Cambridge Economic Policy Group

TECHNICAL MANUAL ON THE CEPG MODEL

by

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Introduction

This manual contains a full specification of the model used by the Cambridge Economic Policy Group to produce medium-term assessments of the UK economy. The version of the model described here is that used to generate projections of the economy up to 1985 published in the group's Economic Policy Review, March 1977, No.3.[+]

The model is implemented by a set of general- and special-purpose computer programs[ϕ]; these are not described in the manual, which is principally concerned with the structure and behavioural relationships of the model, which is the joint work of CEPG members.

Part I of the manual briefly explains the methodology employed, noting where and why concepts underlying definitions of variables used differ from those implicit in the official national accounts, describing causal assumptions and the treatment of behavioural relationships, and explaining how solutions are obtained.

Part II of the manual gives a full specification of the relationships and variables of the model, grouped by broad topic.

Appendix I tabulates values of constant and trend coefficients estimated on currently available data. Appendix II comprises a full index of variables used in the model.

[+] Hereafter referred to as EPR No.3.

[ϕ] These Fortran programs were written by Francis Cripps and Martin Fetherston, for use on the University of Cambridge's IBM 370/165, with facilities provided by the University Computing Service. The regression programs owe much to work on time-series estimation by M.H. Pesaran, a former member of the Group.

I General Methodology

The model consists of a set of precisely defined variables for which annual data have been obtained (mainly from national accounts) covering at least the period from 1960 to date, together with a set of functional relationships between the variables which are either identities or technical and behavioural hypotheses. The variables of the system have been chosen and defined to permit a simple but comprehensive description of key short and medium-term objectives, instruments, exogenous conditions and structural relationships which constrain macro-economic policy in the UK.

Accounting definitions

The basic data of the model differs from official statistics in four main respects. First, production sectors are classified into 'North Sea', 'public services' and the 'business sector' in order to provide an explicit analysis of the effects of future development of the North Sea on national output and income, and to take account of the effect of future levels of public service employment on the growth of overall productive potential. Second, disposable income is divided between three branches of the private sector - 'household grants', 'wages and salaries', and 'property income' (the latter includes all private rents and income from self-employment as well as company profits, interest, etc.). This division allows explicit account to be taken of the effects of future policies on the distribution of private income and on the timing and composition of private expenditure. Third, indirect taxes and subsidies are divided into two categories - 'sales taxes' which are specific to different kinds of final expenditure (i.e. taxes on consumption, investment, imports etc.) and those which feed into business costs generally. This analysis forms the basis of a distinction between expenditure valued at market prices and at 'full cost'. The latter excludes taxes and subsidies on outputs but includes net taxes on primary

inputs which to the business sector comprise local authority rates, protective duties on imports, royalties on North Sea supplies of oil and gas, less subsidies to public corporations. All imports, whether of intermediate or final goods, are assumed to enter the production process as inputs; imported final goods re-emerge in unchanged form but after sales taxes and addition of distributive margins, etc. Fourth, the volume series for the component items of business sector domestic sales - consumers' expenditure, public current expenditure (excluding public services), public and private fixed investment (excluding the North Sea) - are measured at factor cost inclusive of the relative price effect. The price of business sector domestic sales is the basic domestic price variable in the system.*

Causal assumptions

Variables in the model are classified into four groups :

(a) exogenous variables assumed to be determined either by Government policy or by external circumstances which we do not seek formally to explain.

(b) endogenous variables determined by identities.

(c) endogenous variables determined by behavioural relationships for which explicit hypotheses are provided. These hypotheses embody key assumptions about how the economy functions as an inter-dependent system. The econometric procedure used to determine them is discussed in the next section.

(d) semi-endogenous variables. These variables are regarded as being determined in part by external circumstances which are exogenous to the model and in part by other variables of the system. For example, a mainly exogenous variable might be assumed to adjust in money terms to general price inflation. Formally such variables are treated in the same manner as fully endogenous variables of type (c) above, but

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* See EPR No.2., pp. 96-98 for data showing the reconciliation of CEPG definitions with national accounts for 1974.

the behavioural hypotheses are only expected to provide a partial explanation of their movement over time.

The model, thus defined, is our representation of the economic system. It can be used both to interpret the causes of past developments and to obtain conditional predictions of the effects, past or future, of alternative policies and external circumstances. Its structure is verified in two main ways. First, the actual past values of variables predicted by behavioural hypotheses are compared with the values which would be predicted by the equations, taken one at a time, in the absence of disturbances or 'residual errors'. This test is strongest when applied for data which have not been used to estimate any parameters in the equations, and we generally reserve data for the most recent past year for this purpose. The second kind of check on the model is to examine its properties as a complete system - for example, the response to an increase in export demand - to ensure that the overall behaviour of the model is in reasonable accord with what might be inferred from past experience. This is an important check because a set of hypotheses each of which seems plausible on its own may easily give implausible results when the hypotheses are combined.

Treatment of behavioural relationships :

The general form of behavioural relationships specified in the model is :

$$g(y) = \alpha_o + \alpha_1 t + f(p,x) + u \; ; \; g(y) = y \text{ or } g(y) = \ln y$$

where y is the dependent variable, α_o and α_1 are 'trend' parameters, t is a linear time trend, f is a (non-linear) function of parameters p and current or lagged values of other variables x, and u is a disturbance term.

The values of structural parameters p are generally obtained from

the results of time-series estimation conducted separately.* The values of the trend parameters α_o and α_1 are obtained as OLS+ estimates of

$$g(y) - f(p,x) = \alpha_o + \alpha_1 t + u$$

over a uniform time-period.ϕ

Two main advantages derive from incorporating linear trends into the specification of behavioural relationships. First, it permits a convenient display of off-trend past behaviour in which, writing an asterisk for trend values, the values of each dependent variable can be analysed as

$$g(y) - g^* = f(p,x) - f^* + u$$

A quick check is then possible of the extent to which the structural hypothesis $f(p,x)$ explains past fluctuations about trend of $g(y)$.

The second advantage is that projections of the behavioural relationships for future years will generally be rather robust in that they will not be very sensitive to the exact values specified for p. This is demonstrated by the following algebraic theorem :

Consider an equation with one explanatory variable

$$y_t = \alpha_o + \alpha_1 t + \beta x_t + u_t$$

and, for a given pre-specified value of the structural parameter β,

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* These estimates are often based on more complex stochastic specifications (e.g. first or second order serial correlation or moving-average disturbances) and may also make use of additional specification of the function f which is not incorporated in the model because of its limited relevance or cost in terms of adding extra variables.

\+ More general estimation procedures have not so far been used at this stage in order to keep down computing costs.

ϕ The period 1962-74 was used in the March 1977 version of the model. But note that in some cases (e.g. North Sea prices) shorter series (1970-74) have to be used, because the activity did not exist over the full period.

define $\hat{\alpha}_o(\beta)$, $\hat{\alpha}_1(\beta)$ as conditional OLS estimators of α_o and α_1 obtained by regression of

$$y_t - \beta x_t = \alpha_o + \alpha_1 t + u_t \qquad (t \epsilon T_o)$$

on observations for a past period T_o

Define $\hat{y}_t(\beta) \equiv \hat{\alpha}_o(\beta) + \hat{\alpha}_1(\beta)t + \beta x_t \qquad (t \epsilon T_1)$

as the set of predicted values implied by the regression for some future period, T_1 , conditional on assumed values of x_t and on β . Define the 'trend' value of the explanatory variable over the future period T_1 as

$$x^*_t \equiv \hat{\gamma}_o + \hat{\gamma}_1 t \qquad (t \epsilon T_1)$$

where $\hat{\gamma}_o$ and $\hat{\gamma}_1$ are OLS estimates obtained by regression over the past period T_o of

$$x_t = \gamma_o + \gamma_1 t + v_t \qquad (t \epsilon T_o)$$

It can then be shown that for any two alternative pre-specified parameter values, β_1 and β_2 , the difference between predicted values obtained by the above method can be expressed as

$$\hat{y}_t(\beta_1) - \hat{y}_t(\beta_2) = (\beta_1 - \beta_2)(x_t - x^*_t) \qquad (t \epsilon T_1)$$

Hence the difference in predicted values of the dependent variable is proportional to the deviation of x_t from its trend value. In particular, if x lies on its trend, i.e., if $x_t = x^*_t$, then $\hat{y}_t(\beta_1) = \hat{y}_t(\beta_2)$, and the predictions are invariant to the pre-specified value of β .*

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* This method embraces situations where β has been estimated without a trend term for the same past period as above, i.e. T_o ; in this case the estimated value of $\hat{\alpha}_1(\beta)$ will be zero. The result can be seen to generalise to the situation of κ(linear) explanatory variables by noting that each variable can be considered one by one after redefining $\hat{y}_t$ to allow for the influence of variables already considered; we eventually obtain

$$\hat{y}_t(\beta_1) - \hat{y}_t(\beta_2) = \sum_{i=1}^{\kappa} \left[(\beta_{i1} - \beta_{i2})(x_{it} - x^*_{it})\right]$$

where $\beta_1 = (\beta_{11} \ldots\ldots \beta_{\kappa 1})$, etc.

More generally if the deviation of x_t from its trend value is small, the predicted value $\hat{y}_t$ will be insensitive to small changes in the pre-specified value of the structural parameter β .

Although this property is convenient for projections when explanatory variables stay close to trend, not too much should be made of it. In particular it has no relevance at all to comparisons between alternative projections for the same future year for which purpose reasonably accurate specification of values of structural parameters is essential.

In practice the above procedure for obtaining conditional predictions for future years may need some modification. The record of residuals in behavioural equations is examined to see whether current residuals are likely to persist in future years; future disturbances, u , are then either assumed zero or carried forward by a serial correlation process, starting from the latest past value, with a priori coefficients. In the case of semi-endogenous variables (and where there are evident reasons for so doing, in the case of one or two fully endogenous variables) the trend may be modified, or the entire term

$$\alpha_o + \alpha_1 t + u$$

may be overwritten for future years.

Solution

For given values of exogenous variables, including trend parameters and assumed future residuals, the model is then ready to be solved year by year to obtain values of endogenous variables. Unless the pattern of mutual dependence of endogenous variables can be reduced to a triangular structure by appropriate ordering of equations, no simple sequential solution to the model is possible. If equations are evaluated in a given order values of some endogenous variables will then be required before they have been determined in an equation. Such variables are termed 'simultaneous' variables. The procedure we follow to obtain a consistent solution is to modify trial values for such variables until they correspond to a high degree of accuracy with the values subsequently determined when the equations for the variables are evaluated.

The method of solution also permits us to specify any subset of exogenous variables (up to a certain size) as instruments whose values in each year are to be determined such that a subset of an equal number of endogenous variables attains target values in that year. In addition there is a facility for adjusting the values of a variable in two given years to achieve a target in two subsequent years.* The possibility of defining a set of instruments to achieve given targets is of course limited by the structure of the model itself, because certain combinations of targets may not be feasible with the defined set of instruments.

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* For the three strategies presented in EPR No.3, targets and instruments are as follows :

Conventional policies and devaluation		Restriction of imports	
Targets	Instruments	Targets	Instruments
BB	DTW1	BB	DTW1
IRCH	RX	IRCH	RX
		U	MCON

In the devaluation case the level of export competitiveness (IRCH) is adjusted in 1979 and 1982 to meet targets for business output (QUK) in 1981 and 1985.

A consistent solution of the model requires first, that final values of simultaneous variables equal the values supplied before sequential evaluation of the equations, and second that pre-specified values of target variables are attained setting appropriate values of instruments. Thus, adopting the following notation

y'_o , y_o , y^*_o	initial, final and target values of target simultaneous variables
y'_1 , y_1	initial and final values of other simultaneous variables
y_2 , y^*_2	final and target values of other target variables
z'	values of instruments

a consistent solution of the model is obtained by finding initial values y'_o , y'_1 and z' such that the following conditions hold to an acceptable degree of accuracy :

$$y'_o = y_o = y^*_o \; ; \; y'_1 = y_1 \; , \; y_2 = y^*_2$$

The ordering of equations in the model is chosen, with the aid of a special-purpose computer program, such that the number of simultaneous variables is minimised; in certain straightforward cases it is possible to reduce this number further by analytic substitution in the structural equations.*

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* With the current model there are nine simultaneous variables - QUK, PUK', PRUK', NR', PC", TW, MMUK, U and RI25 (see Part II for definitions)

Solutions satisfying the above conditions have readily been computed for the current version of the model using a first-order linear approximation.

Writing

$$u = \begin{bmatrix} y'_o - y_o \\ y'_1 - y_1 \\ y_o - y_o^* \\ y_2 - y_2^* \end{bmatrix} \qquad v = \begin{bmatrix} y'_o \\ y'_1 \\ z' \end{bmatrix}$$

and $$J = \left[\frac{\partial u}{\partial v}\right] ,$$

we start with a trial set of initial values, v_o , and iterate on

$$v_i = v_{i-1} - J^{-1}u(v_i) \qquad i = 1,2,...$$

where J is estimated numerically at each step of the iteration until $|u|$ is acceptably small.*

The facility for solution with one variable adjusted in two given years to meet <u>future</u> targets is achieved by repeated modification of trial values of the variable followed by solution of the model as described above.+

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* Solution of the current model with 9 simultaneous variables and up to 3 targets to a high degree of accuracy requires not more than six iterations and less than ½ second CPU time for each year on the University's IBM370/165 computer.

\+ The CPU time required for this solution is nearly 2 seconds per year.

II The Model

The overall structure of the model is similar to that of most aggregative Keynesian models. Prices and volumes of expenditures determine output and factor incomes, which are then redistributed, mainly via the tax system, as disposable incomes. Private expenditure in money terms is mainly determined by private disposable incomes, public expenditure on goods and services is determined in real terms by government decisions, while imports and exports are determined by demand and relative costs or prices (unless import restrictions are assumed to be in force). Prices are determined by costs and prices of exports and imports are also influenced by the relativity between domestic and world price levels. Labour costs are determined mainly by wage settlements, which are themselves the outcome of a model of a bargaining process*.

Table 1 below illustrates the structure of the model in terms of the extent of interdependence between its various sections.

The variables of the model have been defined in order to conform to the general accounting principles set out above in Part I; the past data of the model have therefore been constructed by modifying official published data in accordance with those principles, which also dictate the framework of accounting identities within the model.

The equations of the model are fully described below under the following headings :

1. Private expenditure
2. Balance of payments
3. Public sector
4. North Sea
5. Employment
6. Earnings

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* See EPR No. 2, Chapter 2.

7. Prices

8. Stockbuilding and stock appreciation

9. GDP identities

10. Money supply and DCE

Table 1 The structure of the model

Section	Number of endogenous variables determined in the section	Number of endogenous variables which appear as explanatory variables, but are determined in other sections										Total number of endogenous variables determined in other sections	Number of exogenous variables
		1	2	3	4	5	6	7	8	9	10		
1	11	-	6	9	1	0	1	1	0	1	1	20	6
2	39	4	-	2	3	0	0	1	1	1	1	13	25
3	27	5	11	-	6	2	2	1	3	1	1	32	35
4	13	0	3	0	-	0	0	1	0	0	0	4	12
5	4	0	0	0	0	-	0	0	0	1	0	1	4
6	10	2	0	2	0	1	-	0	0	1	0	6	7
7	9	0	4	2	1	0	1	-	0	1	0	9	5
8	5	0	1	0	0	0	0	2	-	1	0	4	1
9	4	4	4	6	6	0	0	1	2	-	0	23	9
10	5	3	2	1	0	0	0	1	0	0	-	7	3
Total	127	16	31	20	16	3	4	8	6	7	3		73 *

* A number of exogenous variables appear in more than one section. The total number of variables in the model is thus 127 + 73 = 200

Each section shows the equations which determine values of endogenous variables, followed by an alphabetical list of definitions of all the variables appearing in the section. The term 'tr' in a behavioural equation represents the expression $\alpha_o + \alpha_1 t + u$, where α_o and α_1 are constant and trend coefficients and u is a residual as described above in Part 1 (p.4). Values of these coefficients estimated from currently available data are tabulated in Appendix I. All equations in which no such term appears are identities.

The symbols in the lists of definitions are followed by either an equation reference number for an endogenous variable, or the symbol (ex), which denotes a variable exogenous to the model. The following

notational conventions are adopted for the units in which variables are measured :

£m	£million at current prices
£1970m	£million at 1970 prices
th	thousands
defl	ratio of current money value to value at 1970 prices (may differ from unity in 1970 if e.g. the deflator in question is the ratio of a current market price series to the corresponding 1970 factor cost series)
ratio	ratio of two variables expressed in the same units, e.g. effective tax rates.
index	index number, generally based on 1970=1.0

(p. 2)

As explained in Part I above, / expenditures may be valued at 'full cost', in addition to conventional measures at factor cost and at market prices.

The following notational conventions are adopted for expenditure series :

Constant (1970) factor cost - no superscript (e.g. C for consumption at 1970 factor cost)

Current full cost - single prime (C')

Current market prices - double prime (C'')

Any exceptions to this convention are noted where they occur.

Flows of income measured in current money terms are written with a single prime superscript.

Appendix II provides an overall index of the variables used in the model

1 . Private expenditure

This section discusses the equations which are used to predict private consumption and fixed investment (excluding the North Sea). Previous work by the CEPG, based on analysis of post-war data from 1954 onwards, has emphasised the stability of total private expenditure in relation to total private disposable income. The original formulation, presented in evidence to the House of Commons Expenditure Committee*, expressed real private expenditure as a function of current and lagged real disposable private income and certain monetary variables - hire purchase credit, personal bank advances, and increases in the book value of stocks. This relationship has since been reformulated in current price terms, the correct specification if private sector behaviour is regarded as a process of adjustment of net desired holdings of public and overseas financial assets to income+. This overall relationship (the main role of which is to permit inferences to be drawn about the appropriate stance of fiscal policy) has been disaggregated in two main ways : expenditure is divided between consumption and fixed investment, and each of these is a function of current and lagged levels of three types of private disposable income - wages and salaries, household grants and property income. The conventional definition of disposable property income (YR') used generally in the model is here adjusted by deducting net non-North Sea private investment abroad, which corresponds to the addition of net intra-company investment abroad to private expenditure in the original formulation presented to the Select Committee. The justification for this is that such investment should be treated as expenditure on goods, rather than as acquisition of financial assets, as implied by the conventional definition. Here the analogous modification has been made to the definition of property income, although using a wide definition of capital flows. Its implication is that domestic

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* Cripps, Godley and Fetherston, 'Public expenditure and the management of the economy', Ninth Report from the Expenditure Committee, Session 1974, HC 328.

\+ See EPR No.2, Chapter 6.

investment can be financed directly by inward flows of private capital (rather than by property income itself), whilst outward capital flows constitute a drain on domestic investment. A further adjustment to disposable property income is made to exclude depreciation due to foreign oil companies, which in the national accounts is treated as a capital outflow and not as part of income paid abroad. An additional term in the investment equation allows for the small amount of UK income which is used to provide equity finance for the North Sea.

The coefficients on the various categories of income were derived from analysis of data since 1960, imposing a priori the coefficients on household grants and hire purchase debt, and the constraints that the coefficients on current and lagged values of each category of income should sum to unity. Thus the equations overall retain the property of an approximately one-to-one relationship between increases in private income, and the subsequently generated increase in private expenditure. The principal influence of the disaggregation of income is on the timing and nature - i.e. whether in the form of consumption or investment - of the expenditure generated, rather than on the overall amount of such expenditure. The term on wages and salaries in the investment equation represents the influence of disposable wage incomes on dwellings investment, whilst the consumption equation includes the effect of consumption out of dividends and interest.

Earlier formulations of the aggregate relationship for private expenditure included as one of the explanatory variables the increase in book value of private stocks and work-in-progress, i.e. stockbuilding plus stock appreciation, with a coefficient of almost unity. This incorporated the hypothesis that companies borrow more or less one-for-one with increases in book values of stocks, so that this factor represents a virtually automatic source of finance to the private sector. Stockbuilding was also included as part of private expenditure. The implication of this procedure was that the implied overall

relationship between private expenditure and private income could be disturbed either by fluctuations in stockbuilding or stock appreciation; but it was clear that the relationship might not be appropriate in periods of rapid inflation and high stock appreciation, on which firms might not wish to borrow in full (nor banks to lend) to finance spending as in less inflationary periods. The current specification embodies a modified hypothesis about the influence of stocks which has been found to be consistent with past data : the absence of any stocks term from either side of the equations implies that firms are able to borrow to the full extent of any stockbuilding which they undertake (which may be regarded as a normal cyclical phenomenon), but do not borrow at all (or possibly only up to some constant amount) on stock appreciation (which could not be described as a normal cyclical phenomenon after recent experience). Stockbuilding thus represents a source of cyclical disturbance to the overall behaviour of private net acquisition of financial assets (after deducting stockbuilding), whilst stock appreciation has no direct effect. Nevertheless, the rate of inflation does play a key role in determining the magnitude of the private financial surplus : for a given rate of growth of real income, the effect of the lags in the equations is to generate a larger private financial surplus, the higher the rate of inflation. Conversely, as the rate of inflation moderates, the proportion of disposable income required to sustain the desired relationship between holdings of financial assets and income falls.

Further work has been undertaken on the role of monetary variables in the relationship between private income and expenditure. We have found some evidence that the ratios of both consumption and investment to private disposable income are positively related to movements in share prices, and have proxied this "wealth effect" with negative coefficients on long-term interest rates. The consumption and investment equations both now contain a term which captures the impact of credit restrictions (measured by an index of credit stringency).

Equations

1.1 $$\ln C'' = tr + \ln \left[0.55YW' + 0.41YW'_{-1} + 0.95YH' + 0.05YH'_{-1} + 0.23(YR' + KFUK' - KUKF' - ANSF.PMM') + 0.10(YR'_{-1} + KFUK'_{-1} - KUKF'_{-1} - ANSF_{-1}.PMM'_{-1}) + 0.25(YR'_{-2} + KFUK'_{-2} - KUKF'_{-2} - ANSF_{-2}.PMM'_{-2}) + HP'\right] - 0.15 \ln (1 + RI25) - 0.005QRB$$

1.2 $$C' \equiv C'' - TTC'$$

1.3 $$C \equiv C'/PUK'$$

1.4 $$\ln IPUK'' = tr + \ln \left[0.04YW' + 0.19(YR' + KFUK' - KUKF' - ANSF.PMM') + 0.23 (YR'_{-1} + KFUK'_{-1} - KUKF'_{-1} - ANSF_{-1}.PMM'_{-1}) - KUKNS.PMM'\right] -0.6 \ln (1 + RI25) - 0.005QRB$$

1.5 $$IPUK' \equiv IPUK''/(1 + TI)$$

1.6 $$IPUK \equiv IPUK'/PUK'$$

1.7 $$YW' \equiv CGS' + WBUK' - TTW'$$

1.8 $$YH' \equiv GRH' - TTH'$$

1.9 $$YR' \equiv PNSUK' + PRUK' + PFUK' - PUKF' + NR' + GRRC' + GBRI.PUK' - TTR'.$$

1.10 $$PRUK' \equiv QUK' - TPPG' - WBUK'$$

1.11 $$NR' \equiv NG' - [illegible]'$$

ANSF	(ex)	Foreign oil companies' depreciation allowances (£1970m)
CGS'	(3.4)	Income from employment in public services (£m)
C	(1.3)	Consumers' expenditure (£1970m)
C'	(1.2)	Consumers' expenditure (£m at full cost)
C"	(1.1)	Consumers' expenditure (£m at market prices)
GRH'	(3.14)	Household grants (£m)
GRRC'	(3.17)	Other current grants to private sector (£m)
GRRI	(ex)	Capital grants to private sector (£1970m)
HP'	(ex)	Net increase in consumer hire purchase debt (£m)
IPUK	(1.6)	Private fixed investment, excluding North Sea (£1970m)
IPUK'	(1.5)	Private fixed investment, excluding North Sea (£m at full cost)
IPUK"	(1.4)	Private fixed investment, excluding North Sea (£m at market price
KFUK'	(2.32)	Long-term private capital inflows to business sector (£m)
KUKF'	(2.33)	Long-term private capital outflows (£m)
KUKNS	(ex)	UK private equity finance of North Sea investment (£1970m)
NF'	(2.28)	Public sector net payments of interest and dividends abroad (£m)
NG'	(3.22)	Total public sector net payments of interest and dividends (£m)
NR'	(1.11)	Private sector net receipts of interest and dividends from public sector (£m)
PFUK'	(2.27)	Private property income and transfers received from abroad (£m)
PMM'	(2.17)	Price of imports of finished manufactures to UK business sector (defl.)
PNSUK'	(4.11)	North Sea profits paid to UK, after tax (£m)
PRUK'	(1.10)	Gross private profits of UK business sector, including private rents and income from self-employment, after stock appreciation (£m)
PUKF'	(2.26)	Private property income and transfers paid abroad from UK business sector, before tax (£m)
PUK'	(7.1)	Price of business sector domestic sales (defl.)
QRB	(ex)	Degree of credit restriction (0=no restrictions, 2.5=severe restrictions)
QUK'	(9.2)	Business sector output (£m at factor cost)
RI25	(10.4)	Yield on War Loan, average for the year
TI	(ex)	Effective rate of sales tax on business sector fixed investment and sales to North Sea (ratio)
TPPG'	(3.21)	Gross trading surpluses of public corporations and other public enterprises, after stock appreciation, and public sector rent (£m)
TTC'	(3.18)	Net sales tax revenue on consumers' expenditure (£m)
TTH'	(3.11)	Direct tax on household grants (£m)
TTR'	(3.12)	Direct tax (including national insurance contributions paid by the self-employed) on property income (£m)

TTW'	(3.9)	Direct tax and national insurance contributions on income from employment (£m)
WBUK'	(6.10)	Income from employment in business sector (£m)
YH'	(1.8)	Disposable household grants (£m)
YR'	(1.9)	Disposable property income (£m)
YW'	(1.7)	Disposable income from employment (£m)

2. Balance of Payments

This section describes the components of the current account of the balance of payments, basic balance on current and long-term capital account, and the balance for official financing. For the analysis of trade in goods and services, exports are divided into two categories in order to treat exports of fuels separately from the rest (mainly manufactures and services) whilst imports to the business sector are divided into seven categories - food, drink and tobacco, fuels, basic materials, semi-finished manufactures, finished manufactures (excluding U.S. military aircraft), U.S. military aircraft, and other imports (mainly services). Both imports of finished manufactures and non-fuel exports are influenced by capacity constraints.

(a) Exports of goods and services

Exports of fuels in volume terms are projected exogenously on the basis of the projections of North Sea production. The volume of other exports is determined by world trade and the average level of costs of UK exporters expressed in foreign currency relative to the world price of manufactures. The implied elasticity of the UK's share of world trade with respect to the growth of world trade is -0.22 , which together with the effect of the tren term in the equation implies, assuming no changes in cost competitiveness, that with world trade growth at 9% per annum, the UK's share would decline by 2½% per annum; world trade would need to fall by over 3% per annum in order for the UK's share to increase. Non-fuel exports are reduced by ½% for every 1% by which business output exceeds capacity. The elasticity of exports with respect to cost competitiveness implies a long-run elasticit of total exports with respect to export prices in foreign currency of about -2.3 (see (c) below).

(b) Imports of goods and services

Imports of food, drink and tobacco and of services are projected exogenously; imports of U.S. military aircraft are merely present as an adjustment to past data. Imports of fuels are projected on the basis of the amount and composition of North Sea production in relation to domestic energy requirements and fuel exports, with allowance made for the sensitivity of energy requirements to the level of business activity. Imports of basic materials are determined by the stockbuilding cycle. Both of the equations for manufactures contain both demand and lagged relative price terms : the demand terms are business output and the ratio of stockbuilding to output in the case of semi-finished manufactures, and business sector final sales for finished manufactures. The model now incorporates a saturation level for imports of finished manufactures of 40% of total business sector final sales; the volume elasticity with respect to final sales is given by the formula $3 - 2\beta$ where β $(= \frac{\theta}{1+\theta})$ is the ratio of actual imports to the saturation level and is equal to 2.7 at the 1976 value of β . Capacity constraints are assumed to increase the volume of imports of finished manufactures, with a rise of $3(1 - \beta)\%$ for every 1% by which output exceeds capacity. Quantitative import restrictions are incorporated into the model simply by assuming that imports of finished manufactures are reduced to the required degree (shown by MCON) below the level with which they might otherwise be expected to attain. This assumption is made in order to simplify solution of the model in this case : in practice some restrictions might be applied to semi-finished rather than finished manufactures.

The identities for MUK and M show the definition of total imports to the business sector and total imports as conventionally measured (including North Sea imports from abroad). The implied elasticity of total imports with respect to import prices in sterling (see (c) below), based on 1976 weights, is about -0.15.

(c) Export and import prices

The prices of exports and imports of fuels are both related to the world price of fuels expressed in sterling, allowing the quality differential for UK fuel exports to be maintained in the future. Prices of other categorie of exports and imports are determined, with a lag, partly by domestic costs (adjusted for indirect taxes) and partly by foreign prices, expressed in sterling, depending on the extent to which the UK acts as a price-taker on world markets in the various commodity groups. For exports, and imports of finished manufactures and services, the foreign price variable is an index of world prices of manufactured exports, while for food and basic materials an index of world prices of food and materials is used. A weighted average of the two foreign price indices is used in the equation for the price of semi-finished manufactures. The relationships also allow for different lengths of lag in the adjustment of prices, with the lag being longest in the case of finished manufactures.

Overall these price relationships imply (on the basis of 1976 weights) that the long-run effect of a 1% depreciation of sterling, allowing for the effects on domestic costs of changes in the cost of imported inputs but assuming no effect on money wage settlements, is to increase sterling export prices by 0.63% and sterling import prices by 0.79%.

(d) Current balance

The first part of this section contains the identities necessary to derive the balance of trade in goods and services, expressed at current prices. The difference between the current balance and the balance on goods and services comprises net property income and transfers from abroad, or 'overseas sector disposable income' with the sign reversed.

Private interest, profits, dividends and transfers paid abroad from the business sector, measured before tax, are related to total private business

factor income; North Sea profits paid abroad are treated separately (see section 4). The corresponding inflows are projected in relation to the level of activity and of prices of manufactures in the world economy.

Public sector interest payments are determined by the cumulative total of deficits on the basic balance and the level of world interest rates which determine the terms on which overseas borrowing is made. Government transfers abroad are projected in volume terms on the basis of the Public Expenditure White Paper and linked to general inflation.

(e) Basic balance

The basic balance of payments on current and long-term capital account (converted to foreign currency) is used as a target variable in EPR No.3. Public sector net long-term capital inflows are projected exogenously, whilst capital inflows to the North Sea are discussed under Section 4. Other private inflows and outflows are projected in relation to the corresponding reverse flows of private property income, since a substantial proportion of profits earned by UK companies abroad, and by foreign companies in the UK, are retained to finance investment rather than repatriated to the host country. Net trade credit is derived from changes in gross import and export credit outstanding resulting from changes in exports and imports and in trade credit ratios.

(f) Balance for official financing

Short-term capital flows are related in absolute terms to the current balance of payments and to interest-rate differentials and UK relative cost competitiveness, with national income as a scaling factor for the last two items. The balance for official financing is further discussed in section 10 as a source of finance for the public sector borrowing requirement.

(g) Business capacity

Capacity output of the business sector is calculated on the basis of three assumptions about business planning :

(i) that in each year the trend level of output two years ahead is predicted by an extrapolation of the logarithmic trend fitted over the previous two business cycles (i.e. the past eight years)

(ii) that a 5% margin is allowed to cope with above-trend demand

(iii) that the indicated full capacity level of output assessed in this way becomes operational by the time the year in question is reached.

Equations

(a) Exports of goods and services

2.1 $\ln XX = tr + 0.78 \ln WF - 1.18 (0.2 \ln IRCH + 0.8RCH_{-1}) - 0.5 \phi$

where $\phi = \ln (QUK/QUKK)$ if $QUK > QUKK$

$= 0$ otherwise

2.2 $RCH \equiv 0.4 \ln IRCH + 0.6RCH_{-1}$

2.3 $IRCH \equiv \frac{PUK' (1 + TX) RX}{PWF'}$

2.4 $X \equiv XX + XF$

(b) Imports of goods and services

2.5 $MF = tr + 0.029 QUK$

2.6 $MB = tr + 0.14 S$

2.7 $\ln MS = tr + \ln QUK + 0.3 RCS + 2.5 S/QUK$

2.8 $MMUK \equiv MCON. \frac{\theta}{1 + \theta} . \gamma$

$\ln \theta = tr + 2 \ln \gamma + 1.5 RCM + 3.0 \phi$

$\gamma \equiv 0.4 (QUK + XNS + MUK)$

ϕ is as defined above for XX

2.9 $RCS \equiv 0.5 \ln \left[\frac{PUK'}{(1+TMS)PMS'}\right] + 0.5RCS_{-1}$

2.10 $RCM \equiv 0.7 \ln \left[\frac{PUK'}{(1+TMM)PMM'}\right] + 0.3 RCM_{-1}$

2.11 $MUK \equiv MA + MF + MB + MS + MMUK + MVUK + MAC$

2.12 $M \equiv MUK + MMNSF + MVNSF$

(c) Export and import prices

Excluding fuels, the general form is

$$\ln p = tr + \alpha_1 \ln pf + (1 - \alpha_1) \ln pf_{-1}$$

where $\ln pf = \alpha_2 \ln \left(\frac{PUK'}{T}\right) + (1 - \alpha_2) \left[\alpha_3 \ln PAF' + (1 - \alpha_3) \ln PWF' - \ln RX\right]$

		p	α_1	α_2	α_3	T
2.13	Exports	PXX'	0.67	0.50	0	$\frac{1}{1 + TX}$
	Imports :					
2.14	Food, drink & tobacco	PMA'	0.50	0.10	1	1 + TMA
2.15	Basic materials	PMB'	1.00	0.10	1	1 + TMB
2.16	Semi-finished manufactures	PMS'	1.00	0.20	0.7	1 + TMS
2.17	Finished manufactures	PMM'	0.20	0.70	0	1 + TMM
2.18	Services	PMV'	0.80	0.20	0	1

For fuels :

2.19 $\ln PXF' = tr + \ln (PFF'/RX)$

2.20 $PMF' \equiv PFF'/RX$

(d) Current balance

2.21 $X' \equiv XX.PXX' + XF.PXF'$

2.22 $X'' \equiv X' (1 + TX)$

2.23 $MUK'' \equiv MA.PMA' (1 + TMA) + MF.PMF' (1 + TMF) + MB.PMB' (1 + TMB) + MS.PMS' (1 + TMS) + MMUK.PMM' (1 + TMM) + MVUK.PMV' + MAC'$

2.24 $M' \equiv MA.PMA' + MF.PMF' + MB.PMB' + MS.PMS' + MMUK.PMM' + MVUK.PMV' + MAC' + MVNSF'' + MMNSF'$

2.25 $BT' \equiv X'' - M'$

2.26 $\ln PUKF' = tr + \ln PRUK'$

2.27 $\ln PFUK' = tr + \ln (PWF'/RX) + 2.0 \ln WF$

2.28 $NF' = tr - RIF.SBBW'$

2.29 $SBBW' \equiv SBBW'_{-1} + BB'_{-1}.RX.$

2.30 $YF' \equiv PNSF' + (1 - TF).PUKF' - PFUK' + NF' + GRF'$

2.31 $B' \equiv BT' - YF'$

(e) Basic balance

2.32 $\ln KFUK' = tr + \ln PUKF'$

2.33 $KUKF' = tr + 0.4\ PFUK'$

2.34 $KTRC' \equiv RKTX.X'' - RKTX_{-1}X''_{-1} - RKTM.M' + RKTM_{-1}.M'_{-1}$

2.35 $BB' \equiv B' + KFUK' - KUKF' - KTRC' + KGF' + KFNS.PMM'$

2.36 $BB \equiv BB'.\ \frac{RX}{RX_{1976}}$

(f) Balance for official financing

2.37 $KWR' = tr + \left[0.25\ (RI - RIF) + 0.14\ (1 - IRCH)\right]\ (YR' + YW' + YH' + YG') + 0.6\ B'$

2.38 $BOF' \equiv BB' + KWR'$

(g) Business capacity

QUKK is computed as 1.05 multiplied by the extrapolated value of a logarithmic trend fitted by OLS to previous values of QUK. This may be expressed as a weighted sum of values of QUK by the formula :

2.39 $$QUKK_t = 1.05 \exp\left[\sum_{\kappa=1}^{\beta}\left\{\frac{1}{\beta}\left(4 + \frac{6\alpha}{\beta-1}\right) - \kappa.6\frac{(2\alpha + \beta - 1)}{\beta(\beta-1)(\beta+1)}\right\}.\ln QUK_{t-\kappa-\alpha+1}\right]$$

where the trend is fitted over β periods up to $QUK_{t-\alpha}$ (α=2 and β=8)

B'	(2.31)	Current balance of payments (£m)
BB	(2.36)	Basic balance of payments in foreign currency units (millions)
BB'	(2.35)	Basic balance of payments (£m)
BOF'	(2.38)	Balance for official financing (£m)
BT'	(2.25)	Balance of trade on goods and services (£m)
GRF'	(3.16)	Government current transfers abroad (£m)
IRCH	(2.3)	UK export cost competitiveness (ratio)
KFUK'	(2.32)	Long-term private capital inflows to business sector (£m)
KGF'	(ex)	Net official long-term capital inflows (£m)
KFNS	(ex)	Long-term net private capital inflows to North Sea (£1970m)
KTRC'	(2.34)	Increase in net trade credit outstanding (£m)
KUKF'	(2.33)	Long-term private capital outflows (£m)
KWR'	(2.37)	Net short-term capital inflows (£m)

M	(2.12)	Total imports of goods and services, including imports to North Sea (£1970m)
M'	(2.24)	Total imports of goods and services, including imports to North Sea (£m)
MA	(ex)	Imports of food, drink and tobacco (£1970m)
MAC	(ex)	Imports of US military aircraft (£1970m)
MAC'	(ex)	Imports of US military aircraft (£m)
MB	(2.6)	Imports of basic materials (£1970m)
MCON	(ex)	Degree of import restriction on finished manufactures (=1 with no restrictions) (ratio)
MF	(2.5)	Imports of fuels (£1970m)
MMNSF	(ex)	North Sea imports of capital equipment from abroad (£1970m)
MMNSF'	(4.7)	North Sea imports of capital equipment from abroad (£m)
MMUK	(2.8)	Imports of finished manufactures to UK business sector (£1970m)
MS	(2.7)	Imports of semi-finished manufactures (£1970m)
MUK	(2.11)	Total imports of goods and services to UK business sector (£1970m)
MUK"	(2.23)	Total imports of goods and services to UK business sector (£m at market prices)
MVNSF	(ex)	North Sea imports of services from abroad (£1970m)
MVNSF"	(4.5)	North Sea imports of services from abroad (£m)
MVUK	(ex)	UK business sector imports of 'other items'(mainly services) (£1970m)
NF'	(2.28)	Public sector net payments of interest and dividends abroad (£m)
PAF'	(ex)	World price of food and materials in foreign currency, based on UN index (index)
PFF'	(ex)	World price of fuels in foreign currency (index)
PFUK'	(2.27)	Private interest, profits, dividends and transfers received from abroad (£m)
PMA'	(2.14)	Price of imports of food, drink and tobacco (defl)
PMB'	(2.15)	Price of imports of basic materials (defl)
PMF'	(2.20)	Price of imports of fuels (defl)
PMM'	(2.17)	Price of imports of finished manufactures to UK business sector (defl)

PMS'	(2.16)	Price of imports of semi-finished manufactures (defl)
PMV'	(2.18)	Price of imports of 'services' to UK business sector (defl)
PNSF'	(4.12)	Post-tax North Sea profits paid abroad (£m)
PRUK'	(1.10)	Gross private profits of UK business sector (£m)
PUKF'	(2.26)	Pre-tax private property income and transfers paid abroad from UK business sector (£m)
PUK'	(7.1)	Price of business sector domestic sales (defl)
PWF'	(ex)	World price of exports of manufactures in foreign currency, based on UN index (index)
PXF'	(2.19)	Price of exports of fuels (defl)
PXX'	(2.13)	Price of exports of goods and services excluding fuels (defl)
QUK	(9.1)	UK business output (£1970m)
QUKK	(2.39)	UK business output capacity (£1970m)
RCH	(2.2)	Lagged relative export cost competitiveness (ratio)
RCM	(2.10)	Lagged relative price competitiveness for imports of finished manufactures (ratio)
RCS	(2.9)	Lagged relative price competitiveness for imports of semi-finished manufactures (ratio)
RI	(10.1)	Minimum lending rate (previously bank rate), average for the year
RIF	(ex)	Euro-dollar interest rate, average for the year
RKTM	(ex)	Import trade credit coefficient (ratio)
RKTX	(ex)	Export trade credit coefficient (ratio)
RX	(ex)	Effective exchange rate, in weighted average foreign currency per unit sterling (based on official index in Economic Trends) (index)
S	(8.1)	Stockbuilding (£1970m)
SBBW'	(2.29)	Accumulated basic balance (£m, converted to foreign currency)
TF	(ex)	Effective tax rate on private property income and transfers abroad (ratio)
TMA	(ex)	Effective rate of protective duty on imports of food, drink and tobacco (ratio)
TMB	(ex)	Effective rate of protective duty on imports of basic materials (ratio)
TMF	(ex)	Effective rate of protective duty on imports of fuels (ratio)

TMM	(ex)	Effective rate of protective duty on imports of finished manufactures (ratio)
TMS	(ex)	Effective rate of protective duty on imports of semi-finished manufactures (ratio)
TX	(ex)	Effective rate of sales tax on exports of goods and services (ratio)
WF	(ex)	Volume of world trade in goods and services (based on OECD Index) (index)
X	(2.4)	Exports of goods and services (£1970m)
X'	(2.21)	Exports of goods and services (£m at full cost)
X"	(2.22)	Exports of goods and services (£m at market prices)
XF	(ex)	Exports of fuels (£1970m)
XNS	(ex)	North Sea sales of fuels to UK (£1970m)
XX	(2.1)	Exports of goods and services, excluding fuels (£1970m)
YF'	(2.30)	Overseas sector disposable income (£m)
YG'	(3.25)	Public sector disposable income (£m)
YH'	(1.8)	Disposable household grants (£m)
YR'	(1.9)	Disposable property income (£m)
YW'	(1.7)	Disposable income from employment (£m)

3. The Public Sector

The model incorporates a full set of public sector accounts.

(a) Expenditure on goods and services

Current expenditure on goods and services is split into two components : public service expenditure (CGS), i.e. expenditure on wages and salaries charged to current account, and other (CGP). Public service expenditure is identically equal to public service employment multiplied by the average wage. Public service employment (measured in male full-time equivalents) is largely exogenous, being derived from the latest Public Expenditure White Paper, though it is assumed to vary to a small extent with unemployment, since the proportion of authorised posts filled will tend to be higher, the greater the number unemployed. Average money earnings per male full-time employee in public services are projected on the basis of an assumed relativity with standard average money earnings in the business sector.

Other current expenditure and fixed investment, in volume terms, are derived from official projections in the Public Expenditure White Paper. Excluding the BNOC component of fixed investment in the North Sea, these series are inflated by the general deflator for business sector domestic sales (PUK'). Public sector stockbuilding at current prices is derived as a residual from total and private stockbuilding.

(b) Direct taxes

Direct tax receipts (including national insurance contributions) are divided into four categories. For household grants and private property income paid abroad, tax revenue is derived by applying effective average tax rates to income. Tax on domestic property income (which includes income tax on self-employment and unearned income, as well as Corporation Tax) is calculated by applying the effective tax rate to estimated taxable income - gross income two years previously less investment allowances, and stock relief.

Direct tax on wages and salaries consists of both income tax and employees' and employers' national insurance contributions. Tax revenue is estimated by applying an exogenous marginal tax rate to total income from employment, and deducting from this sum the value of income tax allowances (the average per capita value of allowances multiplied by the estimated number employed at some stage during the year).*

(c) Grants

Household grants comprise all social security benefits and student maintenance grants. The average pension is linked, with a lag, to average money earnings. The numbers of persons receiving grants, excluding the unemployed, is expressed in terms of pensioner-equivalents (using as weights the ratio between average grant received in each category and the average pension) and projected exogenously using Government Actuary statistics. Household grants are obtained by multiplying the weighted numbers plus the unemployed (similarly weighted) by the average pension.

Other current and capital grants to the private sector, and current transfers abroad, are all derived in volume terms from the Public Expenditure White Paper and linked to general inflation.

(d) Indirect taxes

Indirect taxes, including subsidies, are divided into those which affect business costs - local rates, protective duties and subsidies to public corporations- and those which do not, such as VAT, specific duties and food and housing subsidies. In the latter category sales taxes on consumption are split into three components : first, those which are income-elastic and are assumed to vary with the value of expenditure (most of VAT, car tax, betting and gaming duty and specific duties on alcoholic drink); second,

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* In EPR No.3 the instrument of fiscal adjustment used to meet future targets is a package of tax changes based on a discretionary change in the average value of tax allowances (DTWI), with associated changes in tax on domestic property income and sales taxes on consumption (section (d)).

other indirect taxes (specific duties other than those on alcoholic drink, VAT on tobacco and hydrocarbon oil, and stamp duties), whose yield is projected in real terms, and third, subsidies, mainly on food and housing, which are projected in money terms on the basis of forecasts in the White Paper. For sales tax on other expenditure items, and also protective import duties, effective average rates of tax are projected exogenously. The contributions of these items to tax revenue appears in the expression for public sector disposable income, YG' .

Local authority rates are related to average earnings in public service employment; subsidies to public corporations move in line with general inflation, and are inversely related to real output.

(e) Property income and debt interest

Trading income and rent of public corporations and other public enterprises are assumed to move in line with general inflation and with movements in real output. Gross debt interest payments (NG' + NGC') are derived by multiplying the annual amount of debt on which interest is paid by an average interest rate which takes account of the fact that only part of the total debt bears the prevailing rate of interest while the remainder bears rates fixed at various times in the past. The latter rates change over time as debt matures and is renewed at currently prevailing rates, with the exception of irredeemable securities. These securities are excluded from the amount of debt on which interest is to be paid and the interest paid on them is absorbed into the constant term in the equation. Net debt interest is then derived by deducting interest receipts, which are projected to move in line with inflation, from gross payments. Minimum lending rate is related to the level of world interest rates (which is exogenous to the model) and to the rate of domestic inflation (see section 10).

Public sector disposable income consists of revenue from taxes and from trading income, less all grants, transfers and debt interest. The borrowing requirement is then obtained as total expenditure on goods and services minus

disposable income (equals the public sector financial deficit before capital taxes) minus taxes on capital plus asset transactions. The last item is split into three categories : net official long-term capital abroad, net lending by BNOC to North Sea operators, and other net lending.

Equations

(a) Expenditure on goods and services

3.1 EGS ≡ EGS* + 0.1 U

3.2 CGS ≡ 1.9302 EGS

3.3 WGS' ≡ RWGSUK.WUK*'

3.4 CGS' ≡ WGS'.EGS

3.5 CGS" ≡ CGS'(1 + TGS)

3.6 CGP" ≡ CGP (1 + TCGP).PUK'

3.7 IG" ≡ (IG-INSG)(1 + TI).PUK' + INSG"

3.8 SG' ≡ S' - SP'

(b) Direct taxes

3.9 TTW' ≡ -(TW1 + DTW1) (EE + 1715 + 0.25U) + TW2 (CGS' + WBUK')

3.10 ln TW1 = tr + ln PUK'

3.11 TTH' ≡ TH.GRH'

3.12 TTR' ≡ TRR.YRT' - 4800 DTW1

3.13 YRT' ≡ $PRUK'_{-2}$ + NR' - RW1.$IPUK''_{-2}$ + RW2.SAP'_{-2} - ARD'

(c) Grants

3.14 GRH' ≡ GR(EH + U.RU)

3.15 GR ≡ $WUK*'_{-1}$.RHW

3.16 ln GRF' = tr + ln PUK'

3.17 ln GRRC' = tr + 0.81 ln PUK'

(d) Indirect taxes

3.18 $TTC' \equiv TC1\left(1 + \frac{DTW1}{TW1}\right)^{-1.5}.C' + TC2.PUK' - TSC'$

3.19 $\ln TTRTS' = tr + 0.25 \ln WGS' + 0.60 \ln WGS'_{-1}$

3.20 $\ln TSPG' = tr - 1.0 \ln QUK + 1.0 \ln PUK'$

(e) Property income and debt interest

3.21 $\ln TPPG' = tr + \ln QUK + \ln PUK'$

3.22 $NG' = tr + \left[0.92\ (GD' + GD'_{-1}).0.5 - 4500\right]\left[0.37\ (0.75RI + 0.25RI_{-1}) + 0.63SRI - 0.005\right] - NGC'$

3.23 $\ln NGC' = tr + \ln PUK'$

3.24 $BG' \equiv CGP'' + CGS'' + IG'' + SG' - YG' + KGP.PUK' + KGNS.PMM' - KGF' - TKK.PUK'$

3.25 $YG' \equiv TTW' + TTH' + TTR' + TF.PUKF' + TPNS' - GRH' - GRF' - GRRC' - GRRI.PUK' + TTC' + TX.X' + TGS.CGS' + TCGP.CGP.PUK' + TI\left[IPUK' + (MVNSUK'' + MMNSUK'')/(1 + TI) + (IG - INSG).PUK'\right] + TRNS' + TTRTS' - TSPG' + TMA.MA.PMA' + TMF.MF.PMF' + TMB.MB.PMB' + TMS.MS.PMS' + TMM(MMUK.PMM' + MMNSF') + TPPG' - NG'$

3.26 $SRI = 0.89\ SRI_{-1} + 0.11\ (RI_{-1} + RI_{-2}).0.5$

3.27 $GD' = GD'_{-1} + BG'$

ARD'	(ex)	Value of capital allowances other than first year and initial allowances (£m)
BG'	(3.24)	Public sector borrowing requirement (£m)
C'	(1.2)	Consumers' expenditure (£m)
CGP	(ex)	Public current expenditure other than public services (£1970m
CGP"	(3.6)	Public current expenditure other than public services (£m)
CGS	(3.2)	Public services expenditure (£1970m) i.e. wages and salaries on current account
CGS'	(3.4)	Public services expenditure (£m at full cost)
CGS"	(3.5)	Public services expenditure (£m at market prices)
DTW1	(ex)	Discretionary adjustment to average value of income tax allowances in future projections (£th)
EE	(5.3)	Employees in employment (th. persons)
EGS	(3.1)	Public service employment (th. male full-time equivalents)
EGS*	(ex)	Exogenous component of public service employment (th. male full-time equivalents)
EH	(ex)	Recipients of household grants (excluding unemployed), in pensioner-equivalents (th.)
GD'	(3.27)	Outstanding stock of public sector debt (£m)
GR	(3.15)	Average pension (£th. per annum)
GRF'	(3.16)	Current government transfers abroad (£m)
GRH'	(3.14)	Household grants, i.e. social security payments plus student maintenance grants (£m)
GRRC'	(3.17)	Other current grants to private sector (£m)
GRRI	(ex)	Capital grants to private sector (£1970m)
IG	(ex)	Public fixed investment (£1970m)
IG"	(3.7)	Public fixed investment (£m)
INSG	(ex)	BNOC direct investment in North Sea (£1970m)
INSG"	(4.13)	BNOC direct investment in North Sea (£m)
IPUK'	(1.5)	Private fixed investment, excluding North Sea (£m at full cost
IPUK"	(1.4)	Private fixed investment, excluding North Sea (£m at market prices)
KGF'	(ex)	Net official long-term balance-of-payments capital inflows (£m
KGNS	(ex)	BNOC lending to North Sea operators (£1970m)

KGP (ex) Other net lending to private and overseas sectors (£1970m)

MA.PMA' (ex;2.14) Value of imports of food, drink and tobacco (£m)

MB.PMB' (2.6 ;2.15) Value of imports of basic materials (£m)

MF.PMF' (2.5;2.20) Value of imports of fuels (£m)

MMNSF' (4.7) Value of North Sea imports of capital equipment from abroad (£m)

MMNSUK"(4.6) Value of North Sea imports of capital equipment from UK (£m)

MMUK.PMM' (2.8;2.17) Value of business sector imports of finished manufactures (£m)

MS.PMS' (2.7;2.16) Value of imports of semi-finished manufactures (£m)

MVNSUK" (4.4) Value of North Sea imports of services from UK (£m)

NG' (3.22) Public sector net payments of dividends and debt interest (£m)

NGC' (3.23) Public sector receipts of interest and dividends (£m)

NR' (1.11) Private sector receipts of interest and dividends from public sector (£m)

PMM' (2.17) Price of imports of finished manufactures to UK business sector (defl)

PUK' (7.1) Price of business sector domestic sales (defl)

PUKF' (2.26) Private property income and private transfers paid abroad (excluding North Sea profits paid abroad) (£m)

PRUK' (1.10) Gross private profits in UK business sector (gross trading profits of companies, income from self-employment, and rent, after stock appreciation) (£m)

QUK (9.1) UK business output (£1970m)

RHW (ex) Relativity between pensions and average earnings (ratio)

RI (10.1) Minimum lending rate (previously bank rate), average for the year

RIF (ex) Eurodollar interest rate, average for the year

RU (ex) Relativity between average benefit paid to the unemployed and average pension (ratio)

RWGSUK (ex) Relativity between public service and business sector average earnings (ratio)

RW1 (ex) Effective rate of initial investment allowance (ratio)

RW2 (ex) Proportion of private sector stock appreciation which is subject to tax (ratio)

S'	(8.2)	Total stockbuilding (£m)
SAP'	(8.4)	Private sector stock appreciation (£m)
SG'	(3.8)	Public sector stockbuilding (£m)
SP'	(8.3)	Private sector stockbuilding (£m)
SRI	(3.26)	Average rate of interest on debt not turned over within one year
TC1	(ex)	Effective rate of sales tax on income-elastic consumption goods (ratio)
TC2	(ex)	Real yield of other sales taxes on consumption (£1970m)
TCGP	(ex)	Effective rate of sales tax on public current expenditure excluding public services (ratio)
TF	(ex)	Effective rate of tax on private property income and transfers abroad (ratio)
TGS	(ex)	Effective rate of indirect tax on public services expenditure (ratio)
TH	(ex)	Effective rate of direct tax on household grants (ratio)
TI	(ex)	Effective rate of sales tax on UK investment and sales to North Sea (ratio)
TKK	(ex)	Revenue from capital taxes (1970m)
TMA	(ex)	Effective rate of protective duty on imports of food, drink and tobacco (ratio)
TMB	(ex)	Effective rate of protective duty on imports of basic materials (ratio)
TMF	(ex)	Effective rate of protective duty on imports of fuels (ratio
TMM	(ex)	Effective rate of protective duty on imports of finished manufactures (ratio)
TMS	(ex)	Effective rate of protective duty on imports of semi-finished manufactures (ratio)
TPNS'	(4.10)	Revenue from Corporation Tax and Petroleum Revenue Tax levied on North Sea profits (£m)
TPPG'	(3.21)	Gross trading surpluses of public corporations and other public enterprises and public sector rent (£m)
TRNS'	(4.8)	Revenue from North Sea royalties (£m)
TRR	(ex)	Effective rate of direct tax on property income (ratio)

TSC'	(ex)	Subsidies on consumers' expenditure (£m)
TSPG'	(3.20)	Subsidies to public corporations (£m)
TTC'	(3.18)	Net sales tax revenue on consumers' expenditure (£m)
TTH'	(3.11)	Direct tax on household grants (£m)
TTR'	(3.12)	Direct tax (including national insurance contributions paid by the self-employed) on property income (£m)
TTRTS'	(3.19)	Local authority rates (£m)
TTW'	(3.9)	Direct tax and national insurance contributions (employees' and employers') on income from employment (£m)
TW1	(3.10)	Average tax value of income tax allowances per employee (£th)
TW2	(ex)	Effective marginal direct tax rate on income from employment (ratio)
TX	(ex)	Effective rate of sales tax on exports (ratio)
U	(5.4)	Numbers unemployed (th)
WBUK'	(6.10)	Income from employment in business sector (£m)
WGS'	(3.3)	Average money earnings per male full-time equivalent in public service employment (£th per annum)
WUK*'	(6.1)	Standard average money earnings per male full-time equivalent in business sector employment (£th per annum)
X'	(2.21)	Exports of goods and services (£m)
YG'	(3.25)	Public sector disposable income (£m)
YRT'	(3.13)	Taxable property income (£m)

4. The North Sea

The North Sea accounts are constructed in accordance with the principles described in Economic Policy Review Nos. 1, Ch.4,and 3, Ch. 9. The volume of production of North Sea oil and gas, together with operating costs and imports of capital equipment, all expressed in real terms, are projected exogenously on the basis of latest available information, based on the work of Martin Lovegrove at Wood-Mackenzie, Edinburgh and of Jon Morgan and Colin Robinson at the University of Surrey. The price of North Sea oil is projected to move in line with the price of imported fuels with the price of North Sea gas assumed to rise with general UK inflation. The effective rate of royalty payments is assumed to be 10% of total sales.

North Sea output at current factor cost is defined as sales less operating costs less royalties, and forms the base on which taxes within the ring fence (Corporation Tax and Petroleum Revenue Tax) are levied. Post-tax profits paid abroad and to the UK are projected on the basis of assumptions about the distribution of future production and profits between domestic and foreign companies. The public (BNOC) component of North Sea investment is assumed to have the same deflator as total investment.

Other relationships shown below are required to generate various accounting magnitudes used elsewhere in the model to define fully the disaggregation of production between the North Sea, public services and the business sector.

Equations

4.1 QNS $\equiv$ XNS - MVNSUK - MVNSF

4.2 ln PNSG" = tr + ln PUK'

4.3 XNS" $\equiv$ (XNS - XNSG)PNSO.PMF'(1 + TMF) + XNSG.PNSG"

4.4 ln MVNSUK" = tr + ln(MVNSUK.PMV')

4.5 ln MVNSF" = tr + ln (MVNSF.PMV')

4.6 ln MMNSUK" = tr + ln $\left[\text{MMNSUK.PUK'}(1+\text{TMM})\right]$

4.7 ln MMNSF' = tr + ln (MMNSF.PMM')

4.8 TRNS' $\equiv$ 0.1 XNS"

4.9 QNS' $\equiv$ XNS" - MVNSUK" - MVNSF" - TRNS'

4.10 TPNS' $\equiv$ PNS.QNS'

4.11 PNSUK' $\equiv$ SNSUK.QNS'(1 - PNS)

4.12 PNSF' $\equiv$ QNS' - TPNS' - PNSUK'

4.13 INSG" $\equiv$ $\dfrac{\text{INSG}\left[\text{MMNSF' (1 + TMM) + MMNSUK"}\right]}{\text{MMNSF + MMNSUK}}$

INSG	(ex)	BNOC direct investment in North Sea (£1970m)
INSG"	(4.13)	BNOC direct investment in North Sea (£m)
MMNSF	(ex)	North Sea imports of capital equipment from abroad (£1970m)
MMNSF'	(4.7)	North Sea imports of capital equipment from abroad (£m)
MMNSUK	(ex)	North Sea imports of capital equipment from UK (£1970m)
MMNSUK"	(4.6)	North Sea imports of capital equipment from UK (£m)
MVNSF	(ex)	North Sea imports of services from abroad (£1970m)
MVNSF"	(4.5)	North Sea imports of services from abroad (£m)
MVNSUK	(ex)	North Sea imports of services from UK (£1970m)
MVNSUK"	(4.4)	North Sea imports of services from UK (£m)
PMF'	(2.20)	Price of imported fuels (excluding protective duties)(defl)
PMM'	(2.17)	Price of imports of finished manufactures to business sector (excluding protective duties) (defl)
PMV'	(2.18)	Price of imports of services to UK business sector (defl)

PNS	(ex)	Rate of direct tax (Corporation Tax plus Petroleum Revenue Tax) on North Sea profits (ratio)
PNSO	(ex)	Price of North Sea oil relative to price of imported fuels (ratio)
PNSF'	(4.12)	North Sea profits paid abroad, after tax (£m)
PNSG"	(4.2)	Price of North Sea gas (defl)
PNSUK'	(4.11)	North Sea profits paid to UK, after tax (£m)
PUK'	(7.1)	Price of business sector domestic sales (defl)
QNS	(4.1)	Gross domestic product of the North Sea (£1970m)
QNS'	(4.9)	Gross domestic product of the North Sea (£m at factor cost)
SNSUK	(ex)	Share of post-tax North Sea profits paid to UK (ratio)
TMF	(ex)	Effective rate of protective duty on imports of fuels from abroad (ratio)
TMM	(ex)	Effective rate of protective duty on business sector imports of finished manufactures from abroad (ratio)
TPNS'	(4.10)	Revenue from Corporation Tax and Petroleum Revenue Tax levied on North Sea profits (ratio)
TRNS'	(4.8)	Revenue from North Sea royalties (£m)
XNS	(ex)	North Sea sales of fuels to UK (£1970m)
XNS"	(4.3)	North Sea sales of fuels to UK (£m)
XNSG	(ex)	North Sea sales of gas to UK (£1970m)

5. Employment

Total employment is disaggregated into two categories corresponding to the production sectors of the model : public service employment and employment in the business sector.* Levels of employment in each of these sectors are measured in terms of male full-time earnings equivalents in order to allow for changes in the composition of employment : this procedure is followed to simplify the determination of the overall wage and salary bill, which can be obtained for each sector as employment multiplied by average earnings per male full-time equivalent. The conversion factor for numbers of persons relative to earnings equivalent employment is positively related to variations in business output, reflecting increased absorption of female and part-time employees at high levels of activity.

The equation for business employment is derived as a reduced form from the following underlying relationships (together with a term for the effects of SET in the past) :

$$\ln EUK^* - \ln LUK = \alpha_o + \alpha_1 t + \beta_1 (\ln QUK - \beta_2 \ln LUK)$$

$$\ln EUK - \ln EUK_{-1} = \lambda(\ln EUK^* - \ln EUK_{-1})$$

where $LUK = \frac{L}{0.94\ RE} - EGS^*$ = supply of labour to business sector (in full-time earnings equivalents)

The model incorporates an adjustment process for actual to desired business employment, EUK^*, with desired employment determined in relation to output and the pressure of demand, following the hypothesis put forward by Godley and Shepherd.+ Labour supply enters in such a way that

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* North Sea labour costs are treated as part of imports of services produced in the UK business sector, to which is therefore attributed employment in the North Sea.

\+ Long-term growth and short-term policy, N.I.E.R. August 1964.

actual productivity in the medium-term varies about its long-term trend (4% per annum) in response to changes in the pressure of demand. ($\beta_1 = 0.6$). The supply of labour enters into productive potential on a one-for-one basis, (that is, $\beta_2 = 1$). In the expression for LUK, business sector labour supply, the coefficient 0.94 adjusts the conversion factor for employees, RE , to a conversion factor for employees and self-employed. Employment in public services is exogenous, apart from a small component related to the level of unemployment (see section 3).

The expression for unemployment incorporates a marginal propensity to register as unemployed which varies inversely with the pressure of demand for labour in the economy, that is $\frac{\partial U}{\partial EE} = \frac{-1.1792U}{L-EE-EESE}$

Equations

5.1 $\ln EUK = tr - 0.015\ SET' + 0.36 \ln QUK + 0.24 \ln(^{L}/(0.94\ RE) - EGS^{*}) + 0.4 \ln EUK_{-1}$

5.2 $\ln RE = tr + 0.06 \ln QUK$

5.3 $EE \equiv (EUK + EGS).RE$

5.4 $\ln U = -1.931 + 1.1792 \ln (L - EE - EESE)$

EE	(5.3)	Employees in employment (th.persons)
EESE	(ex)	Self-employed (th.persons)
EGS	(3.1)	Public service employment (th. male full-time earnings equivalents)
EGS*	(ex)	Exogenous component of public service employment (th. male full-time earnings equivalents)
EUK	(5.1)	Employment in UK business sector (th. male full-time earnings equivalents)
L	(ex)	Total labour force (th.persons)
QUK	(9.1)	UK business output (£1970m)
RE	(5.2)	Relativity between numbers of persons and male full-time earnings equivalents (ratio)
SET'	(ex)	Rates of Selective Employment Tax (index)
U	(5.4)	Unemployment (UK wholly unemployed, excluding school leavers and adult students, annual average of monthly figures) (th

6. Earnings

This section describes the determination of average earnings and the wage and salary bill in the business sector : income from employment in public services is discussed under the Public Sector (section 3).

Standard (cyclically-adjusted) weekly earnings per male full-time employee (WUK*') depend on a weighted average of current and lagged values of wages at settlement for manual and non-manual employees. Adjustments are made for the effects of changes in normal weekly hours and of unconsolidated cost-of-living and threshold payments. The trend coefficient in the equation represents regular additional increases in earnings (about 2% per annum) due to wage drift and structural changes in employment.

The construction of a wage settlement index for manual employees is described in detail elsewhere.* This index is scaled to be equal to standard weekly earnings (excluding all threshold payments) in 1974. The weights used in combining current and lagged values of this index to give standard weekly manual earnings vary as part of the adjustment of wage determination to changes in the rate of inflation, so that an increase in the rate of inflation increases the weight attached to current wage settlements. The weights also take into account the average time between settlements, the proportion of workers covered by wage settlements in the year, and the bunching of settlements at certain times during the year.

The weights for manual employees are obtained by a detailed analysis of a large amount of information about individual settlements. Similar information is not available for settlements covering groups of non-manual employees. It is assumed that the same settlement index is appropriate for these employees, but the weights are defined in terms of the broad relationships underlying the construction of weights for manual employees, described by a single factor, namely the average time between settlements for non-manual employees.

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* EPR No.2, Chapter 2.

The factors which enter into the weights (RWSA) describe the aggregate frequency of settlements, and depend on the rate of inflation, but also on other factors influencing the process of wage bargaining, such as incomes policies. Thus, in the future, the aggregate frequency of settlements (described by RWS and LWS) are made conditional on the assumed nature of incomes policies.

The level of money wage settlements is assumed to be set, under conditions of free collective bargaining, by attempts to achieve a particular real disposable wage at the settlement date, allowing for the lag between the date of settlement and the date of implementation of wage awards. The operation of incomes policies is assumed to determine the level of money wages at settlement, with the real value of the wage bargain under these circumstances emerging as a consequence of inflation and fiscal drag.* The feasibility of incomes policies can then be assessed on the basis of their consequences for real post-tax wages.

Gross income from employment is derived from standard weekly earnings and level of employment, together with an adjustment for cyclical variations in earnings associated with changes in hours worked and other premium payments.

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* This may be achieved by treating money wages at settlement (WS^{*}') as a target and the real value of the bargain (WD^{**}) as an instrument.

Equations

$$6.1 \quad \ln WUK^{*\prime} = tr + \ln \left[\left\{ 0.68 \left[(1-RWSA)\, WS^{*\prime} + RWSA.WS^{*\prime}_{-1} \right] + RNMM.0.32 \left[\left(\frac{1}{LWSN} - 0.5 \right) .WS^{*\prime} + \left(1.5 - \frac{1}{LWSN} \right) WS^{*\prime}_{-1} \right] \right\} + WCLA^{*\prime} \right] - 0.6 \ln NH$$

$$6.2 \quad WS^{*\prime} = WD^{**} \frac{0.75PC'' + 0.25PC''_{-1}}{1 - 0.75TW - 0.25TW_{-1}}$$

$$6.3 \quad PC'' = C'' / C$$

$$6.4 \quad \% PC'' = PC''/PC''_{-1} - 1$$

$$6.5 \quad TW = TTW'/(CGS' + WBUK')$$

$$6.6 \quad RWSA \equiv RLWS + RWS \left[LWS\ (1 - LWST) - RLWS - \tfrac{1}{2} + LWST \right]$$

$$6.7 \quad RWS = tr + 3,0\ \%PC''$$

$$6.8 \quad RLWS = tr + LWST_{-1} - 0.35\ RWS_{-1}$$

$$6.9 \quad LWS = tr - 2.25\ \%\ PC'' - 0,25\ RWS_{-1}$$

$$6.10 \quad WBUK' \equiv EUK.WUK^{*\prime} \left[\frac{QUK}{EUK.EP^{*}} \right]^{0.4}$$

C (1.3) Consumers' expenditure (£1970m)

C'' (1.1) Consumers' expenditure (£m)

CGS' (3.4) Income from employment in public services (£m)

EP^{*} (ex) Trend labour productivity (£1970 th)

EUK (5.1) Employment in UK business sector (th. male full-time equivalents)

LWS (6.9) Average time since last settlement for groups of manual workers having a settlement in the current year (years)

LWSN (ex) Average time since last settlement for groups of non-manual workers having a settlement in the current year (years)

LWST (ex) Average date of settlement within the year for manual workers (measured as time to the end of the current year (years)

NH (ex) Normal weekly hours worked by male manual employees in all industries and services, excluding public sector (index, 1956=1)

PC'' (6.3) Price of consumers' expenditure (defl)

%PC"	(6.4)	Inflation of consumer prices (ratio)
QUK	(9.1)	Business sector output (£1970m)
RNMM	(ex)	Ratio of non-manual to manual average earnings
RLWS	(6.8)	Average time since the last settlement for those manual workers not settling in the current year (measured to the middle of the year) (years)
RWS	(6.7)	Proportion of manual workers covered by settlements made in the current year (including more than one settlement where appropriate) (ratio)
RWSA	(6.6)	The weights given to settlements for manual workers in the previous year (ratio)
TTW'	(3.9)	Direct taxes and national insurance contributions on income from employment (£m)
TW	(6.5)	Effective direct tax rate on income from employment (ratio)
WBUK'	(6.10)	Income from employment in UK business sector (£m)
WCLA*'	(ex)	Average annual unconsolidated cost-of-living and threshold payments per male full-time employee (£ th per annum
WD**	(ex)	Real value of wage bargain (£1970 th per annum)
WS*'	(6.2)	Level of money earnings at settlements (£th per annum)
WUK*'	(6.1)	Standard weekly money earnings per male full-time employee in UK business sector (£th per annum)

7. Prices

The basic price variable used in the model is the price of business sector domestic sales at full cost (PUK'). This is defined as the ratio of consumers' expenditure plus public current expenditure (excluding public services) plus public and private fixed investment (excluding the North Sea), all measured at current full cost, to the sum of the equivalent items measured at constant factor cost. Movements in this average price thus reflect movements in taxes on business sector inputs - rates, protective import duties less subsidies to public corporations - as well as in costs of domestic factor inputs and in import prices themselves. Average market prices of the various components of domestic sales are derived where necessary by applying the appropriate sales tax rate to the full cost price. The original volume series at factor cost which are used to generate the average full cost price for past years, and which embody different implied full cost prices, are replaced in the model by series which are inclusive of the relative price effect, i.e. which share the same full cost price.

The price of domestic sales is assumed to be determined on a cost-plus basis in a form which generalises the Normal Price Hypothesis* about price formation in manufacturing to the economy as a whole. Thus prices are set as a mark-up on historic normal unit costs, where historic costs are si a lagged function of current costs, with an average lag of about one quarte Current costs are expressed as a weighted average of an index of domestic costs per unit of normal business output and an index of import costs per unit of imports, with the weights being actual business output and actual imports respectively.

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* Godley and Nordhaus, Economic Journal, September 1972, and Coutts, Godley and Nordhaus, 'Industrial Pricing in the UK', forthcoming, DAE monograph.

Domestic costs comprise labour costs per unit of normal output, expressed as standard money earnings per male full-time employee divided by trend productivity, together with rates, farm profits, private rents, less subsidies to public corporations, all expressed per unit of normal output. Rates and subsidies to public corporations are those indirect taxes which are treated as levied on domestic primary inputs; farm profits are included to take account of the fact that prices of domestic agricultural products are not set on a cost-plus basis, but are largely determined by EEC policies, so that domestic farm prices and profits are related to prices of food imports, the effect of which is explicitly incorporated in the equation for farm profits. Private rents are included as an additional item entering into business costs, and are projected to move partly in line with inflation. All domestic costs are expressed per unit of normal output in conformity with the Normal Price Hypothesis, namely that firms set prices in relation to normal, rather than actual costs. Normal output and trend productivity are both defined by logarithmic trends *.

Import costs consist of the average cost of imports to the business sector, including protective duties on imports and the cost of purchases of fuels from the North Sea : exports of fuels from the North Sea are excluded as not affecting business costs or prices except for an assumed profit margin of 20%.

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* Fitted to the period 1962-74.

Equations

7.1 $\ln PUK' = tr + \ln HC^*$

7.2 $HC^* = 0.7\ CC^* + 0.3\ CC^*_{-1}$

7.3 $CC^* = \left[\frac{DC^*}{DC^*_{1970}} \cdot QUK + \frac{MC^*}{MC^*_{1970}} \cdot MXUK \right] / (QUK + MXUK)$

7.4 $MXUK = MUK + XNS - XF$

7.5 $DC^* = \frac{WUK^{*\prime}}{EP^*} + \frac{TTRTS' - TSPG' + PRAG' + TRNTS'}{QUK^*}$

7.6 $MC^* = \frac{MUK'' + XNS'' - 0.8.XF.PXF'}{MXUK}$

7.7 $\ln PRAG' = tr + 0.8 \ln \left[PMA' \ (1 + TMA) \right]$

7.8 $\ln TRNTS' = tr + 0.6 \ln PUK'$

7.9 $\%PUK' \equiv PUK'/PUK'_{-1} - 1$

CC* (7.3) Current full cost per unit of sales (defl)

DC* (7.5) Domestic costs per unit of output (defl)

EP* (ex) Trend labour productivity (£1970th)

HC* (7.2) Historic full cost per unit of sales (defl)

MC* (7.6) Import costs per unit of imports (defl)

MUK (2.11) Total imports of goods and services to UK business sector (£1970m)

MUK" (2.23) Total imports of goods and services to UK business sector (£m)

MXUK (7.4) Business sector purchases from North Sea and abroad, less exports of fuels (£1970m)

PMA' (2.14) Price of imports of food, drink and tobacco (defl)

PRAG' (7.7) Income from self-employment and other trading income in agriculture, forestry and fishing (£m)

PUK' (7.1) Price of business sector domestic sales (defl)

%PUK' (7.9) Inflation of price of business sales (ratio)

PXF' (2.19) Price of exports of fuels (defl)

QUK (9.1) Business sector output (£1970m)

QUK*	(ex)	Trend value of business sector output (£1970m)
TMA	(ex)	Effective rate of protective duty on imports of food, drink and tobacco (ratio)
TRNTS'	(7.8)	Private rents (£m)
TSPG'	(3.20)	Subsidies to public corporations (£m)
TTRTS'	(3.19)	Local authority rates (£m)
WUK*'	(6.1)	Standard average earnings in business sector (£th per annu
XF	(ex)	Exportsof fuels (£1970m)
XNS	(ex)	North Sea sales of fuels to UK (£1970m)
XNS"	(4.3)	North Sea sales of fuels to UK (£m)

8. Stockbuilding and stock appreciation

Total stockbuilding in volume terms is expressed in the form of a conventional cyclical adjustment relationship to current and lagged changes in real output. The constant and trend terms currently used in the equation imply a slow downward trend in the stock-output ratio. The average price of additions to stocks moves in line with the historic cost of sales, and this relationship is used to generate stockbuilding at current prices. Private and public sector stockbuilding at current prices are required to complete the private and public sector income-expenditure accounts; private stockbuilding is obtained as approximately 92% of the total, and public stockbuilding as a residual.

Stock appreciation in the private and public sectors is in each case obtained from the difference between business sector final sales measured at current and historic full cost.

Equations

8.1 $S = tr + 0.35\ (QUK - QUK_{-1}) + 0.2\ (QUK_{-1} - QUK_{-2})$

8.2 $S' = tr + S.HC^*$

8.3 $SP' = tr + 0.92\ S'$

8.4 $SAP' = tr + 0.92\ (CC^* - HC^*)(QUK + XNS + MUK)$

8.5 $SAG' = tr + 0.08\ (CC^* - HC^*)(QUK + XNS + MUK)$

CC* (7.3) Current full cost per unit of sales (defl)

HC* (7.2) Historic full cost per unit of sales (defl)

MUK (2.11) Total imports of goods and services to UK business sector (£1970m)

QUK (9.1) Business sector output (£1970m)

S (8.1) Stockbuilding (£1970m)

SAG' (8.5) Public sector stock appreciation (£m)

SAP' (8.4) Private sector stock appreciation (£m)

SP' (8,3) Private sector stockbuilding (£m)

S' (8,2) Stockbuilding (£m)

XNS (ex) North Sea sales of fuels to UK (£1970m)

9. GDP identities

The first two of these, QUK and QUK' , determine business sector output at constant and current factor cost respectively. The output of the North Sea and public services is added to business sector output to obtain gross domestic product (compromise) on the conventional Blue Book definition, i.e., Q* .

Equations

9.1 $$QUK \equiv C + CGP + IPUK + IG - INSG + MVNSUK + MMNSUK + X + S - XNS - MUK$$

9.2 $$QUK' \equiv (C + CGP + IPUK + IG - INSG).PUK' + (MVNSUK'' + MMNSUK'')/(1 + TI) + X' + S' - XNS'' - MUK'' - TTRTS' + TSPG'$$

9.3 $$Q \equiv QNS + CGS + QUK$$

9.4 $$PDX'' \equiv \left[(1 + TMM)MMNSF' + MMNSUK'' + IPUK'' + C'' + S' + CGS'' + CGP'' + IG'' - INSG''\right] / (IPUK + MMNSUK + MMNSF + C + S + CGS + CGP + IG - INSG)$$

C	(1.3)	Consumers' expenditure (£1970m)
C''	(1.1)	Consumers' expenditure (£m)
CGP	(ex)	Public current expenditure other than public services (£1970m)
CGP''	(3.6)	Public current expenditure other than public services (£m)
CGS	(3.2)	Public services expenditure (£1970m)
CGS''	(3.4)	Public services expenditure (£m)
IG	(ex)	Public fixed investment (£1970m)
IG''	(3.7)	Public fixed investment (£m)
INSG	(ex)	BNOC direct investment in North Sea (£1970m)
INSG''	(4.13)	BNOC direct investment in North Sea (£m)
IPUK	(1.6)	Private fixed investment, excluding North Sea (£1970m)
IPUK''	(1.4)	Private fixed investment, excluding North Sea (£m)

* The residual error between compromise and expenditure estimates of GDP is allocated to private stockbuilding (SP') and the error between compromise and income estimates to private trading income (PRUK')

MMNSF	(ex)	North Sea imports of capital equipment from abroad (£1970m)
MMNSF'	(4.7)	North Sea imports of capital equipment from abroad (£m)
MMNSUK	(ex)	North Sea imports of capital equipment from UK (£1970m)
MMNSUK"	(4.6)	North Sea imports of capital equipment from UK (£m)
MUK	(2.11)	Total imports of goods and services to UK business sector (£1970m)
MUK"	(2.23)	Total imports of goods and services to UK business sector (£m)
MVNSUK	(ex)	North Sea imports of services from UK (£1970m)
MVNSUK"	(4.4)	North Sea imports of services from UK (£m)
PDX"	(9.4)	Price of domestic expenditure (defl)
PUK'	(7.1)	Price of business sector domestic sales (defl)
Q	(9.3)	Gross domestic product, compromise estimate (£1970m)
QNS	(4.1)	Gross domestic product of the North Sea (£1970m)
QUK	(9.1)	Gross domestic product of UK business sector (£1970m)
QUK'	(9.2)	Gross domestic product of UK business sector (£m at factor cost)
S	(8.1)	Stockbuilding (£1970m)
S'	(8.2)	Stockbuilding (£m)
TI	(ex)	Effective rate of sales tax on UK investment and sales to North Sea (ratio)
TMM	(ex)	Effective rate of protective duty on imports of finished manufactures (ratio)
TSPG'	(3.20)	Subsidies to public corporations (£m)
TTRTS'	(3.19)	Local authority rates (£m)
X	(2.4)	Exports of goods and services (£1970m)
X'	(2.21)	Exports of goods and services (£m)
XNS	(ex)	North Sea sales of fuels to UK (£1970m)
XNS"	(4.3)	North Sea sales of fuels to UK (£m)

10. Money supply and DCE

The model now explicitly contains the links between the finance of the PSBR, interest rates and the principal monetary aggregates. The short-run interest rate (Minimum Lending Rate, see also section 3) is related to the level of world interest rates and the rate of domestic inflation. Except for the influence of credit restrictions such as the "corset", the money stock is assumed to be demand-determined in relation to short-term interest rates, the rate of inflation and the level of private disposable income. The positive interest-elasticity for both nominal and real interest-rate changes, represents an own-rate effect for interest-bearing bank deposits : when MLR rises, bank deposit rates rise also, thus making bank deposits more attractive, cet.par., than long-term assets or other short-term deposits.

Given the finance for the PSBR which is provided by reserve changes (BOF' - see section 2) and by the banking system, sales of public sector debt are determined by the financing identity for the PSBR, and the level of long-term interest rates by the yield differential required to achieve such sales, allowing for the income elasticity of demand for securities.

Domestic Credit Expansion is split into two components : the change in M3 less the 'basic' balance of payments, and 'other credit sources', which is absorbed into the constant and residual.

Equations

10.1 $$RI = tr + 0.33\ RIF + 0.67(PUK'/PUK'_{-1} - 1)$$

10.2 $$\ln M3' = tr + 0.2 \ln (1 + RI) - 0.14.PUK'/PUK'_{-1} + \ln (YR' + YW' + YH') - 0.025\ QRB$$

10.3 $$KPG' \equiv BG' + BOF' - RKBG.(M3' - M3'_{-1})$$

10.4 $$RI25 = tr + RI + \left[\frac{0.5KPG' - 0.05(YW'_{-1} + YH'_{-1} + YR'_{-1})}{YW' + YH' + YR'}\right]$$

10.5 $$DCE' = tr + M3' - M3'_{-1} - BB'$$

BB'	(2.35)	Basic balance of payments (£m)
BG'	(3.24)	Public sector borrowing requirement (£m)
BOF'	(2.38)	Balance for official financing (£m)
DCE'	(10.5)	Domestic Credit Expansion, pre-December 1976 official definition (£m)
KPG'	(10.3)	Sales of public sector debt to private sector and overseas (£m)
M3'	(10.2)	End-year money supply, M3 definition (£m)
PUK'	(7.1)	Price of business sector domestic sales (defl)
QRB	(ex)	Degree of credit restriction (0 = no restrictions, 2.5 = severe restrictions)
RI	(10.1)	Minimum lending rate (previously bank rate), average for the year
RIF	(ex)	Eurodollar interest rate, average for the year
RI25	(10.4)	Yield on War Loan, average for the year
RKBG	(ex)	Bank lending to the public sector in sterling, plus increased currency in circulation, as a proportion of the change in the money supply (ratio)
YH'	(1.8)	Disposable household grants (£m)
YR'	(1.9)	Disposable property income (£m)
YW'	(1.7)	Disposable income from employment (£m)

Appendix I

Constant and trend coefficients fitted in equations on data for 1962-74[a] as at March 1st 1977

Equation Number	Dependent variable	Estimated coefficients	
		Constant	Trend
1. Private expenditure			
1.1	ln C''	0.010	0.0
1.4	ln IPUK''	-0.012	0.0
2. Balance of payments			
2.1	ln XX	9.481	-0.007
2.5	MF	-404.701	18.935
2.6	MB	1207.554	3.750
2.7	ln MS	-3.289	0.051
2.8	ln θ	-22.165	0.022
2.13	ln PXX'	0.017	-0.003
2.14	ln PMA'	0.083	-0.003
2.15	ln PMB'	0.104	-0.012
2.16	ln PMS'	0.047	-0.009
2.17	ln PMM'	0.092	-0.006
2.18	ln PMV'	-0.176	0.008
2.19	ln PXF'	0.033	-0.0003
2.26	ln PUKF'	-2.991	0.039
2.27	ln PFUK'	8.631	-0.123
2.28	NF'	115.330	-2.741
2.32 (s)	ln KFUK'	-0.273	0.0
2.33 (s)	KUKF'	922.720	-86.680
2.37 (s)	KWR'	1732.315	0.0
3. Public sector			
3.10	ln TW1	-2.885	0.077
3.16	ln GRF'	5.122	0.013
3.17	ln GRRC'	4.628	0.113
3.19	ln TTRTS'	6.728	0.026
3.20	ln TSPG'	14.857	0.117
3.21	ln TPPG'	-2.834	0.009
3.22	NG'	-68.406	25.910
3.23	ln NGC'	5.210	0.058

Equation Number	Dependent variable	Estimated coefficients Constant	Trend
4. North Sea			
4.2 (s)	ln PNSG"	0.624	-0.048
4.4 (s)	ln MVNSUK"	0.172	0.0
4.5 (s)	ln MVNSF"	0.092	0.0
4.6 (s)	ln MMNSUK"	0.121	0.0
4.7 (s)	ln MMNSF'	0.232	0.0
5. Employment			
5.1	ln EUK	-0.224	-0.015
5.2	ln RE	-0.412	0.003
6. Earnings			
6.1	ln WUK*'	-0.429	0.022
6.7	RWS	0.702	-0.003
6.8	RLWS	0.702	-0.015
6.9	LWS	1.605	-0.005
7. Prices			
7.1	ln PUK'	0.077	0.001
7.7	ln PRAG'	6.467	0.036
7.8	ln TRNTS'	6.719	0.081
8. Stockbuilding and stock appreciation			
8.1	S	-167.681	0.0
8.2	S'	22.777	0.0
8.3	SP'	-11.348	0.0
8.4	SAP'	-432.495	71.242
8.5	SAG'	-1.096	-1.981
10. Money supply and DCE			
10.1	RI	0.006	0.0
10.2	ln M3'	-0.661	0.0
10.4	RI25	0.049	0.0
10.5	DCE'	147.000	0.0

(a)

(s) after an equation number indicates exceptions to this rule, where coefficients were fitted over the period 1970-74.

Appendix II

Name	Reference no. in manual	Reference no. in model program	
ANSF	1 ex	191	Foreign oil companies' depreciation allowances (£1970m)
ARD'	3 ex	144	Value of capital allowances (£m)
B'	2.31	104	Current balance of payments (£m)
BB	2.36	186	Basic balance in foreign currency units (millions)
BB'	2.35	105	Basic balance of payments (£m)
BG'	3.24	162	Public sector borrowing requirement (£m)
BOF'	2.38	195	Balance for official financing (£m)
BT'	2.25	103	Balance of trade in goods and services (£m)
C	1.3	48	Consumers' expenditure (£1970m)
C'	1.2	43	Consumers' expenditure (£m at full cost)
C"	1.1	41	Consumers' expenditure (£m at market prices)
CC*	7.3	64	Current normal unit costs (defl)
CGP	3 ex	51	Public current expenditure other than public services (£1970m)
CGP"	3.6	170	Public current expenditure other than public services (£m)
CGS	3.2	1	Public services expenditure (£1970m)
CGS'	3.4	2	Public services expenditure (£m at full cost)
CGS"	3.5	3	Public services expenditure (£m at market prices)
DCE'	10.5	197	Domestic Credit Expansion (£m)
DC*	7.5	65	Domestic normal unit costs (defl)
DTW1	3 ex	27	Discretionary tax allowances (£th)
EE	5.3	129	Employees in employment (th. persons)
EESE	5 ex	132	Self-employed (th. persons)
EGS	3.1	5	Public service employment (th. male full-time earnings equivalents)

EGS*	3 ex	183	Exogenous component of public service employment (th. male full-time earnings equivalents)
EH	3 ex	153	Recipients of household grants (th. pensioner-equivalents)
EP*	7 ex	66	Trend labour productivity (£1970th)
EUK	5.1	128	Employment in business sector (th. male full-time earnings equivalents)
GD'	3.27	176	Total end-year public sector debt (£m)
GR	3.15	152	Average pension (£th per annum)
GRF'	3.16	38	Current government transfers abroad (£m)
GRH'	3.14	151	Household grants (£m)
GRRC'	3.17	135	Other current grants to private sector (£m)
GRRI	3 ex	136	Capital grants to private sector (£1970m)
HC*	7.2	67	Historic normal unit costs (defl)
HP'	1 ex	167	Net increase in consumer hire purchase debt (£m)
IG	3 ex	52	Public fixed investment (£1970m)
IG"	3.7	172	Public fixed investment (£m)
INSG	4 ex	18	BNOC direct investment in North Sea (£1970m)
INSG"	4.13	20	BNOC direct investment in North Sea (£m)
IPUK	1.6	50	Private fixed investment, excluding North Sea (£1970m)
IPUK'	1.5	49	Private fixed investment, excluding North Sea (£m at full cost)
IPUK"	1.4	42	Private fixed investment, excluding North Sea (£m at market prices)
IRCH	2.3	189	Export cost competitiveness (ratio)
KFNS	2 ex	112	Long-term net private capital inflows to North Sea (£1970m)
KFUK'	2.32	106	Long-term private capital inflows to business sector (£m)
KGF'	2 ex	108	Net official long-term capital inflows (£m)
KGNS	3 ex	25	BNOC lending to N. Sea operators (£1970m)
KGP	3 ex	163	Other net lending to private sector (£1970m)

KPG'	10.3	198	Sales of public sector debt to private sector and overseas (£m)
KTRC'	2.34	109	Increase in net trade credit outstanding (£m)
KUKF'	2.33	107	Long-term private capital outflows (£m)
KUKNS Pahl	1 ex	190	UK private equity finance of North Sea investment (£1970m)
KWR'	2.37	194	Net short-term capital inflows (£m)
L Roger	5 ex	133	Labour force (th. persons)
LWS	6.9	123	Average time since last settlement for groups of manual workers having a settlement in the current year (years)
LWSN Roger	6 ex	142	Average time since last settlement for groups of non-manual workers having a settlement in the current year (years)
LWST Roger	6 ex	141	Average date of settlement within the year for manual workers, measured as time to the end of the current year (years)
M	2.12	54	Total imports of goods and services (£1970m)
M'	2.24	100	Total imports of goods and services (£m)
MA Fry	2 ex	90	Imports of food, drink and tobacco (£1970m)
MAC (Fry)	2 ex	96	Imports of US military aircraft (£1970m)
MAC' ( )	2 ex	99	Imports of US military aircraft (£m)
MB	2.6	92	Imports of basic materials (£1970m)
MC*	7.6	187	Import costs per unit of imports (defl)
MCON ( )	2 ex	184	Degree of import restriction on finished manufactures (= 1 with no restrictions)(ratio)
MF	2.5	91	Imports of fuels (£1970m)
MMNSF Pahl	4 ex	15	North Sea imports of capital equipment from abroad (£1970m)
MMNSF'	4.7	24	North Sea imports of capital equipment from abroad (£m)
MMNSUK Pahl	4 ex	14	North Sea imports of capital equipment from UK (£1970m)
MMNSUK"	4.6	19	North Sea imports of capital equipment from UK (£m)
MMUK	2.8	94	Imports of finished manufactures to business sector (£1970m)

MS	2.7	93	Imports of semi-finished manufactures (£1970m)
MUK	2.11	97	Total imports of goods and services to business sector (£1970m)
MUK"	2.23	98	Total imports of goods and services to business sector, including protective duties (£m)
MVNSF	4 ex	13	N. Sea imports of services from abroad (£1970m)
MVNSF"	4.5	23	N. Sea imports of services from abroad (£m)
MVNSUK	4 ex	12	N. Sea imports of services from UK (£1970m)
MVNSUK"	4.4	17	N. Sea imports of services from UK (£m)
MVUK	2 ex	95	Imports of 'other items' (mainly services) to business sector (£1970m)
MXUK	7.4	4	Business sector purchases from N. Sea and abroad, less exports of fuels (£1970m)
M3'	10.2	196	End-year money supply (£m)
NF'	2.28	35	Public sector net payments of interest and dividends abroad (£m)
NG'	3.22	161	Public sector net payments of interest and dividends (£m)
NGC'	3.23	164	Public sector receipts of interest and dividends (£m)
NH	6 ex	181	Normal weekly hours (index, 1956=1)
NR'	1.11	134	Private sector net receipts of interest and dividends from public sector (£m)
PAF'	2 ex	82	World price of food and materials in foreign currency (index)
PC"	6.3	173	Price of consumers' expenditure (defl)
%PC"	6.4	127	Inflation of consumer prices (ratio)
PDX"	9.4	185	Price of domestic expenditure (defl)
PFF'	2 ex	83	World price of fuels in foreign currency (index)
PFUK'	2.27	34	Private property income and transfers received from abroad (£m)
PMA'	2.14	69	Price of imports of food, drink and tobacco (defl)
PMB'	2.15	71	Price of imports of basic materials (defl)
PMF'	2.20	70	Price of imports of fuels (defl)
PMM'	2.17	73	Price of imports of finished manufactures (defl)

PMS'	2.16	72	Price of imports of semi-finished manufactures to business sector (defl)
PMV'	2.18	74	Price of imports of 'services' to business sector (defl)
PNS Paish	4 ex	32	Effective rate of Corporation Tax and Petroleum Revenue Tax on N. Sea profits (ratio)
PNSF'	4.12	30	N. Sea profits paid abroad, after tax (£m)
PNSG"	4.2	193	Price of N. Sea gas (defl)
PNSO Paish	4 ex	11	Price of N. Sea oil relative to price of imported fuels (ratio)
PNSUK'	4.11	29	N. Sea profits paid to UK, after tax (£m)
PRAG'	7.7	117	Farm profits (£m)
PRUK'	1.10	115	Business sector private trading profits and rent (£m)
PUK'	7.1	63	Price of business sector domestic sales (defl)
%PUK'	7.9	102	Inflation of price of business sales (ratio)
PUKF'	2.26	33	Private property income and transfers paid abroad from business sector, before tax (£m)
PWF' Paish	2 ex	81	World price of exports of manufactures in foreign currency (index)
PXF'	2.19	84	Price of exports of fuels (defl)
PXX'	2.13	68	Price of non-fuel exports of goods and services (defl)
Q	9.13	159	Gross domestic product, compromise estimate (£1970m)
QNS	4.1	16	Gross domestic product of the N. Sea (£1970m)
QNS'	4.9	22	Gross domestic product of the N. Sea (£m)
QRB Paish	1 ex	26	Degree of credit restriction (0 = no restrictions, 2.5 = severe restrictions)
QUK	9.1	53	Gross domestic product of business sector (£1970m)
QUK'	9.2	60	Gross domestic product of business sector (£m at factor cost)
QUK* ( )	7 ex	188	Trend value of business sector output (£1970m)
QUKK	2.39	158	Business output capacity (£1970m)

RCH	2.2	89	Lagged export cost competitiveness (ratio)
RCM	2.10	174	Lagged price competitiveness for imports of finished manufactures (ratio)
RCS	2.9	182	Lagged price competitiveness for imports of semi-finished manufactures (ratio)
RE	5.2	130	Relativity between numbers of persons and male full-time earnings equivalents (ratio)
RHW	3 ex	155	Relativity between pensions and average earnings (ratio)
RI	10.1	37	Bank rate/MLR, average for the year
RIF	10 ex	177	Eurodollar interest rate, average for the year
RI25	10.4	199	Yield on War Loan, average for the year
RKBG	10 ex	200	Bank lending to the public sector in sterling, plus increased currency in circulation, as a proportion of the change in the money supply (ratio)
RKTM	2 ex	111	Import trade credit coefficient (ratio)
RKTX	2 ex	110	Export trade credit coefficient (ratio)
RLWS	6.8	122	Average time since last settlement for those manual workers not settling in the current year, measured to the middle of the year (years)
RNMM	6 ex	143	Relativity between non-manual and manual average earnings (ratio)
RU	3 ex	154	Relativity between average unemployment benefit and average pension (ratio)
RWGSUK	3 ex	8	Relativity between public service and business sector average earnings (ratio)
RWS	6.7	124	Proportion of manual workers covered by settlements made in the current year (ratio)
RWSA	6.6	121	Weight given to settlements for manual workers in the previous year (ratio)
RW1	3 ex	139	Effective rate of initial investment allowances (ratio)
RW2	3 ex	140	Proportion of private sector stock appreciation subject to tax (ratio)
RX	2 ex	86	Effective exchange rate, in weighted average foreign currency per unit sterling (index)

S	8.1	55	Stockbuilding (£1970m)
S'	8.2	62	Stockbuilding (£m)
SAG'	8.5	179	Public sector stock appreciation (£m)
SAP'	8.4	116	Private sector stock appreciation (£m)
SBBW'	2.29	36	Accumulated basic balance in foreign currency (millions)
SET'	5 ex	178	Rates of Selective Employment Tax (index)
SG'	3.8	168	Public sector stockbuilding (£m)
SNSUK	4 ex	31	Share of post-tax N. Sea profits paid to UK (ratio)
SP'	8.3	166	Private sector stockbuilding
SRI	3.26	175	Average rate of interest on debt not turned over within one year
TCGP	3 ex	171	Effective rate of sales taxes on public current expenditure excluding public services (ratio)
TC1	3 ex	45	Effective rate of sales tax on income-elastic consumption goods (ratio)
TC2	3 ex	46	Yield of other sales taxes on consumption (£1970m)
TF	3 ex	39	Effective rate of tax on private property income and transfers paid abroad (ratio)
TGS	3 ex	6	Effective rate of indirect tax on public services expenditure (ratio)
TH	3 ex	157	Effective rate of direct tax on household grants (ratio)
TI	3 ex	57	Effective rate of sales tax on UK investment and sales to N. Sea (ratio)
TKK	3 ex	165	Revenue from capital taxes (£1970m)
TMA	3 ex	76	Effective rate of protective duty on imports of food, drink and tobacco (ratio)
TMB	3 ex	78	Effective rate of protective duty on imports of basic materials (ratio)
TMF	3 ex	77	Effective rate of protective duty on imports of fuels (ratio)
TMM	3 ex	80	Effective rate of protective duty on imports of finished manufactures (ratio)
TMS	3 ex	79	Effective rate of protective duty on imports of semi-finished manufactures (ratio)

TPNS'	4.10	28	Revenue from Corporation Tax and Petroleum Revenue Tax levied on N. Sea profits (£m)
TPPG'	3.21	113	Gross trading surpluses of public enterprises and public sector rent (£m)
TRNS'	4.8	21	Revenue from N. Sea royalties (£m)
TRNTS'	7.8	118	Private sector rents (£m)
TRR Terry	3 ex	145	Effective rate of direct tax on property income (ratio)
TSC' Terry	3 ex	47	Subsidies on consumers' expenditure (ratio)
TSPG'	3.20	59	Subsidies to public corporations (£m)
TTC'	3.18	44	Net sales taxes on consumers' expenditure (£m)
TTH'	3.11	156	Direct tax on household grants (£m)
TTR'	3.12	138	Direct tax on property income (£m)
TTRTS'	3.19	58	Local authority rates (£m)
TTW'	3.9	147	Direct tax on income from employment (£m)
TW	6.5	180	Effective rate of direct tax on income from employment (ratio)
TW1	3.10	148	Average tax value of income tax allowances (£th)
TW2 Terry	3 ex	149	Effective marginal direct tax rate on income from employment (ratio)
TX Terry	3 ex	75	Effective rate of sales tax on exports (ratio)
U	5.4	131	Numbers unemployed (th.)
WBUK'	6.10	114	Income from employment in business sector (£m)
WCLA*' Roger	6 ex	120	Average value of cost-of-living and threshold supplements (£th per annum)
WD** Roger	6 ex	126	Real value of wage bargain (£1970th per annum)
WF Paul	2 ex	85	Volume of world trade in goods and services (index)
WGS'	3.3	7	Average earnings in public services per male full-time equivalent (£th per annum)
WS*'	6.2	125	Level of money earnings at settlement (£th per annum)
WUK*'	6.1	119	Standard money weekly earnings in business sector per male full-time equivalent (£th per annum)

X	2.4	56	Exports of goods and services (£1970m)
X'	2.21	61	Exports of goods and services (£m at full cost)
X"	2.22	101	Exports of goods and services (£m at market prices)
XF	2 ex	87	Exports of fuels (£1970m)
XNS	4 ex	9	N. Sea sales of fuels (£1970m)
XNS"	4.3	10	N. Sea sales of fuels (£m)
XNSG	4 ex	192	N. Sea sales of gas (£1970m)
XX	2.1	88	Exports of goods and services, excluding fuels (£1970m)
YF'	2.30	40	Overseas sector disposable income (£m)
YG'	3.25	160	Public sector disposable income (£m)
YH'	1.8	169	Disposable household grants (£m)
YR'	1.9	146	Disposable property income (£m)
YRT'	3.13	137	Taxable property income (£m)
YW'	1.7	150	Disposable income from employment (£m)