$ is the flat yield on the indexed consol,

$$n_2 = Sm_2 = S\int_t^{\infty} e^{-\int_t^{\tau} \hat{s}(u, t)\,du} \int_t^{\tau} \frac{\partial \hat{s}}{\partial t}(u, t)\,du \, d\tau$$

and we have assumed $\hat{s}(t, t) = s$.

This second arbitrage condition is analogous to the earlier one, and shows how indexed consol yields will fall if "news" of higher real rates enters the market.

ANNEX 3 DERIVATION OF MARKET VALUE BASED ADJUSTMENTS SHOWN IN TABLE 1

The composition and financing of the Public Sector/Financial Deficit (PSFD)

Let the Public Sector/Financial Deficit consist of non-interest and interest components as follows:

$$(1)\quad PSFD = G-T + rb + B + pC$$

and let it be financed by the issue of cash, bills, bonds and indexed bonds, so

$$(2)\quad PSFD = DN + Db + \frac{DB}{R} + p\frac{DC}{S}$$

where G denotes Government expenditure (excluding interest payments)
T denotes Government tax receipts
r " Treasury bill rate
b " the nominal stock of Treasury bills
R " consol (flat) yield
B " the nominal flow of consol coupons
S " (flat) yield on "indexed consols"
pC " the nominal flow of coupons indexed consols
p " the price level

and D denotes the differential operator
thus

$Dp/p = (\frac{\partial p}{\partial t})/p$, the instanteous rate of inflation

$s = r-Dp/p$, the instanteous real rate.

We now use these equations in deriving the evolution of nominal and real financial wealth held in the form of government liabilities, and of the flows of "permanent" income to be derived from such stocks. The Arbitrage conditions used are to be found as A1 and A2 in the Annex 2.

The evolution of (financial) wealth in nominal and real terms

(a) Nominal Wealth

Denoting the market value of the assets issued by the Government by W, we assume

(3) $W = N + b + \frac{B}{R} + \frac{pC}{S} = (f_N + f_b + f_B + f_c)\ W$

where f_x denotes the fraction of W constituted by asset x.

It follows that

(4) $DW = DN + Db + \frac{DB}{R} + \frac{pDC}{S} - \frac{(DR)}{R}\frac{B}{R} - \frac{(DS)}{S}\frac{pC}{S} + \frac{(Dp)}{p}\frac{pC}{S}$

$= PSFD - \frac{(DR)}{R}\frac{B}{R} - \frac{(DS)}{S}\frac{pC}{S} + \frac{(DP)}{p}\frac{pC}{S}$, using equation (1)

$= G-T + rb + B + pC$

$- (R-r+n_1)\frac{B}{R} - (S - s + n_2)\frac{pC}{S} + \frac{(Dp)}{p}\frac{pC}{S}$, using (1), A1, A2

$= G-T + rb + (r-n_1)\frac{B}{R} + (s + \frac{Dp}{p} - n_2)\frac{pC}{S}$

$= G-T + rb + (r-n_1)\frac{B}{R} + (r-n_2)\frac{pC}{S}$

So $\frac{DW}{W} = \frac{G-T}{W} + rf_b + (r-n_1)\ f_B + (r-n_2)\ f_C$

or

(5) $\frac{DW}{W} = \gamma + (1-f_N)\ r - f_B n_1 - f_C n_2$

where $\gamma = \frac{G-T}{W}$ = the PSD, excluding interest costs, as a fraction of wealth.

/As we can see, the ex post change in nominal wealth is subject to 'news' about future nominal and real interest rates if f_B and f_C and non-zero. Nominal Capital Certainty can only be obtained by excluding consols and indexed consols. Nominal wealth will be constant if, in addition, $\gamma = -(1-f_N)r$ _/

(b) Real financial wealth and the "adjustment" (Table 1 line 9)

Let $w = \frac{W}{p}$ denote financial wealth in real terms. Then

$$\frac{DW}{W} - \frac{Dp}{p} = \gamma + (1-f_N)\ r - f_B n_1 - f_C n_2 - \frac{Dp}{p}$$

so

$$(6)\ \frac{Dw}{w} = \gamma + s - rf_N - f_B n_1 - f_C n_2 \equiv \frac{\text{"Real" PSFD}}{W} - f_B n_1 - f_C n_2$$

where $\gamma = \frac{G-T}{pw} = \frac{G-T}{W}$

Hence the "Real" PSFD is simply $G-T + r(1-f_N)W - \frac{Dp}{p} W$. The difference between the "Real" PSFD and the nominal PSFD in equation (2) defines the adjustment for inflation in Table 1 line 9.*

Real Hicksian Income (h) and the "alternative adjustment" (Table 1 line 11)

The amount which asset holders could consume in real terms while expected to leave themselves in a position to maintain that level of consumption in the indefinite future is given (ex ante) by the number of indexed consols which could be purchased. So this measure of income is

(7) $h = S(w-J)$ where J is the present discounted value of $\frac{rN}{p}$.

The actual change in h over time turns out to be

$$Dh = w + S(w-J) + n_2(w-J) - f_B n_1 w - f_C n_2 w - n_3$$

letting $DJ = sJ - \frac{rN}{p} + n_3$ where n_3 denotes "news" (about J). So

$$(8)\ \frac{Dh}{h} = \frac{G - T + S(W-pJ)}{W-pJ} + \text{"news"} \equiv \frac{\text{"Real" PSFD}}{W-pJ} + \text{"news"}.$$

where the "Real" PSFD (now adjusted to measure ex ante Hicksian income) is simply $G - T + S(W-pJ)$.
The difference between the "Real" PSFD on this definition and the nominal PSFD in equation (2) defines the "alternative adjustment" in Table 1 line 11.*

*But see Annex 1 for the simplifications used in drawing up Table 1.

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BEQB Bank of England Quarterly Bulletin
FS Financial Statistics
FSBR Financial Statement and Budget Report
NIE National Income and Expenditure (Blue Book)

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