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No 29

The Bank of England Model 1989: recent developments and simulation properties

by

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and

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The object of this Technical Series of Discussion Papers is to give wider circulation to econometric research work predominantly in connection with revising and updating the various Bank models, and to invite comment upon it; any comments should be sent to the authors at the address given below.

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ABSTRACT

This paper gives a description of the Autumn 1989 vintage of the Bank's quarterly econometric model of the UK economy (the most recent version of the model to be deposited with the ESRC Macroeconomic Modelling Bureau). The two years between this and the last published vintage of the Bank model have seen substantial changes to virtually all sections of the model. These changes have resulted from two related initiatives: a major effort to improve the model, in part so as to enhance the efficiency of the Bank's forecasting procedures, by reducing the number of discretionary adjustments to model output; at the same time there was a move towards simplification of the structure of the model, where possible reducing the number of variables. Considerable progress has been made in both these areas, though the process is an ongoing one, and inevitably a number of rough edges remain, some of which are noted in the paper. In particular, major changes are currently being made to the financial sector of the model, which will be incorporated in the next public version of the model.

The paper is divided into two main parts: the first describes the structure of the model, and key equations; the second examines the simulation properties of the model, when subjected to changes in key factors which influence the UK economy. Two appendices give further details of simulation properties, and a full listing of the model's over 400 equations and identities.

A number of points of general interest can be drawn out of the paper. (i) There has been an increase in the role of interest rates in the model, both directly, and indirectly (through, for example, effects on personal wealth, and hence consumption). Though the effects on any one component of expenditure are generally fairly small when taken in isolation, these effects are mutually reinforced in the response of the model as a whole, resulting in a major increase in the effect of interest rate changes on domestic demand and output. (ii) The effects of interest rates, or other demand shocks, on UK inflation, (other than indirect effects via changes in the exchange rate) remain small, despite the influence of capacity utilisation on profit margins in the model. This partly reflects the small estimated effect of changes in unemployment on UK earnings growth. (iii) In the trade sector of the model, which encapsulates the UK's supply response to changes in UK and overseas demand, there has been a considerable reduction in adverse trends, which formerly tended to imply that the UK's trade position would worsen, for given levels of competitiveness, when both the UK and competing economies were growing at similar rates. At the same time, there has been a reduction in the estimated effects of changes in the exchange rate on the UK's trade position. This is partly due to lower estimates of the direct effects of competitiveness on trade volumes, but also reflects the fact that UK earnings in the current model respond more rapidly to the price changes caused by an exchange rate appreciation/depreciation, hence limiting the effects of changes in the nominal exchange rate on competitiveness.

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INTRODUCTION

The last published record of the Bank's quarterly econometric model appeared in Harnett and Patterson (1989). That article detailed the changes to the Bank model between the Autumn 1986 vintage, described in Patterson et al (1987), and the Autumn 1987 vintage. This document describes the Autumn 1989 vintage of the model. The two years between these vintages have seen substantial changes to virtually all sections of the model; as a result this paper represents an almost complete description of the current model. The main exclusion is of any description of most variables within the Flow-of-Funds matrix - this area is currently undergoing major changes which will be the subject of a forthcoming Technical Paper.

The changes to the model described here are partly due to the necessary reestimation work after the rebasing of the National Accounts; but have also resulted from two related initiatives. In the summer of 1988 it was decided to make a major effort to improve the model: it had been felt that due to deficiencies in a number of areas, which resulted in off-model adjustments and exogenisations of key variables, the Bank's six-monthly forecasts were absorbing excessive resources, which could be better used were the model more reliable. As a result of this initiative, an intensive period of research was set in motion: no fewer than 357 changes were made to the model coding between the Autumn 1988 and the Spring 1989 versions of the model alone.

Alongside the perceived need for improved performance on an equation-by-equation basis there was a related initiative: to simplify the structure of the model, and where possible to reduce the number of variables. A number of criteria were taken into account when making a decision as to whether an existing degree of complexity should be retained in a given sector of the model:

1) Could a simpler model be accepted without serious loss of econometric performance?
2) Even when a given degree of complexity was econometrically more acceptable, was it possible to make use of the more subtle distinctions in a forecasting context?
3) Did a more complex model significantly improve our understanding of the underlying processes being modelled?

Application of these criteria suggested a number of sectors where considerable simplification could be brought about, with a quite significant reduction in the number of variables. Between the Autumn 1986 and Autumn 1987 versions of the model the number of variables had actually increased marginally, from 660 to 671; the current model reported here has 579 variables. Furthermore, as Table 1 shows, this figure understates the degree of simplification involved, since the reduction was significantly greater in endogenous variables determined by behavioural or technical equations.

Alongside the progress made in simplification, considerable gains have also been made with respect to the more imprecise aim of 'improving' the model. As a measure of this, there are now very few equations which are 'switched off' during forecasts (the remaining exceptions largely being policy-related variables). It has as a result proved possible to streamline the forecasting process, and considerably reduce the resources which are devoted to it. The process is however a

continuing one - the sheer number of changes over the past year or so has inevitably left some rough edges (some of them noted in the main text of this paper) which need to be attended to. In addition, further simplification of the model is under way: in particular, as outlined above, in the financial sector, which will also allow behavioral equations resulting from the Barr-Cuthbertson Flow of Funds Project (1989) to be taken on to the model.

Due to the large number of changes resulting from the initiatives discussed above, it has been necessary to be selective in reporting on individual equations, in order to keep this paper to a manageable size. The paper has two main sections. In the first, principal changes are divided into seven sub-sections: domestic expenditure components; the external accounts; output determination; the financial sector, including the exchange rate; domestic prices; personal sector incomes and taxes, and the labour market. The second main section discusses changes in model simulation properties.

TABLE 1: ANALYSIS OF VARIABLE TYPE BY MODEL MANUAL SECTION
Autumn 1989 (Autumn 1987 in parentheses)

Section Number	Description	Number of variables, by type of equation: Exogenous	Behavioural		Technical		Identity		Total	
1	Consumers' Expenditure		4	(4)	1	(2)	2	(4)	7	(10)
2	Fixed Investment		7	(7)	1	(1)	9	(10)	17	(18)
3	Stockbuilding		2	(6)	3	(3)	10	(11)	15	(20)
4	Exports of Goods and Services		5	(7)	1	(1)	6	(7)	12	(15)
5	Imports of Goods and Services		3	(8)	2	(2)	8	(8)	13	(18)
6	GDP Identities and Output Components		5	(5)	1	(6)	14	(14)	20	(25)
7	Labour Market		11	(12)	0	(4)	5	(9)	16	(25)
8	Exchange Rates and Interest Rates		4	(13)	2	(6)	4	(9)	10	(28)
9	Prices		22	(33)	16	(14)	13	(24)	51	(71)
10	Personal Sector Income and Expenditure		8	(13)	27	(30)	20	(26)	55	(69)
11	Company Sector Income and Expenditure		5	(4)	14	(17)	16	(15)	35	(36)
12	Public Sector Income and Expenditure, Expenditure Taxes, Oil and Oil Taxes.		7	(8)	15	(17)	13	(14)	35	(39)
13	Balance of Payments including IPD		7	(3)	5	(22)	25	(13)	37	(38)
14	Non-Bank Private Sector Flow of Funds (FoF)		9	(10)	11	(19)	30	(23)	50	(52)
15	Overseas sector FoF		2	(0)	4	(8)	6	(5)	12	(13)
16	Public Sector and Monetary Sector FoF		2	(5)	3	(3)	16	(13)	21	(21)
17	World trade and commodity prices		0	(5)	0	(0)	0	(0)	0	(5)
	Exogenous variables, trends, quarterly dummies etc	173 (168)	0	(0)	0	(0)	0	(0)	173	(168)
	TOTAL	**173 (168)**	**103**	**(143)**	**106**	**(155)**	**197**	**(205)**	**579**	**(671)**
NB:										
	Real Economy (1-9 and 17)		**63**	**(100)**	**27**	**(39)**	**71**	**(96)**	**161**	**(235)**
	Nominal income, taxation, BoP (10-13)		**27**	**(28)**	**61**	**(86)**	**74**	**(68)**	**162**	**(182)**
	Flow of Funds (14-16)		**13**	**(15)**	**18**	**(30)**	**52**	**(41)**	**83**	**(86)**

A RECENT MODEL DEVELOPMENTS

(a) Domestic Expenditure Components

(i) Consumption

1) Consumption of non-durables

The specification of the equation for consumers' expenditure on non-durable goods has changed several times since the Patterson et al (1987) vintage of the model, in which both CD (consumption of durables) and CND (consumption of non-durables) were specified in a moving average formulation in line with research at the Bank by Davis (1984). This formulation carries with it arguably rather implausible dynamic responses (Dicks (1988)) and so has been dropped.

The first change to the CND equation was the adoption of the type of formulation used in Dicks (1988). This retained inflation-adjusted disposable income (YDLH) and net financial wealth (NFWJ) as explanatory variables, but brought in a direct effect from a real interest rate variable as in the durable expenditure equation. Since that paper, work has proceeded to examine the effects of including a broader measure of wealth than NFWJ, and in particular to include effects from the housing market. The resulting specification identifies separate roles for non-housing net financial wealth, (which is defined as the more usual NFWJ variable before deduction of loans for house purchase) and for net housing wealth (which is the value of the housing stock less the corresponding mortgage debt). The two measures capture net housing wealth and net (non-housing) financial wealth. The steady state solution for the CND equation is:

$$\ln(CND)=-.27+0.943*\ln(YDLH)+0.139*\ln(HW/YDLH)+0.304*\ln(FW/YDLH)-0.624*\ln(1+RR)$$

where:

YDLH = inflation adjusted real household disposable income;
HW = real net housing wealth;
FW = real net financial wealth;
RR = the real interest rate (in terms of the base rate and consumer prices).(1)

The cumulative responses of this equation to step changes in the independent variables are shown below.

Period	ln(YDLH)	ln(HW/YDLH)	ln(FW/YDLH)	ln(RR)	ln(YDLH*)
0	0.17	0	0	-0.04	0.17
1	0.37	0.01	0.02	-0.06	0.34
2	0.35	0.01	0.03	-0.09	0.31
3	0.39	0.02	0.04	-0.12	0.33
4	0.41	0.03	0.06	-0.14	0.33
5	0.44	0.03	0.07	-0.16	0.34
10	0.55	0.05	0.12	-0.26	0.37
20	0.70	0.09	0.19	-0.40	0.42

(1) For detailed definitions see model manual (Appendix 2, Section 1.1).

The table above shows that despite the move away from a moving average specification the dynamic response of non-durable consumption is still quite long. The problem of response time is then added to when we look at the wealth terms in the equation. As noted above these are expressed as ratios of YDLH which means that over periods, of up to a few years, in which wealth is little affected by changes in income, the coefficients on wealth can be treated as negative coefficients on income, leaving a long run coefficient on income of 0.5 rather than 0.94 and a step response pattern show by YDLH* above.

Clearly the assumption that wealth is unaffected by changes in income is an unrealistic one in the long run. However, since the existing stocks of housing and financial wealth are very large in comparison to flows of income and since, in the present Bank model, increases in demand for assets have little effect on asset prices it is not an unreasonable assumption over the short and medium term.

The large wealth effects reported here are in fact mid-way estimates of those obtained over various sample periods. Dicks (1988) has found that substantial parameter variation emerges in estimates of interest rate and wealth effects. For the present specification of the CND equation, the wealth effects varied substantially over time; the equation reported above was estimated to 1985 Q4, whereas those estimated to the end of 1984 indicate negligible (housing) wealth effects but those to 1986 indicate far more powerful effects. The current equation is a compromise choice and one which will be continuously monitored, particularly in the light of data revisions. The equation performs quite well econometrically on the present vintage of data, although it underpredicts slightly on average.

2) Consumption of Durables

Using the preferred CND equation, CD was re-estimated imposing the appropriate cross-equation restriction on income so that the long run income elasticity of total consumption is unity at a given ratio of durable to non-durable consumption (Dicks (1988)). The long run of this equation is:

$$\ln(CD)=-11.3+1.7*\ln(YDLH)-0.1*\ln(RMD)-0.9*\ln(1+RR)+0.19*\ln(LEND)+0.13*\ln(RLIQ)$$

where:

RMD = the minimum hire-purchase deposit rate on durables;

LEND = the real flow of mortgage lending (used to proxy the effect of increased turnover in the housing market on the purchase of household-related consumer durables);

RLIQ = the real stock of personal sector liquid assets in relation to YDLH.(2)

As the table below shows, this equation (which is very little changed from the version in Harnett and Patterson (1989)) has a rapid dynamic response to changes in the independent variables; unfortunately it now has an increasing tendency to overpredict.

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(2) For detailed definitions see model manual (Appendix 2, Section 1.2).

Period	ln(YDLH)	ln(RMD)	ln(RR)	ln(LEND)	ln(RLIQ)
0	0.66	-0.08	0	0	0
1	1.47	-0.09	-0.70	0.15	0
2	1.65	-0.10	-0.85	0.18	0.10
3	1.69	-0.10	-0.89	0.19	0.12
4	1.70	-0.10	-0.89	0.19	0.12
5	1.70	-0.10	-0.89	0.19	0.12

(ii) Fixed Investment

1) Manufacturing Investment

Non-residential investment is now determined by a form of error correction mechanism (ECM) as proposed by Bean (1979). In Patterson et al (1987) a more standard ECM was used where investment adjusted to a desired capital stock;

$$I=f(K^{*} - K)_{t-1}$$

The present approach substitutes out K leaving the ECM as an adjustment to an equilibrium rate of investment. The equilibrium rate of investment is then determined as the first derivative of the equilibrium capital stock at the steady state growth rate (after allowing for depreciation). In this formulation equilibrium investment is a function of output and relative factor costs. By substituting out, this formulation avoids the problems associated with using unreliable capital stock data.

In the manufacturing investment equation relative factor costs are defined using a definition of the user cost of capital which follows the work of Kelly and Owen (1985). The user cost of capital can be defined as the real purchase price plus the return foregone on alternative investments, less the real return from selling the asset at the end of the period, or;

$$UCC=(1/PVIC)/(1-(TRYC/100))*(PIFO/PPOX)*(RHO+DELTA-0.5*\Delta_4 lnPIFO)$$

The first term describes the present value of investment allowances (PVIC) adjusted for corporation tax (TRYC) so that the value of investment allowances increases as the tax rate increases. This means that the second term, the price of investment (PIFO) deflated by producer's output prices (PPOX) which measures the real purchase price of capital, is tax-adjusted. The term RHO is calculated by weighting together the tax-adjusted marginal cost of different forms of finance (debt, new equity and retained earnings)(3) The rate of depreciation (DELTA) is also added to the rate of return foregone. Finally, the expected realisable capital gain on new investment one year ahead is defined as the change in PIFO over the last year (ie it assumes a form of adaptive expectations).

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(3) The cost of debt (RD) is defined as the required return after corporation tax necessary to service debt interest payments. The cost of equity (RE) is the return after corporation tax required to finance a return to shareholders equivalent to the return on an alternative investment. The cost of retained finance (RR) is the return required after the effective rate of capital gains tax to finance a return to shareholders equivalent to the return on an alternative investment. RHO is then defined as the mean of these three measures. For detailed definitions see model manual, Appendix 2, Section 2.1.

This final term is multiplied by 0.5 to allow for the illiquid nature of the second-hand market. Relative factor costs are then defined as a ratio of labour costs and the user cost of capital; other factor costs are ignored. Despite its theoretical advantages this relative factor cost term was found to be only marginally significant in the manufacturing equation. This meant that it has been supplemented by a more conventional after tax real interest rate term.

Estimation was carried out using the Engle and Granger (1987) two-step technique. The (explicitly estimated) long run for the manufacturing investment equation is:

$$\ln(IMAN) = -7.165 + 1.487*\ln(MPRO) + 0.094*\ln(RFC) - 0.775*\ln(1+RLRI/100)$$

where:

MPRO = manufacturing output;
RFC = relative factor costs;
RLRI = the corporation tax adjusted real rate of interest (defined in terms of the long rate and the price of investment).

In this formulation the incremental capital-output ratio is partially determined in the equation dynamics so that the long run above describes a steady state with no output growth. The coefficient on output of almost 1.5 appears somewhat implausible since it implies that either there are strongly decreasing returns to investment or that the rate of depreciation increases as the level of output increases. More recent work does however suggest that the restriction of a unit coefficient on output is statistically acceptable in some specifications.

The table below outlines the response of the IMAN equation to step changes in the independent variables.

Period	ln(MPRO)	ln(RFC)	CAP*	ln(1+RLRI/100)	ln(1+RSRI/100)
0	0	0	0	0	0
1	0.34	0.02	0.57	-0.18	0
2	0.60	0.04	0.44	-0.31	0
3	1.43	0.06	0.45	-0.46	0
4	1.49	0.07	0.32	-0.56	-0.95
5	1.76	0.08	0.44	-0.69	-0.73
1	1.86	0.11	0.01	-0.92	-0.39
2	1.39	0.09	-0.03	-0.75	0.08

$$* \quad CAP = \ln MPRM_{-1} - \frac{1}{9} \sum_{i=2}^{10} \ln MPRM_{-i}$$

As the table shows, the dynamics of the equation imply overshooting responses to all the independent variables. In particular the response to changes in manufacturing output peaks at over two in period seven, and this is added to by the term in MPRM (manufacturing output excluding food drink and tobacco), which is used to proxy manufacturing capacity utilisation. This is the correct dynamic response since there is clearly a positive relationship between output growth and investment. The dynamic equation also contains the change in real short term interest rates (RSRI) which represents short run borrowing costs.

2) Investment in distribution and services

The investment in distribution and services (IDS) equation follows a similar formulation to the manufacturing equation, though not using a relative factor cost term, and including an effect from nominal long-term interest rates. The explicitly estimated long run is:

$$\ln(IDS) = -14.44 + 2.1*\ln(OOTH) + 0.002*TIME - 2.09*(1+NLRI/100)$$

where:

OOTH = output of 'other' sectors (private services, utilities and construction);
NLRI = corporation tax-adjusted long-term rate.

As with manufacturing, the long run implies strongly decreasing returns to investment. The long run also contains a time trend. The cumulative responses of the IDS equation are described below.

Period	ln(OOTH)	ln(1+NLRI/100)
0	0	0
1	0.54	-1.89
2	0.94	-1.94
3	1.24	-1.98
4	2.37	-2.01
5	2.30	-2.03
10	2.42	-2.08
20	2.14	-2.10

As the table shows the dynamic structure of the services equation is simpler than that of the manufacturing equation. Again, there is some overshooting in response to an output shock (an elasticity of over 3 in period 6).

3) Residential Investment.

In the current version of the model the determination of private residential investment (IHP) has been supplemented by a new equation for private sector housing completions (IHPC) (though this is only an interim system). This means that a large part of residential investment is explained by the completions equation with the remainder (mainly housing improvements) explained in the IHP equation. The long run solutions of these equations are:

$$\ln(IHPC) = -14.7 + 1.78*\ln(YDLH) - 8.3*\ln(1+RCBR/100) + 1.13*\ln(PAHM/EMAN)$$

$$IHP = -1377 + 0.06*YDLH - 18.61*(1+RRMI/100) + 24.2*IHPC$$

where:

YDLH = Inflation adjusted real household disposable income;
RCBR = Banks' base rate;
PAHM/EMAN = Price of housing divided by earnings in manufacturing;
RRMI = Real tax-adjusted rate of interest (in terms of the mortgage rate and consumer prices);

The IHPC equation suggests that investment in new housing is a luxury good since its elasticity with respect to real income is greater than one.The coefficient on the interest rate term implies that a one point increase in interest rates causes a fall in IHPC of 8.3% in the long run. The final term

PAHM/EMAN proxies the profitability of building. As the table of cumulative responses shows, the profit term first appears in the equation with an eight period lag, which is consistent with the view that there are long gestation lags in house building.

Period	ln(YDLH)	ln(1+RCBR/100)	ln(PAHM/EMAN)
0	0	-1.88	0
1	0.40	-2.55	0
2	0.55	-3.58	0
3	0.77	-4.22	0
4	0.90	-4.88	0
5	1.04	-5.38	0
10	1.45	-7.02	0.27
20	1.71	-8.06	0.97

IHPC enters directly into the linear specification for IHP; the rest of IHP is determined as a function of tax-adjusted real interest rates, inflation adjusted disposable income and (in the short-run) the real flow of mortgages (RSM). The cumulative responses of this equation are shown below.

period	YDLH	RRMI	RSM	IHPC
0	0	-9.4	0	22.0
1	0.02	-14.1	0.11	30.9
2	0.04	-16.4	0.05	15.3
3	0.05	-17.5	0.03	19.8
4	0.05	-18.1	0.01	22.1
5	0.06	-18.3	0.01	23.2
10	0.06	-18.6	0	24.2
20	0.06	-18.6	0	24.2

(iii) Stockbuilding.

The determination of stockbuilding has altered in a number of important ways since Patterson et al (1987). First, in the spirit of model simplification, the stockbuilding system has been aggregated from four to two equations. Manufacturing stocks have been aggregated from two equations (stocks of basic materials and stocks of finished goods and work in progress) to one total manufacturing stock equation. Second, distributors' stocks and 'other' stocks have been aggregated to one non-manufacturing stock equation. Both these stock equations now include a real cost of stockholding term following the work of Kelly and Owen (1985). As well as these changes in approach, the functional form of the equations has changed somewhat since both equations are now log linear and do not impose a unit coefficient on output.

The cost of stockholding (RCI2) is defined in a similar way to the cost of capital in the fixed investment equation. In simplified terms,

RCI2=(PS/PEF)*(TAR-QDOT)*TAX DUMMIES

where the first term is the price of stocks deflated by the price of final expenditure, TAR is the tax-adjusted rate of interest (banks' base rate) and QDOT is the change in the price of stocks over the last year which, assuming adaptive expectations, is a measure of the expected price of stocks one year ahead. The tax dummies adjust for periods of nominal and physical tax relief on stocks, though there is no adjustment for tax exhaustion.(4)

1) Manufacturers' Stocks

The long run solution(5) of the manufacturers' stocks equation is:

$$\ln(KIIM) = -15 + 1.135*\ln(MPRO) + 1.39*\ln(KLI/PEF) - 0.0297*RCI2$$

where:

KIIM	=	the level of manufacturers' stocks;
KLI	=	Proxy for ICCs' holdings of liquid assets;
PEF	=	price of final expenditure.

The coefficient of greater than one on manufacturing production implies a rising stock-output ratio with output. However, over the eighties there appears to have been a structural change in stockbuilding, with a strong tendency for the stock-output ratio to decline. As a result this equation has over-predicted to an increasing extent since the mid-eighties. The second term in the long run solution is a measure of the effect of company liquidity on stockholding. This term can be seen as capturing the portfolio aspect of stockbuilding where physical stocks are viewed as one form of wealth.(6) The final term (RCI2) is the cost of stockholding discussed above.

Period	ln(MPRO)	ln(KLI/PEF)	RCI2
0	0	0	0
1	0.16	0	0
2	0.30	0	0
3	0.43	0.04	0
4	0.42	0.08	-0.001
5	0.42	0.12	-0.002
10	0.51	0.27	-0.005
20	0.65	0.52	-0.011
40	0.84	0.87	-0.018

The table above shows the cumulative response of the manufacturers' stocks equation to step changes in the independent variables. From the table it can be seen that the adjustment, in term of stock levels, is very slow; however, the impact effect in terms of stockbuilding is quite large. A change in gross output (MPRO*MRGN in the terminology below) of £100 million in 1989 Q1 causes manufacturers' stockbuilding to rise by about £20 million in each of the two quarters following the change.

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(4) For detailed definitions see model manual (Appendix 2, Section 3.1).

(5) Not explicitly estimated. It should be borne in mind that the near unit root in this equation means that long-run parameters are poorly determined.

(6) For a discussion of related modelling issues see Callen and Henry (1989).

2) Non-manufacturers' Stocks

The non-manufacturers' stock equation has a similar, but simpler, specification to that of the manufacturing equation. The long run solution is

ln(KIIR)= 1.32*ln(GDP) - 0.0032*RCI2

where GDP is used as a proxy for non-manufacturers' sales(7) whilst RCI2 is the same cost term as appeared in the manufacturers' stocks equation. As with the manufacturing equation this equation implies a rising stock-output ratio and so has had a tendency to over-predict in the recent past, though this effect is less marked than in the KIIM equation. The table of cumulative responses shows that the non-manufacturers' stock equation adjusts considerably more quickly than the manufacturing equation. Since the level of non-manufacturers' stocks in 1989 was around 25% higher than that of manufacturers, this also implies a larger stockbuilding response.

Period	ln(GDP)	RCI2
0	0	0
1	0.17	0
2	0.36	0
3	0.54	-0.001
4	0.70	-0.002
5	0.83	-0.002
10	1.16	-0.003
20	1.30	-0.003

(b) The External Accounts

(i) Goods: Volumes and Prices

Since the Autumn 1987 model, there have been wide-ranging changes to the trade sector in addition to the changes implied by rebasing: this is a prime example of an area which has seen considerable simplification, as well as a move towards greater consistency in modelling, in line with the two initiatives discussed in the introduction.

- On the import side, finished (MGFM) and semi-manufactures (MGSM) have been aggregated into a single category (MGMA).
- The model of manufactures trade now uses relative actual unit labour costs (RULC) rather than normalised costs (NULC), and where relative prices did appear (either alone or in combination with NULC) in the old model (MPRM, MGSM, XGMA) as an indicator of competitiveness these have now been replaced by RULC.
- As the Bank now uses a version of LBS and NIESR's Global Econometric Model (GEM) to produce its world economic forecast, the world variables entering the trade equations have been changed to make them consistent with that model. This has meant an aggregation of certain world commodity price series (UNAN, UNFD, UNME and UNMO have been superseded by WPFD and WPIC for food and industrial commodities respectively), and, in addition, the key world activity variable in the UK model is now WTMU, UK 1985 base export-weighted world import volumes. This replaces the world export volume series WTX.

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(7) Note that this measure of stocks includes retailers' stocks of domestically produced and imported manufactures, as well as stocks more specifically related to non-manufacturing output.

- The sector has also been re-estimated in the light of the new weights used in the construction of the sterling effective exchange rate index, (Bank of England, 1988) and all world price series are now expressed in local currency, using the new exchange rate weights; the only exceptions being commodity and oil prices, which are expressed in dollars.
- Finally, the model has moved to using Balance of Payments basis trade data (fob-fob) rather than data on an Overseas Trade Statistics basis (fob-cif) (as disaggregated data on a BoP basis have become available), which has permitted considerable simplification.

(1) Goods: Volumes

A summary comparison of equation properties for trade volume equations is shown in Table 2.

Table 2: A Comparison of the Autumn 1989 and Autumn 1987 Trade Volume Equations

	1987 Model			1989 Model		
	Activity Elasticity	Competitiveness Elasticity*	Time Trend % pa	Activity Elasticity	Competitiveness Elasticity*	Time Trend % pa
Exports of Manufactures	1.00	-0.76		1.00	-0.40	
Exports of Non-Manufactures	0.83	-0.40		1.00	-0.12	
Imports of Manufactures						
- Finished	1.00	-0.55	+4.10			
- Semis	1.25	-0.82	+2.31			
- Total				0.86	-0.34	+1.77
Imports of Non-Manufactures						
- Food	0.44+	-0.12		1.00	-0.83	
- Basic Materials	0.72	-0.49		1.00	-0.29	

*Note: the competitiveness elasticities are not strictly comparable either across equations or between models; for details of competitiveness variables see discussion above and relevant model listings.

+ The 1987 model also included an effect from UK agricultural production.

For exports of manufactures (XGMA), the restriction of a long run unit elasticity on world imports (WTMU) was found to be statistically acceptable over the sample period used (1976 Q3 to 1986 Q4). The competitiveness elasticity is estimated in terms of current and lagged relative unit labour costs (RULC); this is almost half the size of that in the Autumn 1987 model, which was specified half in terms of normalised unit labour costs and half in terms of manufactured export prices relative to world manufacturing prices. However, relative unit labour costs is a more volatile series than relative prices: this will tend to reduce the estimated competitiveness elasticity.

Imports of manufactures are still given by residual in the model, once the demand for manufactures (MAND) and domestic manufacturing output (MPRM) (see section (c) below) have been determined.(8) In the old model, finished manufactures (MGFM) were determined by residual, while semis (MGSM) were modelled directly; in the new model, total manufactures (MGMA) are determined by residual. The implied activity elasticity of manufactured imports is now 0.86, compared with unity (for finished manufactures) in the old model, due to the non-unit coefficient on XGMA in the equation for MPRM (see below); there is also now a significantly smaller adverse implicit time trend (of 1 3/4% pa).

The structure of this sub-system renders the calculation of the appropriate competitiveness elasticity a somewhat lengthy procedure. The elasticity of MGMA with respect to competitiveness is given by:

$$\eta_{RULC} = \left(0.25 * \frac{XGMA}{MGMA} * \frac{\partial XGMA}{\partial RULC} - \frac{\partial QD}{\partial RULC} \cdot \frac{QD}{MGMA} \right) / 1.055$$

where QD = MPRM * MRGN - 0.75 XGMA.

The elasticity of exports with respect to competitiveness is here scaled by the ratio of exports to imports, and by 0.25, which is the assumed average import content of exports, since MGMA is given by the expression [(MAND- 0.75 * XGMA - QD)/1.055]. Evaluating this expression at end-1988 values provides the estimates in Table 2, from $\partial XGMA/\partial RULC = -0.4$ and $\partial QD/\partial RULC = -0.50$.(9) There is a proxy capacity utilisation effect in the MPRM equation; the long run elasticity of manufactured imports with respect to this variable is 0.46.

The calculation of the time trend increase in MGFM and MGMA is also somewhat indirect. In the new model, the long run coefficient on time in the MPRM equation is -0.0056. At an annual rate this implies a 2.25% pa fall in domestic manufacturing output share. The actual implied fall in domestic output is given by (0.0225 * (MRGN * MPRM-0.75XGMA))/1.055], which in 1989 was equal to 1.77% of MGMA: the figure shown in Table 2. (Note the effects of base dependency here: the competitiveness elasticity of imports falls as the volume of imports rises.) For the old model, the calculation is similar but applies to MGFM rather than MGMA. For MGSM, a separate time trend entered the equation directly.

The evidence suggests that the adverse time trend on imports has ameliorated somewhat in the 1980s compared with the 1970s (this has also emerged from preliminary work on the direct modelling of imports). Despite this, there are problems in determining what it is that the time trend proxies: in estimation there tended to be shifts between the estimated coefficients on time, competitiveness and demand.

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(8) Work is currently underway at the Bank investigating the direct estimation of an MGMA equation and a restructuring of this sector of the model.

(9) Dividing by 1.055 scales down the gross output estimate of manufactured imports taking account of the OTS-BOP data differences; ie MGMA is based on BOP data from which insurance and freight costs are deducted. An additional complication is that, in the current Bank model, manufactured exports (XGMA) wrongly enter the equation for the demand for manufactures (MAND) with a coefficient of greater than unity. This will be corrected to be unity in the next version of the model but does affect the simulation properties reported below. These elasticities are reported on the basis of a unit coefficient; if the present coefficient of 1.17 were used the implied model competitiveness elasticity would be 0.27 rather than 0.34, as in Table 2.

In addition to these differences in long run effects there are also important differences in the short run adjustment paths of manufactured exports and imports. On the activity side, there is a prolonged overshooting response for imports (see discussion of MPRM equation in Section (e)) while for exports there is no overshooting, but adjustment is comparatively rapid, with 90% of it complete within one year. For competitiveness, the lag structure is such that exports respond more rapidly than imports. The proportion of adjustment that is completed after a given number of quarters is shown in Table 3.(10) For exports, 50% of the response is complete within three quarters; but for imports 50% is complete only within eight quarters. In the previous Bank model imports responded more rapidly, but this was an imposed rather than an estimated model property. The current model is underpinned by the view that imports are essentially demand-determined given a competitive world supply and that demand adjusts quite slowly to competitiveness; exports on the other hand are more a UK supply phenomenon, with supply responding quickly to improved competitiveness for given world demand.

Table 3: Proportion of Competitiveness Response Completed After Given Number of Quarters

Period	Exports (XGMA)	Imports (MGMA)
0	0.13	0
1	0.36	0.04
2	0.53	0.11
3	0.64	0.21
4	0.74	0.31
5	0.81	0.40
6	0.86	0.48
7	0.90	0.54
8	0.92	0.60
9	0.94	0.65
10	0.96	0.69

For exports of non-manufactures (XGNM), the activity elasticity has increased in the new model but there is a smaller competitiveness elasticity. For non-manufactured imports (MGBM,MGFD) there have been changes to the specification of activity and competitiveness effects. The net effect has been: to raise the activity elasticities (to unity); and to raise the competitiveness elasticity of food and lower that of basics.

(2) Goods: Prices

The price side of the trade sector includes both unit value indices (UMGM, UXGM) and average value indices (PMFD, PMBM, PMGM, PXNM, PXGM). The former are base weighted Laspeyres price indices of the form:

$$UVI = \frac{P_t \, q_o}{P_o \, q_o}$$

(10) This response pattern is approximated in the model by the 'effective competitiveness' variables, XCME and MCME.

while the latter are a sequence of current weighted Paasche price indices:

$$AVI = \frac{p_t \, q_t}{p_o \, q_t}$$

The continually shifting pattern of weights in the AVI prices mean that they are in principle (and indeed sometimes in practice) imperfect indicators of true price movements. However, the model requires them in order to convert volume series into current prices, whereas UVIs are in principle dispensable. For this reason, given the impetus towards model simplification, it was decided to retain UVIs only for trade in manufactures. The AVIs for manufactures are modelled by technical equations, in terms of the corresponding UVIs; these equations typically fail to cointegrate, reflecting the fact that the ratio of current- to-base-weighted relative price indices is not constant. As a general rule, under growth and inflation, the (AVI/UVI) ratio is expected to decrease (Robinson (1989)): this is reflected in the less than unit elasticities in the linking equations.

In the estimated behavioural equations, the UVI for manufactured imports (UMGM) depends on world manufactured export prices (WPX) in the long run with a unit coefficient. There are short run effects from WPX and from domestic prices (PPOX). In previous model vintages, domestic prices also had a long-run effect on the price of finished manufactures; but both theoretical and statistical considerations led to the exclusion of any effect in the current model. The short-run effect in the present equation is however, quite prolonged, due to the small coefficient on the single error-correction term. For exports of manufactures, the UVI (UXGM) is given in the long run by domestic producer prices (PPOX), with an elasticity of 65%, and a prior-weighted average of world producer prices in sterling (WPP) and world export prices in sterling (WPX), with a total weight of 35%.

The remaining (non-manufactures) trade prices are essentially determined by world commodity prices (see Table 4). The AVI for imports of food, drink and tobacco (PMFD) is given by the world price of food (WPFD) and by world producer prices (WPP). The AVI for imports of basic materials and miscellaneous commodities (PMBM) is overhomogenous in world producer (WPP) and industrial commodity (WPIC) prices. In re-estimation, overhomogeneity was a persistent problem here, possibly reflecting a compositional shift towards higher value goods within basics. For exports of non-manufactures, there are imposed weights on the import price series on the right hand side (0.71 PMFD, 0.29 PMBM) which are based on export shares for the corresponding trade categories. Long run homogeneity is imposed here, although there are additional short run effects from both these import prices and from domestic producer prices: this long-run property means that, for a given commodity composition of trade, the non-manufacturing terms of trade remain constant.

Table 4: Long Run Determinants of Trade Prices

Dependent variable	UMGM	UXGM	PMGM	PXGM	PMFD	PMBM	PXNM	PXS	PMS
Explanatory Variable (converted to £)									
WPFD					0.44				
WPP		0.24			0.46	0.26			
WPIC						0.87			
PMFD							0.71		
PMBM							0.29		
PMS								0.40	
WPC									0.39
PXS									0.51
PC								0.60	
UMGM			0.91						
UXGM				0.93					
WPX	1.0	0.11							
PPOX		0.65							

(ii) Services

For the service sector, imports of services excluding shipping (MSOT) are determined by total final expenditure and by the ratio of service export and import prices (PXS/PMS), with long run elasticities of unity and +1.8 respectively. This is the same structural form as in the Patterson, et al (1987) model, but the relative sensitivities of the equation have been reversed: the long run expenditure elasticity was formerly over 2.0 and the competitiveness elasticity was only 1.15. This type of specification appears to be more robust for exports of services excluding shipping (XSOT): both the competitiveness and income elasticities are smaller in the new model than in the old. For competitiveness (PXS/PMS) the long run elasticity is now -0.78 rather than -1.0 and for world income (WGDP) it is 1.4 rather than 1.6. The shifts in the activity variables on the two equations mean that there is now a small 'reverse doomsday' mechanism in this part of the model: with steady-state growth of the respective activity variables exports of services will tend to grow more rapidly than imports of services.

The determination of the prices of traded services in the model remains highly simultaneous, as PXS depends on PMS, which in turn depends on PXS. Additionally, PMS depends on world consumer prices (WPC) while export prices depend on domestic consumer prices (PC). Homogeneity is imposed for PXS but PMS is underhomogenous (see Table 4). For PMS the imposition of homogeneity was found to be borderline statistically rejected both in the single equation and on a systems basis and had a distinctly adverse effect on the equation's forecasting performance.

(iii) Oil Sector

Although there have been substantial revisions to the system determining oil imports and exports the underlying structure remains the same. Oil trade is determined by assuming that all forms of oil are perfect substitutes. This means that North Sea oil producers are price-takers in an international market and that the prices of imports and exports of oil move in line with one

another and the prevailing world price of oil. As a result, net exports of oil can simply be taken as the remainder once domestic output and demand have been determined. However, it is still necessary to determine total imports and total exports. In Patterson et al (1987) this was done by assuming that oil exports (XGO) were a fixed proportion of output which left imports as the residual. This assumption meant that changes in the domestic demand for oil had no effect on exports and so were totally reflected in imports. The present version of the model still has imports as the residual but assumes that home produced oil supplied to the domestic market remains fixed as a proportion of that market:

$$XGO = NSO*POIL_{85} - .32*NOLD$$

where:
NSO = North Sea oil production (million tonnes);
POIL = Price of North Sea oil;
NOLD = domestic demand for oil.

This means that a change in output only affects exports. Although this specification has the advantage that exports are affected by changes in home demand it has the disadvantage that imports are not affected by changes in domestic output.

The only truly behavioural equation in this sector is that for domestic demand for oil (NOLD). The specification of this equation has changed only slightly in the present version of the model - relative prices are now defined in terms of producer prices (PPOX) rather than coal prices (which have been dropped from the model) and a time trend has been added to capture the effects of improved energy use.

(iv) Overseas IPD

As in Patterson et al (1987) the balance of IPD from abroad (BIPD) comes from a system that determines the stock of overseas assets and liabilities and the rates of return on those assets and liabilities. The present system simplifies the rather complex structure used in Patterson et al (1987) by modelling asset stocks by sector and type, categorised as below. The rate of return equations that determine the IPD associated with these stocks have also been re-estimated. This system is described in more detail in MacFarlane (forthcoming), but is summarised in the table below.

Sector	EXTERNAL ASSETS			EXTERNAL LIABILITIES		
	Stock	Rate	IPD	Stock	Rate	IPD
Non-bank						
Portfolio	KOPO	ROPO	YOPO	KIPO	RIPO	YIPO
Direct	KODI	RODI	YODI			
Oil				KIOL	RIOL	YIOL
Non-oil				KIDI	RIDI	YIDI
Bank	KOBA	ROBA	YOBA	KIBA	RIBA	YIBA

In this system the assets stocks are determined by investment flows (from the flow of funds system) and revaluation effects (including exchange rate effects). Having determined these stocks the IPD flows associated with them are in most cases determined by a behavioural equation for the rate of return on the given asset/liability stock. The data for these rates of return

are defined by dividing the relevant IPD flow by a two-period average of the asset stock: this results in a form of composite rate of return for the individual instruments within a given stock.

(c) Output

(i) Home Demand for Manufactures

The aggregation of the stockbuilding equations and the trade equations, described above, has meant that the variable MAND (proxy for demand for manufacturing output) has been respecified. In Patterson et al (1987) the data for MAND (then called MND) referred to output of finished manufactured goods only. The new definition is in terms of total manufactures:

MAND= 1.055.MGMA + MRGN.MPRM

where:

MGMA = Imports of manufactures;
MRGN = Ratio of gross to net output in manufacturing;
MPRM = Manufacturing output excluding food, drink & tobacco.

Now that IIFW (manufacturers' stockbuilding of finished goods & work in progress) has been absorbed into total manufacturers' stockbuilding it has been dropped from the definition. This means that MAND, which is otherwise defined in 'net sector' terms (ie, to exclude any intermediate demand from UK manufacturers for output from within the sector) does include a small element of intermediate expenditure.

The equation for MAND is a pseudo-identity relating it to expenditure categories using weights derived from the 1984 input-output tables. As well as this change the equation was estimated without an autoregressive error term or a relative price term as was formerly the case. This simply left the constant term of this equation to be estimated. In this context the constant term can be interpreted as the average measurement error between MAND and the constructed demand term.

(ii) Manufacturing Output

This respecified MAND term enters into the determination of manufacturing output which has also been respecified. As before, total manufacturing output (MPRO) is determined as the sum of the output of food drink and tobacco (MPRX) and the rest (MPRM) where the proportionate change in MPRX is set to equal 66% of the proportionate change in MPRM. This means that MPRM is the driving variable in the output system. Other than changes in the variables used, the main change in the MPRM equation has been to take account of the effect of changes in manufactured exports (XGMA) on manufactured imports. Since manufactured imports (MGMA) are defined as the residual between MAND and MRGN*MPRM (gross output) and since the effect of XGMA on MAND and MPRM was equal in Patterson et al (1987), there was no response of MGMA to changes in XGMA. This led to implausibly large responses of domestic output in response to changes in XGMA. In the present specification the import content of manufactured exports is set at 25%, based on the 1984 input-output tables, which means that gross output only rises by 75% of any increase in XGMA.

The present version of the MPRM equation also uses some different variables. First, two variables that appeared in the old MPRM equation, other exports (XGOT) and IIFW (discussed above), have been subsumed into other variables. Second and more importantly the competitiveness term in the equation is now defined in terms of relative unit labour costs (RULC below) instead of a composite price and labour cost term. Also, worries over the output response to an exchange rate depreciation meant that a long run elasticity of output with respect to competitiveness was restricted to be 0.5 , which was accepted by the data, despite the fact that the freely estimated elasticity was 0.26. The long run solution of the MPRM equation is:

$$\ln(MPRM.MRGN - 0.75\ XGMA) = 0.399 + \ln(MAND - XGMA) - 0.5\ \ln(RULC) - 0.0056\ TIME - 0.5845\ CAP$$

The imposed (and accepted) unit elasticity on domestic demand for manufactures was also present in the previous version of this equation, as was a term in the lagged ratio of MPRM to its nine-period moving average, but there was a more powerful adverse time trend.(11) The term in MPRM proxies the effect of capacity utilisation as in previous versions. The cumulative responses of this equation are described below;

Period	ln(MAND-XGMA)	ln(RULC)	TIME	CAP*
0	0.88	0	-0.001	-0.08
1	0.82	-0.02	-0.002	-0.17
2	0.77	-0.06	-0.002	-0.22
3	0.82	-0.10	-0.003	-0.27
4	0.85	-0.16	-0.003	-0.31
5	0.87	-0.21	-0.003	-0.35
10	0.94	-0.36	-0.005	-0.47
20	0.97	-0.43	-0.005	-0.53

$$* \quad CAP = \ln MPRM_{-1} - \frac{1}{9} \sum_{i=2}^{10} \ln MPRM_{-i}$$

These responses are on the whole quite smooth (if a little long) apart from the demand term which has a strong contemporaneous response. Note that the less-than unit impact response of domestic output to domestic demand for manufactures results in the overshooting response of imports mentioned in Section (b), given that imports are derived by residual.

(d) The Financial Sector

(i) The Exchange Rate

Although there have been major changes in specification the present exchange rate equation still has the same theoretical basis as Patterson et al (1987). It follows a form of uncovered interest parity for the real exchange rate adjusted for risk and assuming adaptive expectations.

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(11) Note that in the old model the time trend was not constant in percentage terms, since the equation was not estimated in logs.

On re-estimation of the equation using the new definition of the effective exchange rate (Bank of England 1988), it was decided to look into a new specification, which could take on board the criticisms of the equation in the Autumn 1988 vintage of the model made in Fisher et al (1989a). Criticism of this equation (in which the real exchange rate was determined in the long run by the real interest differential, and the ratio of non-oil exports to non-oil imports) centred on the real interest rate differential term: firstly, the long run coefficient on the interest rate differential (0.31) was felt to be implausibly low (the uncovered interest rate parity condition would imply a coefficient of unity). Secondly, there was no response of the exchange rate to interest rates in the dynamic specification, only in the long run (again theory would suggest that, unless there were very large costs of adjustment, reaction should be rapid). Despite these criticisms the equation passed all statistical tests (except parameter stability for the last three quarters of the sample), though this may have been partly due to its low explanatory power.

The present version of the model has two exchange rate equations, a 'main' and 'alternative' equation. The, explicitly estimated, long run of the 'main' equation is:

$$\ln(EER.PPOX/WPP)=0.123 + 1.08\ BAL/GDPN - 0.001\ CPBR + 0.635\ (RRUKG-RRUSG)$$

where:

BAL/GDPN= Current balance as a proportion of nominal GDP;
CPBR = Cumulated PSBR as a % of nominal GDP (from 1979 Q1);
RRUKG = Real* long rate on UK gilts (in terms of consumer prices);
RRUSG = Real* long rate on US bonds (in terms of US consumer Prices).

* Real interest rates defined as $\{R_t/100-(P_t/P_{t-4}-1)\}/(P_t/P_{t-4})$

Some of the data definitions have been changed, and a cumulative PSBR term has been included, but this equation still effectively encompasses the old equation and increases both the long run and impact effect of the interest rate differential. It also significantly reduces the effect of the balance of trade. Some of this improvement is due to the move from short to long rates which are felt to be a better proxy for the expected interest rate differential. However, the interest rate differential effect is still less than unity, and there is also still no contemporaneous exchange rate response to changes in interest rates. The role of the current balance term is the same as the non-oil visible trade balance term in the previous specification; the theoretical justification is as a measurement of the risk premium involved in holding UK assets. The new term in this equation, the cumulated PSBR, is more difficult to justify on theoretical grounds (although it is required in order to obtain a cointegrating vector). It can be argued that it is an extension of the risk premium to reflect fiscal stance: if the fiscal stance is (or has been) loose then market participants might view the government as 'imprudent' thereby increasing the risk premium.

Period	BAL/GDP	RRUKG/RRUSG	CPBR*
0	0.954	0	-0.0036
1	1.456	0.372	-0.0038
2	1.460	1.370	-0.0023
3	1.238	1.359	-0.0009
4	1.043	0.956	-0.0004
5	0.975	0.572	-0.0006
10	1.088	0.681	-0.0011
20	1.077	0.635	-0.0011

* response to a one-period shock (ie shock in PSBR lasts only one period, hence CPBR is permanently raised by one)

The table shows overshooting in response to all the independent variables. This overshooting can be seen as mimicking the Dornbusch type overshooting one would expect to find in an equation with forward looking expectations.

The 'alternative' exchange rate equation has a far simpler structure. As with the 'main' equation it was estimated using the two-stage procedure of Engle and Granger (1987). It has the current balance and real interest rate differentials in the long run solution with only the current balance appearing dynamically. The restriction of dynamic homogeneity (Currie 1981) through instantaneous and complete adjustment of the nominal exchange rate to prices is also relaxed in the 'alternative' equation.

(ii) Mortgage Lending

In Patterson et al (1987) an equation that determined building society mortgage lending was reported; other mortgage lending was exogenous. However, since non-building society lenders are playing an increasingly important role in the mortgage market the present version of the model now determines total mortgage lending (KHPT) and then divides this up amongst alternative lenders using exogenously determined shares. This new equation was derived using the same set of explanatory variables as in Patterson et al (1987) augmented by a term capturing the impact of endowment mortgages, and by long run inflation effects. The long run solution of this equation is:

$$\ln(KHPT) = -11.5 + \ln(VOHS) + \ln(RPDI) - 0.76*\ln(PAHM/PC) - 0.08*\ln(RZMG*(1-TRY/100)) + 0.39*\ln(ZLVF) - 1.11*GCIF + 0.003*ZDOW$$

where:

VOHS	=	value of the owner-occupied housing stock;
RPDI	=	real personal disposable income;
PAHM/PC	=	real price of housing (in terms of consumer prices);
RZMG.(1-TRY/100)	=	net mortgage interest rate;
ZLVF	=	loan to value ratio for first time buyers;
GCIF	=	geometrically weighted cumulation of consumer price inflation;
ZDOW	=	percentage of endowment mortgages in building society mortgages.

The long-run relationship can be seen as determining the ratio of the stock of mortgage lending to the value of the housing stock. The unit coefficient on RPDI (imposed, not on the basis of any strong priors, but because the freely estimated coefficient was close to unity) implies that lending for house purchase is, in some sense, a 'superior good', probably largely reflecting prudential considerations by both borrowers and lenders. The negative coefficient on the ratio of house prices to consumer prices means that when house price increases lead to a rise in the real value (in PC terms) of the housing stock, the value of loans only partially adjusts: this reflects the limitations on equity extraction for existing loans. The interest rate term in this specification has a weaker effect than in the Patterson et al (1987) equation: a ten percent (not percentage points) increase in interest rates only decreases lending by 0.8% rather than over 3% in Patterson et al. The term ZLVF (the loan to value ratio for first time buyers) is a measure of rationing in the mortgage market, and hence is mainly relevant to the institutional regime in the early part of the estimation period (1970 Q2-1987 Q2). The term GCIF (the cumulation of prices) captures the disequilibrium effects of inflation on real lending. This effect appears in the long run because the adjustment lags in the housing market are very long (given that people only move house every

seven years on average). The final term, measuring the proportion of endowment mortgages in the total, allows for the fact that since endowment mortgages are only paid off in the final period, unlike repayment mortgages that are paid off incrementally over the life of the mortgage, then the outstanding stock of mortgages will be larger on average for a larger proportion of endowment mortgages.

(iii) The Demand for M0

The determination of M0 now follows from work by Hall et al (1989) on the long run determinants of the UK monetary aggregates. The, explicitly estimated, long run for the M0 equation is:

$$\ln(KM0)=0.564 + \ln(C£) + 0.00138*CRSN$$

where:
KM0= The stock of M0
C£=Consumers' expenditure in current prices
CRSN= Cumulated interest rate on building society deposits (since 1963 Q1)

This equation restricts M0 to grow in line with consumers' expenditure after allowing for the effects of financial innovation on money holdings. Innovation is proxied by cumulated interest rates, which effectively acts as a time trend which increases more quickly at times of high interest rates. This pattern is consistent with the view that there has been a steady decline in money holdings for transactions purposes but that this decline is more rapid when the cost of money holdings (and hence the incentive to adopt innovations such as credit cards, cash dispensers, etc) increases.

Period	ln(C£)	ln(PC)	CRSN*
0	0.178	0	-0.0002
1	0.396	0.298	-0.0005
2	0.591	0.674	-0.0008
3	0.742	-0.038	-0.0010
4	0.850	-0.074	-0.0012
5	0.920	-0.075	-0.0013
10	1.005	-0.012	-0.0014
20	1.000	0	-0.0014

* shock is equivalent to a one-period, one point rise in interest rates.

The table of responses above shows that although consumers' expenditure and interest rates only enter the dynamic equation through the error-correction term, they have a contemporaneous effect on M0. This is done by defining the error-correction term as $M0_{t-1}-M0^{*}_{t}$ rather than the more conventional $M0_{t-1}-M0^{*}_{t-1}$ where $M0^{*}$ is the long run equilibrium level of M0 from the cointegrating equation. Despite this change the adjustment of money holdings in response to a change in expenditure is still quite slow. The dynamic term in prices allows the response of money holding to changes in prices to be different from that of a change in real expenditure. However, because the price term is only in second differences, the long-run response to changes in the volume and deflator of consumption is the same.

(iv) The Long Term Interest Rate

Since Patterson et al (1987) the specification of the equation for the long term interest rate (represented by the yield on 20-year UK government stock, RUKG) has been simplified somewhat. Both the old and new specification exploit the expectations theory of the term structure of interest rates. This theory relates short term interest rates to long rates through a risk-adjusted open arbitrage condition. This means that the long term rate of interest is simply the geometric mean of the current known and future expected short term rates (the three month local authority rate, RLA, in this case) plus a risk/liquidity premium (see, for example, Miles (1989)). In Patterson et al (1987) a proxy variable for expected future short rates was constructed as a function of the exchange rate and producers' output prices; the present specification simply replaces this with percentage changes in the effective exchange rate (EER). The present equation also corrects an anomaly that meant that a 1 point change in the short rate only produced a .28 point change in the long rate in the long run. Clearly, the expectations theory implies that if the risk/liquidity premium is constant the short rate must appear with a unit coefficient in the long run solution and no other variables can be present (since all other variables are simply proxies for expected future short rates).

Care needs to be taken in interpreting the role of the exchange rate in this equation. The table below shows the response of RUKG both to a change in the level of, and the rate of change of, EER. Since it is being used as a proxy for inflationary expectations, it is the rate of change of the EER which is of greater significance. For example, a sustained depreciation of 5% pa raises RUKG by 0.9 pp in the long-run, compared to the case of a constant EER,[12] while a single shock to the level of the EER clearly has a far smaller effect.

Period	RLA	EER:*	
		level	rate of change
0	0.316	-0.067	-.067
1	0.379	-0.061	-.129
2	0.436	-0.055	-.184
3	0.489	-0.050	-.235
4	0.536	-0.046	-.280
5	0.579	-0.042	-.322
10	0.741	-0.026	-.478
20	0.902	-0.010	-.634

* changes expressed in percentage terms

(v) Building Society interest rates

As with the long rate, the system determining building society interest rates has been simplified somewhat since Patterson et al (1987). In the Patterson et al (1987) system a term in building society liquidity and non-homogeneity meant that there could be long run changes in interest rate differentials between the building society rates and other rates. The present system imposes fixed long run (proportional) differentials between the gross share rate (RZSG) and the gross mortgage

(12) A depreciation of 5% pa implies a fall of 1.2% per quarter, which scaled by 0.73 (the 'long-run' coefficient on the percentage change in EER) implies the rise in RUKG quoted. Strictly speaking, if such a depreciation were sustained indefinitely, its inflationary effects would be fully incorporated into expectations, and hence, following on from the argument above, the long-run should still only include the short rate with a unit coefficient: this might point to the inclusion of an EER term in second, rather than first differences.

rate (RZMG), and between RZSG and the 3 month local authority rate (RLA). This change to fixed differentials is consistent with changes in building society behaviour as the shift from asset to liability management has meant that building society rates are now more closely related to short-term money market rates.

The table below shows the cumulative responses of the two building society rates to a step change in ln(RLA). Although the long-run relationships imply a premium of RZMG over RZSG and RLA, the lags in this relationship imply a prolonged reduction in building society margins after a rise in money market rates.

period	ln(RZSG)	ln(RZMG)
0	0.422	0.390
1	0.666	0.636
2	0.807	0.785
3	0.888	0.873
4	0.935	0.926
5	0.963	0.962
10	0.997	0.997

(e) Prices

In the present version of the model the whole price system has been re-estimated with particular regard to improving the treatment of expenditure taxes and researching the magnitude of pressure of demand effects. There has also been a significant move towards model simplification: the number of variables in the sector has been reduced by nearly a third. Only equations or sectors that have changed significantly in structure are discussed below.

(i) Expenditure tax rates

Since the Patterson et al (1987) vintage of the model the system of expenditure tax rates has been updated, and made more coherent. The six tax rate variables (TCON, TCAT, TCF, TCD, TPG, TPIF) are constructed using appropriate weightings of the revenues from five indirect taxes (AVAT, TAT, TRES, THCO, TRAT) and subsidies (ESAB), divided by the pre-tax values of the respective expenditure components.(13) The weights, currently based on 1987 data, are derived from an Inland Revenue analysis of indirect tax revenues, and are constructed such that all indirect taxes are allocated exhaustively to final expenditure. Since each of the tax rates also enters with a unit elasticity into relevant price deflators, a full pass-through from indirect tax rates to prices is ensured. In the previous model taxes on intermediate expenditure were allocated to producer prices (PPOX), but these have now also been included in the constructions of taxes on final expenditure. It was also a feature of the old model that the allocation of taxes was not exhaustive: the sum of the coefficients on AVAT in Patterson et al (1987) was only 0.73.

(ii) Manufacturers' prices

The determination of manufacturers' output prices (PPOX) in the present version of the model is broadly similar to that of previous versions but with a richer structure. The long run of the PPOX equation is:

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(13) For details, see model manual (Appendix 2, Section 9.3).

$$\ln(PPOX) = -2.15 + 0.506*\ln(UCLM) + 0.376*\ln(UCLN) + 0.118*\ln(UCM) - 0.153*\ln(RULC) + 0.886*\ln(1+CUCI/100)$$

where:

UCLM = Unit labour costs in manufacturing
UCLN = Unit labour costs in private services
UCM = Proxy for manufacturers' input prices
RULC = Relative unit labour costs (manufacturing)
CUCI = Transformed CBI index of capacity utilisation

The second labour cost term proxies the cost of non-manufacturing inputs into manufacturing. The final cost term (UCM) is a weighted sum of import prices.(14) Homogeneity is imposed, and accepted, by making the sum of the coefficients on these three cost terms equal to one. The term in RULC proxies the effect of foreign prices on UK producers' pricing decisions (as this term appears as a ratio its inclusion does not break the homogeneity restriction). Finally, the use of the CBI capacity utilization index replaces an explicitly defined capacity utilization proxy (CAPM) and its inclusion means that capacity effects are doubled in this version of the model (though the difference in definition makes direct comparison difficult). The step responses shown below indicate a slight overshooting response to all the independent variables.

Period	ln(UCLM)	ln(UCLN)	ln(UCM)	ln(RULC)	ln(1+CUCI/100)
0	0.13	0	0.11	0	0.27
1	0.24	0.03	0.18	-0.01	0.50
2	0.34	0.08	0.23	-0.03	0.69
3	0.43	0.14	0.25	-0.06	0.84
4	0.49	0.21	0.25	-0.08	0.94
5	0.53	0.26	0.24	-0.11	1.00
10	0.56	0.40	0.14	-0.16	0.99
20	0.50	0.38	0.11	-0.15	0.87

Despite these changes this PPOX equation retains a strong tendency to underpredict over the recent past. Some of this underprediction is explained by the inability of the producer input price proxy to track actual input prices since 1987 though the problem remains largely unexplained and is the subject of current research.

(iii) Price of non-durable consumption excluding food, drink and tobacco

In the present version of the model the equation for the price of non-durable consumption excluding food, drink and tobacco (PCON) has been supplemented by a proxy for pressure of demand, defined as the ratio of of non-durable consumption (excluding food, drink & tobacco) to the distribution and services capital stock (KDS). The import price of oil (PMGO) has also been added to the new equation.

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(14) For detailed definitions see model manual (Appendix 2, Section 9.3).

period	PPOX*(1+TCON)	ULCN	DEMAND	PMGO
0	0.42	0.16	0	0.02
1	0.35	0.24	0.18	0.02
2	0.38	0.31	0.27	0.03
3	0.39	0.36	0.35	0.04
4	0.40	0.40	0.41	0.04
5	0.41	0.43	0.45	0.04
10	0.42	0.50	0.55	0.05
20	0.43	0.52	0.58	0.05

TCON=implicit expenditure tax rate

The step responses above are generally quite smooth, except for PPOX which has a strong contemporaneous effect which is then damped. This pattern was required to meet the long run homogeneity restriction.

(iv) Retail Prices

As in previous versions of the model Retail Prices (RPI) are determined by a two-stage process: the index excluding mortgage interest payments (RPIX) is linked in first differences to consumer prices; this series is then weighted together (in fourth differences) with a proxy for mortgage interest payments to generate the year-on-year change in the total RPI. In the data mortgage interest payments (MIPs) are calculated using a proxy for the average debt of the representative household (represented by a 25-year weighted average of house prices), multiplied by the tax-adjusted mortgage rate. A further complication in the data is that the weights used in constructing the RPI are updated on a yearly basis. In the previous vintage of the model (Patterson et al, 1987) average debt was simply proxied using a time trend; in the current vintage it is proxied by the value of total mortgage debt, and an offsetting negative time trend. The current model also assumes, for simplicity, a constant weight on MIPs, as did the previous version.

In the recent past the simplifications used in the model's representation of the RPI data generation process have not proved capable of tracking movements in the RPI, for given RPIX and interest rates, very successfully - this has prompted work on developing a more sophisticated representation (including an endogenised weight on MIPs), which overcomes most of these problems, and which is expected to be included in the next public version of the model.

(v) Other Domestic Prices

The determination of the non-residential fixed investment deflator has undergone a fairly radical reformulation in this vintage of the model, since it was seen as a prime case of excessive detail, with little payoff in terms of greater understanding. The system in Patterson et al (1987) involved three main behavioural equations, nine exogenous weights, and six final component deflators. The new version of the model has a single behavioural equation (PIFO), which feeds directly into PIF (deflator for total investment).(15) Despite this major simplification, the long-run properties of the new single equation are not greatly different from the reduced form of the previous system.

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(15) Three first-difference linking equations remain, which are used to derive those remaining component deflators which are required for other purposes (for example, PINS, the deflator for North Sea investment, is required in deriving North Sea taxes, but does not feed into PIF, and hence PGDP).

PIFO is determined in the long-run only by PPOX and the tax rate on fixed investment (TPIF), both with a unit elasticity; the dynamics include effects from manufacturing unit labour costs and the price of manufactured imports.

The equation for house prices (PAHM) has the same basic structure and independent variables as the equation in Patterson et al (1987), but, as shown below, the parameter estimates have undergone considerable changes. This partly reflects the restriction, in the current model, that the coefficient on the housing stock equals (with opposite sign) the sum of the coefficients on lending and real income; this was not imposed in the old equation. The dynamics of the equation also show changes: in particular, the coefficient on the cubic term in the lagged difference of the dependent variable is half its previous value. This reduces the explosive tendency of this equation, but it remains very sensitive to changes in independent variables.

Table 5: Long-run Coefficients in the PAHM Equation

	lnRPDI	lnKOHS	ln(mortgage lending)	GIGH
Old model	3.1	-2.0	.85	-.09
Current model	2.7	-4.0	1.3	-.08

where:
RPDI = Real personal disposable income;
KOHS = Owner-occupied housing stock;
GIGH = Household income gearing ratio (net of tax in old model; gross in current model).

(f) Personal Sector Income and Taxation

(i) Personal Sector income from interest, dividends and rent

In the present version of the model the determination of personal sector gross income has been simplified somewhat. First, a number of marginal variables have been been dropped from the determination of household dividend and interest income. Second, the system for personal sector income from rent has been simplified considerably: imputed rent to owner-occupiers (ORNT) has been dropped from the model and total personal sector rent is now simply determined as a fixed proportion of total rent. These changes and the rest of the personal sector IPD system are described in more detail in Egginton (1988).

(ii) Direct taxation

There have been a number of changes to the personal sector taxation system in the present model. These can be conveniently divided into four areas: mortgage interest; tax allowances; higher and basic rate tax.

In the past the model equation which calculated mortgage tax relief deducted relief from all mortgage payments by the personal sector which overstated the effect of relief as some loans exceed the ceiling level. To resolve this problem a variable was calculated that represented the fraction of mortgage interest subject to relief (FRAM) which has been introduced into the model as an additional exogenous variable.

In Patterson et al (1987) the equation for the aggregate value of personal sector allowances tended severely to underestimate their true value. This was mainly due to the treatment of age allowances and women in employment. The new system uses equations to calculate the numbers claiming allowances (NCPA) and the average rate of allowances (RPAL) which give an improved measure of current allowances. NCPA is set to grow at the same rate as employment (including self-employment) whilst RPAL is indexed to the RPI in the second quarter, as suggested by the Rooker-Wise amendment.

The structure of the term that proxies revenue from higher rate tax is largely unchanged in the present version of the model. However, the determination of the distribution of higher rate income has been altered. Both systems assume a Pareto distribution of the upper range of taxable income so that the number of taxpayers with income above the tax threshold (Y) can be described as $\beta Y^{-\alpha}$ where β and α are parameters of the distribution. In previous versions of the model α has been set at 2 and then β was evaluated at average income. Recent work shows that the value of α is probably about 2.75 and that evaluating β at average income led to biased results since the Pareto distribution only applies to higher income levels. This problem has been circumvented by evaluating β at a multiple of average income.

Having determined allowances, receipts from basic rate tax should simply be post-allowance income multiplied by the rate of tax. However, estimation shows that this is not in fact the case: the coefficient on income varies over time. One reason for this variation might be possible over-recording of income between 1969 and 1981 and under-recording over the recent past (the possibility of recent under-recording is consistent with data from other sources such as the discrepancy between the real and financial measure of personal sector saving). As in Patterson et al (1987) an unrestricted coefficient on income of slightly less than one was used whilst the fit of the equation was improved somewhat by moving to a log-linear form.

(g) The Labour Market

(i) Earnings

In the present version of the model the system determining earnings is largely unchanged from that described in Harnett and Patterson (1989) and Mackie (1987). However, the definition of sectoral earnings (manufacturing, public and other) in this system have been changed somewhat to ensure consistency in the model; all the data series are now based on Department of Employment figures. This redefinition has caused some changes to the parameter values of the earnings system. In particular the effect of unemployment on earnings has fallen (the distinction between short and long term unemployment has been dropped). The effect of the retentions ratio has also fallen considerably so that it is now statistically insignificant (though this is also due to a change in its definition). Taking into account interaction between the sectoral earnings equations, a 1% rise in the retentions ratio leads to a 0.3% fall in manufacturing and public sector earnings, and a fall of around half that amount in service sector earnings. The size of this effect, within this subsector of the model, implies that in the model as a whole there are considerable asymmetries between the effects of direct and indirect taxes on the price level, (See Appendix 1, Tables 4, 5 and 6) since the latter are fully passed through to prices in the price equations. The impact of employers' National Insurance contributions is more analogous to that of indirect taxes than to direct taxation, given the manner in which unit labour costs feed into the model's price equations.

(ii) Unemployment

As in Harnett and Patterson (1989) unemployment is determined directly by a flow equation relating the change in unemployment to changes in employment, the population of working age and the number of Restart interviews. However, the present specification, described in Dicks and Hatch (1989), has moved from using a moving average of the population of working age to the actual value and the Restart interview effect has been constrained to have only a one period impact on the flow of unemployment. This flow specification has two potential drawbacks: unemployment is not bounded, by the size of the difference between total employment and the population of working age at one extreme or to be greater than zero at the other; and this specification implies that the difference between the working population and the population of working age is only determined by changes in the composition of employment, rather than, for example, including a discouraged worker effect from the level of unemployment. However the equation has proved reasonably successful at tracking recent changes in unemployment.

B SIMULATIONS

This section discusses the basic simulation properties of the Bank model. It concentrates on the model's behaviour when the exchange rate is constrained, although a set of tables is also presented showing the model's simulation properties with an endogenous exchange rate at the end of this section. Unless otherwise stated all simulations have been run using the interest rate reaction function described in the equation manual (Appendix 2, Section 8.3). This reaction function, which encompasses the net impact of responses both by private sector market participants and by the authorities, implies that in general changes in both interest rates and monetary aggregates will occur in response to shocks.

The emphasis on simulations with a fixed exchange rate in this paper is perhaps worthy of some explanation, particularly given the generally exclusive use elsewhere of an endogenous exchange rate (see, for example, Fisher et al, 1989b). Several points can be made:

- Exchange rate equations have, to date, tended to be econometrically ill-determined, and structurally unstable. At the same time the exchange rate plays a key role in the structure of the model. For these reasons a change in the model exchange rate equation may well imply major changes in whole-model properties, and may disguise the effects of other, more wide-ranging changes.

- Since exchange rate changes are often very imperfectly explained by the model equation, it can be useful to analyse the response of the rest of the model to a given change in the exchange rate (as in the first simulation discussed in this section). A similar consideration applies to interest rate changes (see the discussion of simulation 3).

- When attempting to understand whole-model simulation responses (the main purpose of this section of the paper) it can be very helpful to to hold constant any variable which strongly conditions this response. While this is most commonly done in the case of the exchange rate, it can also be helpful in the case of other major variables, even if - as in the case of earnings, for example - these are highly endogenous.

Despite these considerations, care should be taken in interpreting the results of simulations which hold the exchange rate fixed. However imperfect the individual equation may be, simulations with an endogenous exchange rate are nonetheless the best available representation of the true system response, and should be regarded accordingly.

Although there is in general little base dependency in the simulations presented below, some of the differences between the Autumn 1987 and Autumn 1989 model simulations are due to the fact that the 1987 model simulations begin in 1988 Q1 whilst the 1989 model simulations begin in 1989 Q1.(16)

This section discusses the following simulations, the numbering of which refers to the overall table numbering in Appendix 1 (where comparable exchange rate free simulations appear denoted as tables E2-E10). All simulations are reported as % changes from base, except when otherwise stated.

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(16) Differences due to base dependency are also evident when comparing simulations reported here for the Autumn 1987 model, and those reported in Harnett and Patterson (1989). These latter simulations all started in 1986 Q1. The most noticeable discrepancy is in responses to exchange rate changes, discussed in section (a), simulation (1).

(a) Main simulations

1 10% depreciation of the exchange rate.
2 World trade raised by 5%, exchange rate fixed.
3 1% rise in all interest rates, exchange rate fixed (including sub-section on 'Demand Effects on Prices').
4 Standard rate of income tax reduced by 1p, exchange rate fixed.
5 VAT rate reduced by 1% point, exchange rate fixed (including details of effects of 5% cut in specific duties).
7 Government spending raised by £500 mn, exchange rate fixed.
9 World prices raised by 2%, exchange rate fixed.
10 Oil price cut by $5 pb, exchange rate fixed.

This is followed by a brief review of three other simulations.

(b) Other simulations

6 Employers' NI contributions cut by 1%, exchange rate fixed.
8 All earnings plus 1% in first quarter only, exchange rate fixed.
11 Domestic demand raised by 1%, exchange rate fixed. (not reported in Appendix 1.)

(c) Multipliers

The output multipliers of alternative tax changes are briefly compared.

In general, the tables set out in this section have the same format. The percentage difference between the simulation and base in a given quarter is shown for most variables. However, for balances such as the current balance and the PSBR the annual difference between the simulation and the base are shown. Variable definitions can be found in the variable index at the back of this paper.

(a) Main simulations

(i) 10% depreciation of the exchange rate (Appendix 1, Table 1)

In this simulation, there is a less positive response of the current account balance to a depreciation in the Autumn 1989 model than there was in the Autumn 1987 model, and the visible balance response remains negative throughout. This is only to a limited extent due to base dependency effects.(17) Most of the change between the two models is due to lower estimated exchange rate effects on real activity. The principal reasons for the lower response are twofold: the first lies in the reduced competitiveness elasticities in the export equations discussed in Part A, Section (b); the second lies in the changed response of wages to depreciation, and consequent changes to relative unit labour costs. This is because domestic

(17) Base dependency can be significant in comparing simulations when the current balance in the base is non-zero. In a situation of initial deficit, any initial 'J-curve' effects are augmented by the revaluation of the deficit itself: this can result in a considerably more prolonged 'J-curve'. This does not apply to any great extent when comparing the two bases used here, but does have a considerably greater effect on the comparison with the Harnett and Patterson (1989) simulations.

prices and wages are now more responsive to changes in the exchange rate so that changes in competitiveness are now shorter in duration. This can be seen by looking at the changes in labour cost competitiveness (RULC) on the table below.(18) If the 10% depreciation is combined with wages constrained to base, the relative deterioration in volume responses between the models is again a feature of the simulation, although this is no great surprise given the relative size of the competitiveness elasticities. It should be noted, however, that with the wage responses suppressed, the change in the visible balance is negative only in the first year. The two alternative simulations are summarised in Tables 1A and 1B.

Table 1A: 10% depreciation, wages free

(i) new model

	1	2	4	8	12
X	0.4	1.2	1.9	2.0	1.5
XGMA	0.5	1.5	2.6	3.0	2.3
M	-0.3	-0.5	-1.0	-0.7	-0.1
MGMA	0	0	-0.5	-0.5	0.1
PX	2.0	3.1	4.7	7.0	8.3
PM	4.4	6.5	7.6	8.8	9.6
BALV(£bn)			-2.6	-1.0	-1.2
BIPD(£bn)			1.5	1.8	2.3
BAL(£bn)			-0.7	2.0	2.3
RULC	-9.9	-9.7	-8.9	-6.6	-4.0
WS	0.1	0.6	2.1	4.8	7.1

(ii) old model

	1	2	4	8	12
X	0.6	1.2	2.5	3.5	3.2
XGMA	0.5	1.3	3.0	4.5	4.2
M	-0.5	-1.3	-2.1	-2.0	-0.9
MGMA	-0.6	-1.5	-2.5	-2.5	-1.3
PX	2.3	3.3	4.4	6.2	7.6
PM	4.3	5.9	7.1	8.5	9.1
BALV(£bn)			0.5	2.7	1.9
BIPD(£bn)			0.9	1.4	2.1
BAL(£bn)			1.3	4.8	4.7
RULC	-10.0	-10.0	-9.8	-8.1	-5.1
WS	0	0.1	0.5	2.5	5.8

(18) It should be noted that the definitions of labour cost competitiveness differ between the two models. In the old model relative normalized unit labour costs (ie, with UK and world productivity 'normalised' for the state of the cycle) was used; but given doubts about the validity of the normalisation procedure used, the present model uses relative actual unit labour costs. Fortunately, the simulation properties of these two variables are fairly similar.

Table 1B: 10% depreciation, wages fixed

(i) new model

	1	2	4	8	12
X	0.4	1.2	2.0	2.4	2.4
XGMA	0.5	1.5	2.7	3.7	3.7
M	-0.3	-0.5	-1.1	-1.5	-1.4
PX	2.0	3.0	4.4	5.6	5.9
PM	4.3	6.2	7.2	7.8	7.9
BALV(£bn)			-2.2	0	0.7
BAL(£bn)			-0.3	2.8	4.1
RULC	-10.1	-9.7	-10.6	-10.6	-10.1

(ii) old model

	1	2	4	8	12
X	0.6	1.2	2.6	3.8	4.1
XGMA	0.5	1.3	3.0	4.8	5.3
M	-0.5	-1.3	-2.1	-2.6	-2.2
PX	2.3	3.3	4.4	5.8	6.0
PM	4.3	5.9	7.1	8.4	8.7
BALV(£bn)			0	-0.1	-0.1
BAL(£bn)			-0.1	-0.2	-0.2
RULC	-10.0	-10.0	-10.0	-10.0	-10.0

The IPD balance (BIPD, formerly BYPA) now improves by more in each year of the simulation than in the old model. Annual responses are summarised in Table 1C. In the new model, on the credit side, the depreciation leads to substantial increases in the flows, measured in sterling, from non-bank direct investment (YODI), non-bank portfolio and miscellaneous investment (YOPO) and particularly in those from monetary sector assets held abroad (YOBA). These increases follow from the revaluation of asset stocks in line with the depreciation of sterling; a weakening of sterling implies a proportionate upward revaluation in sterling of external foreign currency asset holdings. These stocks are very large: in 1989 Q2 KODI was £112 bn, KOPO £210 bn, and KOBA £544 bn, and the changes in income flows shown in the table reflect these relativities. On the debit side, a similar argument applies, but the debits stocks are generally smaller than the credit stocks and, to the extent that debits are denominated in sterling (overseas purchases of UK equity for example), are less affected by changes in the exchange rate. The improvement in the net asset position (KNEA) in response to a 10% depreciation is substantial, at around 30%.

The main difference in the IPD responses of the two models, shown in Table 1C, is that changes in gross flows for both credits and debits are substantially higher in the new model. For both credits and debits, the largest change has occurred in the area of monetary flows (YOBO, YIBA). This reflects a strengthening of the direct currency revaluation factors in the model; previously, not all stocks were revalued as they are now.

Table 1C: IPD sector with 10% depreciation, wages free (£m, annual totals)

(i) new model

	4	8	12
BIPD	1490	1820	2325
Credits	6989	8725	8241
Debits	5500	6905	5917
Net asset position			
KNEA (£m)	30690	33281	37078
KNEA %	24.5	25.7	26.0

(ii) old model

	4	8	12
BIPD	868	1395	2118
Credits	1617	2253	2376
Debits	750	859	258

(ii) World trade raised by 5% (Appendix 1, Table 2)

Tables 2A and 2B show the detailed effects of raising world trade volumes by 5%, in the new and old models respectively. In the new model, the current account balance rises by significantly more than in the previous vintage. The differences seem to lie in a number of areas: the invisible balance is stronger throughout, but most noticeably in the first year; the visible balance is stronger throughout, and to an increasing extent as the simulation progresses.

The price responses to the rise in world trade are small. In some sense, this highlights the artificial nature of the simulation where world prices are unchanged despite a substantial increase in world trade flows. The increased demand for UK output increases capacity utilisation, and puts upward pressure on domestic prices and wages, although there are also offsetting effects on prices from higher UK productivity in the short run. The rather artificial differential between UK prices and wages and those overseas which results is the explanation for the less than proportionate response of non-oil exports to the rise in world activity, despite the unit elasticities in the individual equations.

Table 2A: World Trade Up 5%, Exchange Rate Fixed

(i) New Model

	1	2	4	8	12
BAL(£bn)			5.0	4.5	4.3
BALV (£bn)			1.8	1.7	1.5
BALI (£bn)			3.0	2.9	2.7
BIPD (£bn)			2.2	1.0	0.7
X	2.4	3.6	4.4	4.7	4.6
XGMA	3.4	3.9	4.6	5.1	4.9
PX	0.2	0.2	0.3	0.5	0.7
M	0.8	1.2	1.9	2.4	2.8
MGMA	0.9	1.4	2.3	2.9	3.3
PM	-0.1	-0.1	-0.1	0	0.1
MPRM	1.6	1.9	2.5	3.0	3.2
OOTH	0.1	0.8	1.3	1.4	1.5
PPOX	-0.1	-0.1	-0.1	0.1	0.6
PC	0	-0.1	-0.1	0.1	0.6
XSOT	0	4.4	6.9	7.3	7.2
MSOT	0.2	0.5	0.9	1.4	1.9
PXS	0	0	-0.1	0	0.3
PMS	0	0	0	0	0.2
XGNM	5.4	5.4	5.2	5.1	4.9
RULC	-1.2	-1.2	-1.3	-0.5	0.5

(ii) Old Model

	1	2	4	8	12
BAL (£bn)			2.6	2.3	2.5
BALV (£bn)			1.0	0	0.1
BALI (£bn)			1.6	2.2	2.4
BIPD (£bn)			1.2	1.0	0.8
X	2.2	3.2	3.9	4.3	4.3
XGMA	3.7	4.9	4.8	4.6	4.3
PX	0.1	0.2	0.3	1.0	1.5
M	0.3	1.1	1.8	1.8	1.8
MGMA	0.4	1.4	2.1	2.4	2.2
PM	0.4	0.7	1.2	1.8	2.0
MPRM	1.3	2.3	2.6	2.4	2.1
OOTH	0.4	0.8	1.1	1.3	1.1
PPOX	0	0	0.1	1.1	1.8
PC	0	-0.1	0	0.6	1.3
XSOT	0	2.0	4.6	7.0	7.6
MSOT	0.4	0.8	1.6	2.8	2.3
PXS	0	-0.1	0	0.5	1.1
PMS	0	0	0	0.3	0.6
XGNM	4.0	4.0	4.0	3.9	3.6

(iii) 1% rise in interest rates (Appendix 1 Table 3)

The effects of interest rates in the Bank model have changed considerably from the previously published vintages of the model. This simulation examines a 1% rise in all interest rates. An overview of the simulation properties of the new and old model is shown in Table 3A; more detailed figures are given in Table 3B. In the new model domestic demand (DOMD) shows a significant and sustained negative response; in the old model long-run responses in particular were very small. Perhaps the most noticeable feature of this simulation is the way in which the generally small single equation responses are mutually reinforced in the system response. Since output falls by less than domestic demand, there is a substantially greater improvement in the current account. There is also a stronger response of prices to the rise in interest rates, which is now negative rather than positive. For the GDP deflator (PGDP), the response is particularly strong in the third year. For consumer prices (PC), the effects are much weaker but the ultimate effect on PC is now negative leading to a small downward response in wages. The greater reduction in output when interest rates are raised leads to an increase in the estimated PSBR cost of the increase; it also leads to a larger increase in unemployment.

Table 3A: Interest rates plus 1%, exchange rate fixed

(i) new model

	1	2	4	8	12
GDPO	0	-0.2	-0.4	-0.7	-0.9
DOMD	-0.1	-0.4	-0.7	-1.1	-1.4
PGDP	0	0	-0.1	-0.2	-0.4
RPI	0.4	0.4	0.3	0.2	0
PC	0	0	0	0	-0.2
WS	0	0	0	-0.1	-0.4
LU (000)	0	3	12	35	58
PSBR (£bn)			0.7	1.5	2.5
KM0	0	-0.1	-0.4	-1.3	-2.2
KM4	0	-0.1	-0.3	-0.8	-1.3
BAL (£bn)			0.6	1.5	2.0

(ii) old model

	1	2	4	8	12
GDPO	0	-0.2	-0.2	0	0.1
DOMD	0	-0.3	-0.3	-0.1	0.1
PGDP	0.1	0.1	0	0	0.1
RPI	0.3	0.4	0.4	0.3	0.3
PC	0	0	0	0	0
WS	0	0	0	0	-0
LU (000)	0	2	9	4	-9
PSBR(£bn)			0.6	1.0	0.9
KNCS*	-0.4	-0.7	-1.0	-1.2	-1.3
BAL(£bn)			0.2	0	-0.4

*Notes and coins proxy for total M0

On the income side total personal income (YJ) initially shows a small fall in response to the interest rate rise. Part of this comes from lower income from wages and salaries, as employment falls in response to the activity slowdown; but household income is further depressed by a fall in net dividend and interest receipts (in model terms = YDIJ - YVO), given the household sector's initial position as a net floating rate debtor. This is important in that it is real household disposable income (YDLH) which feeds into the model consumption equations. Further into the simulation this effect turns around, as the household sector cuts back on consumption, relative to income, thereby reducing its net debt.

The changes to the housing sector in the model have led to an increased responsiveness of both the price and volume of housing wealth to changes in interest rates. Private sector mortgage lending (KHPT) depends mainly on income (RPDI), the housing stock, house prices and the mortgage rate. The rise in interest rates leads to a reduction in the stock of lending of 1 1/2% in the first year and of nearly 3% in the third year. KHPT is then itself a major determinant of house prices (PAHM) which are nearly 9% below base levels in the third and fourth years. Private housing investment (IHP) responds more consistently than in the old model - it falls by 3%-4%, with some oscillation.

The responses of personal income, house prices and wealth also feed through into consumption, which falls by nearly 1% by the end of the second year - a significantly greater response than in the old model. Only a relatively small part of this response is due to the direct effects of the interest rate change: the second round effects through income and wealth are dominant.

Within corporate spending, the components of industrial investment (IMAN, IDS) both respond more than previously. Manufacturing investment (IMAN) falls by 2 1/2% in years 2 and 3, while distributive investment (IDS) falls by 2 3/4%-3 3/4%. Thus, in the current model distributive investment is more interest sensitive than is manufacturing investment: a reversal of the relative responses embodied in the previous model. The changes to the stockbuilding sector also lead to a larger negative response of stocks to a rise in interest rates. For all components of corporate spending, as well as the new direct effects of interest rates there are increased second round effects as output responds to interest changes elsewhere in the model, since output effects are larger in all these equations.

Table 3B: Interest rates up 1%, exchange rate fixed

(i) new model

	1	2	4	8	12
Incomes(£m)					
YWS			-133	-849	-2470
YDIJ			-233	67	576
YVO			174	-6	-121
YJ			-386	-740	-2099
YDLH (£m 1985)			-236	-413	-550
Wealth					
VOHS	-1.1	-2.4	-5.1	-8.9	-9.9
NFWJ	0	0.1	0.2	0.7	1.2
NLAJ	0	0	0	0.5	1.2
Consumption					
CD	-0.1	-2.0	-3.5	-4.5	-3.6
CND	-0.1	-0.1	-0.2	-0.6	-0.9
CONS	-0.1	-0.3	-0.5	-0.9	-1.2
SR (%pts)	0	0.2	0.4	0.7	0.9
Housing					
PAHM	-1.2	-2.4	-5.2	-9.1	-10.1
IHPC	-1.6	-2.4	-4.2	-7.4	-12.4
IHP	-0.9	-3.4	-3.2	-3.1	-4.1
KHPT	-0.3	-0.6	-1.3	-2.6	-3.2
LHPT (£bn)			-3.3	-4.0	-2.9
Investment					
IMAN	0	-0.2	-0.9	-2.7	-3.1
IDS	0	-1.1	-1.4	-2.6	-3.5
Stockbuilding (£bn 1985)					
II			-0.2	-0.5	-0.5
IIM			0	-0.3	-0.3
IIR			-0.1	-0.3	-0.2

Table 3B, continued: Interest rates up 1%, exchange rate fixed

(ii) old model

	1	2	4	8	12
YWS (£m)			-82	-155	32
YDIJ (£m)			285	333	389
YJ (£m)			202	349	620
CONS	0	-0.2	-0.2	0	0
PAHM	-0.9	-1.8	-4.0	-6.5	-8.1
IHP	0	-4.3	-2.4	1.4	3.6
IMAN	0	-0.6	-0.9	-1.3	-1.3
IDS	0	0	-0.1	-0.2	-0.2
II (£bn 1985)			-0.1	-0.1	0

The responses of the IPD sector to the rise in interest rates are shown in Table 3C. As in the exchange rate simulation, the gross flow movements on both the credit and debit side are increased. The net effect produced by the model has also changed considerably, and now a considerably smaller deterioration in the IPD balance (BIPD) is generated.

Table 3C: IPD sector, interest rates plus 1%, exchange rate fixed (£m)

(i) new model

	4	8	12
BIPD	-128	-223	-190
Credits	799	1238	1386
Debits	927	1461	1575

(ii) old model

	4	8	12
BIPD	-250	-398	-504
Credits	14	14	14
Debits	264	412	518

A Digression: Demand Effects on Prices

The re-examination of the responses of price series to demand shocks played a major part in the Bank's model re-estimation exercise. The major changes have been the inclusion of pressure-of-demand terms in the price equations for producer prices (PPOX) and for other non-durable consumption (PCON). The PPOX equation plays a major role in the model as this variable helps determine other price series, including all of the consumption deflators. In the above simulations of interest rate and exchange rate changes, the effects on demand and inflation have been summarised; here, we digress briefly to examine the effects of these simulations on the pressure-of-demand variables which enter the PPOX and PCON equations.

The revised PPOX equation includes a transformation of the CBI capacity utilisation index, with an effect which appears quite large in single equation terms: it has a long run coefficient of +0.89. This means that if the capacity series rises by 1 percentage point, say from 80 to 81, then producer prices will be expected to rise by 0.9% in the long run. In the equation for the other non-durable consumption price deflator, the pressure-of-demand effect is proxied by the ratio of

non-durable consumption (excluding food, drink and tobacco) to the capital stock in distribution and services. In the long run the log of this ratio enters with a coefficient of 0.58. A 1% rise in this ratio would lead to a 0.6% rise in PCON.

Despite these relatively large long run effects, in model simulations demand effects on prices emerge as rather small. This reflects the responses of the particular capacity variables themselves to demand, or other shocks. There is an explicit equation for CUCI, which is determined by the ratio of the level of manufacturing output (MPRM) to a nine quarter moving average. Such a moving average variable is likely to respond quite slowly to any demand change in a simulation and tends towards a constant over the simulation horizon. There is no explicit equation for capacity utilisation in distribution: the consumption components are determined independently, and KDS is given its depreciated lagged value and by current (IDS) investment.

The effects of a 1% rise in interest rates and a 10% sterling depreciation on these two series are shown in Table 3D. For the rise in interest rates, by the 12th quarter there is a 0.6% fall in distributive capacity utilisation and a 0.4% fall in CUCI. These are small, and imply price reductions of 0.4% in PCON, and 0.3% in PPOX in the long run. For the 10% depreciation, the effects are larger for PPOX, implying a long run response of +1%; in the PCON equation, however, the capacity proxy actually falls, implying a reduction of 0.4% in PCON. These are 'first round' estimates: in the long run PPOX enters the PCON equation with a coefficient of 0.43 so second round effects are not altogether negligible. However, in the full model the effects of demand on prices do appear to remain quite small. In the case of depreciation, the effects of the demand terms are in any case swamped by the effects of world prices. In the interest rate simulation, where other influences on prices are fairly minor, the limited extent of demand effects is more evident.

These effects can also be examined in the more artificial case, discussed below (see Table 11), where components of domestic demand are raised by constraint. Here price effects are, in the long-run, larger, but they emerge only slowly, through wage-price interaction.

Table 3D: Capacity Responses in Interest and Exchange Rate Simulations

(a) Interest rates plus 1%, EER fixed

	1	2	4	8	12
CUCI (%)	-0.01	-0.16	-0.35	-0.51	-0.36
Distributive (%)	-0.07	-0.11	-0.20	-0.42	-0.60

(b) Exchange rate minus 10%

	1	2	4	8	12
CUCI (%)	0.09	0.33	0.85	1.59	1.18
Distributive (%)	-0.17	-0.46	-0.75	-0.92	-0.77

Note: Distributive utilisation = ((CND - CAT - CF)/KDS)

(iv) Standard rate of income tax reduced by 1p (Appendix 1 Table 4)

The properties revealed by this simulation have been affected most notably by the revised estimates of the wage sector, originally devised by Mackie (1987), and the consumers' expenditure equations. In the wage sector, successive re-estimation has revealed a marked decline in the size and significance of the retentions ratio variable which enters the wage equations. In terms of how this has affected the model's simulation properties, it can be seen from Table 4A that wages now fall by much less than they did in the old model. This change to the retentions ratio effect is accentuated by the simultaneous nature of the determination of wages and prices in the model: with less of an initial downward push to wages, both wages and prices respond by less thereafter.

In terms of activity, the 1% cut in income tax leads to a 0.1% increase in output. This small effect is due to the fact that a substantial proportion of the income tax cut is saved by the personal sector. Consumption is increased by only 0.3% by the end of the simulation, despite an increase in disposable income (RPDI) of 0.5%: around 50% of the increase in real income is saved. This high propensity to save from a cut in taxes means that the tax cut has a low cost in terms of the current balance, since demand is not strongly affected, and a high cost in terms of the PSBR, since little revenue is generated from increased activity.

The weak adjustment of consumption to a change in income follows from the fact that a substantial proportion of the effect of income on consumption comes through wealth effects. As noted in Part A, Section (a), (i) the long run response of total consumption to a change in income, if wealth is held constant, is only 0.5. The rest of the adjustment, which must eventually reach unity, comes through the effect of income on wealth, through savings. However, since the flow of savings is tiny relative to the stock of wealth this form of wealth adjustment is very slow indeed and means that over the period of this simulation only the direct effect of income on consumption is important.

Table 4A: Standard rate of income tax cut by 1% point

(i) New model

	1	2	4	8	12
EMAN	0	-0.1	-0.1	-0.2	-0.2
EGG	0	0	-0.1	-0.2	-0.2
EOTH	0	0	0	-0.1	-0.1
WS	0	0	-0.1	-0.1	-0.2
PC	0	0	0	0	0
PPOX	0	0	0	-0.1	-0.1
CONS	0.1	0.3	0.3	0.3	0.3
GDPO	0.1	0.1	0.1	0.1	0.1
BAL (£bn)			-0.3	-0.4	-0.5
PSBR (£m)			1.5	1.9	2.2
RPDI	0.5	0.5	0.5	0.6	0.5

(ii) Old model

	1	2	4	8	12
WS	0	0	-0.2	-0.5	-0.9
PC	0	0	-0.1	-0.3	-0.5
GDPO	0.1	0.1	0.1	0.2	0.3

(v) VAT reduced by 1% (Appendix 1, Table 5)

In this simulation, the standard rate of VAT is reduced by 1% point from its current rate of 15%.[19] In both versions of the model the reduction in VAT is more or less fully passed through to retail prices within three years; although it should be noted that, given wage-price interaction, it is not necessarily the case that the response is limited to a one-for-one pass-through.

There have been substantial changes to the model in its treatment of both taxes and prices since Harnett and Patterson (1989) as outlined in Part A, Section (e). In the old model, there was a particular problem in that less than the full amount of any change in expenditure tax receipts fed into the implicit expenditure tax rates. In the current model, as described in Section (e), the construction of indirect tax rates ensures a full pass-through of taxes, on a single equation basis. In Table 5A, the price and activity responses of the two models are summarised. In general, as might be expected, prices respond more in the present model than in the old.

As regards activity, lowering VAT has a mixed effect. Consumer demand rises as prices fall which raises import demand; however, wages respond to the fall in prices and lead to improved relative unit labour costs which helps net trade performance: the net result is a small boost to output, and a small worsening of net trade. In the new model, the current account balance worsens by slightly less than the old; this is partly the result of a slightly smaller response of manufactured imports (all manufactures MGMA in the new model compared with finished manufactures MGFM in the old model).

Table 5A: VAT reduced by 1% point, exchange rate fixed

(i) New model

	1	2	4	8	12
PAHM	0	0.1	0	-1.1	-2.7
PPOX	0	0	-0.2	-0.5	-0.8
RPI	-0.2	-0.3	-0.5	-0.8	-1.1
PC	-0.2	-0.3	-0.6	-0.9	-1.2
PF	-0.1	-0.2	-0.3	-0.6	-0.8
PAT	-0.1	-0.3	-0.8	-1.4	-1.7
CND	0.1	0.1	0.1	0.1	0.1
CD	0.2	0.6	0.7	0.2	-0.3
CONS	0.1	0.2	0.2	0.2	0.1
GDPO	0	0.1	0.1	0.1	-0.1
PSBR (£bn)			1.2	1.9	2.1
BAL (£bn)			-0.2	-0.2	-0.1
WS	-0.1	-0.2	-0.5	-0.9	-1.2
AVAT (£bn)			-1.6	-2.1	-4.4
MGMA	0.1	0.1	0.2	0.1	-0.1

(19) Note that in the present model this requires that the standard rate VATS be cut by 1%, whereas in the old model an additional variable for goods subject to higher rates of VAT, TRCD, also had to be changed - this variable has now been dropped.

Table 5A continued: VAT reduced by 1% point, exchange rate fixed

(ii) Old model

	1	2	4	8	12
PAHM	0.1	0.2	0.6	0.6	0
PPOX	0	0	0	-0.2	-0.6
RPI	-0.2	-0.3	-0.4	-0.6	-0.9
PC	-0.2	-0.3	-0.4	-0.7	-1.0
PF	-0.1	-0.1	-0.1	-0.2	-0.5
PAT	-0.2	-0.4	-0.8	-1.2	-1.5
CND	0.1	0.2	0.2	0.2	0.2
CD	0.2	0.5	0.6	0.6	0.5
CONS	0.1	0.2	0.3	0.3	0.2
GDPO	0	0.1	0.1	0.2	0.2
PSBR (£bn)			0.9	1.4	1.6
BAL (£bn)			-0.3	-0.5	-0.5
WS	0	-0.1	-0.2	-0.6	-1.1
AVAT			-1.4	-1.7	-2.0
MGFM	0.1	0.3	0.4	0.3	0.3

In the new model, the PSBR costs of reducing VAT and the direct revenue costs are considerably larger. Indeed, the VAT revenue cost (AVAT) is roughly 50% higher. This increase will partly reflect base dependency but is also influenced by the larger fall in the nominal tax base, given a greater downward price response, and a less positive volume response.

Changes in other expenditure taxes can also exert a considerable impact on prices. It is not proposed to pursue such changes in any great detail, but below are shown the effects on the RPI of reducing the average rate of specific duty on alcohol and tobacco (CEAT) and hydrocarbon oil (CEOL) by 5%. In the first year, such reductions reduce the RPI by 0.2% and 0.1% respectively. By the end of the third year these effects have risen to 0.5% and 0.3%.(20)

Effect on RPI of 5% cut in -

	4	8	12
CEOL	-0.1	-0.2	-0.3
CEAT	-0.2	-0.3	-0.5

(20) Short-run responses may not be entirely reliable, due to the lagged response of the relevant price series to tax changes. Unit elasticity is only imposed in the long-run, whereas in the case of these two taxes in particular, changes may feed through into prices amost instantaneously.

(vi) Government spending raised by £500 mn pq (Appendix 1 Table 7)

In this simulation, current government spending is raised permanently by £500 mn (1985 prices), which broadly corresponds to a 2 1/2% increase in the volume of spending. This spending initially almost all goes to procurement but employment then responds with a lag so that after a year the increase in spending is split between procurement and employment in proportions which are just below the historic average. The spending has mixed money and bond financing, because the interest rate reaction function that is used in simulations only partially offsets the monetary expansion induced by the increase in spending. It is not proposed to undertake a detailed comparison of the new model with the old in this case, because the overall government spending multiplier properties of the model have not changed markedly.

The rise in government spending leads to a rise in output and in prices and to a reduction in unemployment (Tables 7A and 7B). The multiplier effects on output are dampened by leakages, as import demand rises by 0.3-0.4% and there is a high propensity to save by consumers. Even though real household income rises by almost 0.4 per cent in this simulation the induced increase in consumption is marginal: this is a combination of the lag effects discussed earlier, higher interest rates, and the effect of higher inflation, which affects consumption through the inflation adjustment to income and its effect on the real value of wealth.

The multiplier effects of the increased spending are shown in Table 7B, where: the base simulation is shown in column A; in column B, the exchange rate is free to respond; and in column C, both the exchange rate and interest rates are constrained. For the basic case, the multiplier is below unity and averages 0.8 over the three years;' when the exchange rate is endogenous, the multiplier is slightly larger, at an average 0.88, as the exchange rate depreciates somewhat boosting activity via net trade. In column C the additional constraint on interest rates leads to a higher multiplier than in the base case, as the dampening effect of higher interest rates is suppressed.

In the short run, there is a downward response in the price of government consumption (PG). This may be open to question, but essentially reflects the model assumption that the increased volume of government spending is entirely 'real'. The negative response stems partly from the negative response of the variable for the effective tax rate on government consumption (TPG): this falls as its determinant tax revenues are unchanged while the volume of government spending is increased. In addition, in the short run output responds more quickly than wage costs and so reduces unit labour costs in the PG equation. Consumer prices are, as might be expected, boosted in this simulation, due to demand effects and the fall in unemployment; and to the impact on consumer prices of higher payments to local authorities.

With regard to the labour market, public sector employment rises by around 130,000; a further 20,000 increase in employment is induced elsewhere in the economy. A notable feature of the Bank model here is that the fall in unemployment is considerably smaller than the rise in employment (less than one third in fact). This feature of the model has been the subject of some criticism (Fisher et al, 1989a). While the proportion of the higher employment that comes from the stock of unemployed is open to debate, the relationship is clearly less than one to one. In the services sector in particular, employment may rise without cutting unemployment as part-time and female workers typically have a low propensity to register as unemployed. In contrast, the (estimated) relationship is one-for-one in manufacturing, where full-time working remains the norm.

Table 7A: Government spending raised by £500 mn, EER fixed, IR free

	1	2	4	8	12
GDPO	0.5	0.5	0.5	0.4	0.4
PG	-1.0	-0.7	-0.1	0.1	0.3
PGDP	-0.3	-0.2	0	0.2	0.4
CONS	0	0	0.1	0	0
IF	0	0	0.1	0.1	0
X	0	0	0	0	-0.1
M	0.2	0.3	0.4	0.3	0.3
BAL (£bn)			-0.3	-0.6	-0.6
BALV (£bn)			-0.4	-0.4	-0.3
PSBR (£bn)			1.1	1.4	1.7
LEG (000)	26	65	131	129	127
LE (000)	29	73	149	156	149
LU (000)	-4	-12	-30	-41	-40
WS	0	0.1	0.1	0.4	0.5
RLA (% pts)	0	0.2	0.3	0.3	0.2

Table 7B: Government expenditure multipliers

	(A) Exchange rate fixed, IR free	(B) Exchange rate free, IR free	(C) Exchange rate fixed, IR fixed
1	0.80	0.80	0.80
2	0.86	0.88	0.88
3	0.89	0.92	0.94
4	0.91	0.94	1.00
5	0.88	0.93	1.04
6	0.83	0.90	1.06
7	0.80	0.88	1.09
8	0.76	0.85	1.10
9	0.73	0.84	1.11
10	0.71	0.85	1.12
11	0.70	0.86	1.13
12	0.69	0.87	1.13

(vii) World prices raised by 2% (Appendix 1 Table 9)

A rise in all world prices in the model is by and large equivalent to an exchange rate depreciation of 2%, since on the trade side world prices and the exchange rate always enter symetrically. The principal result to emerge from the model in this simulation, however, is that the current account does not improve when world prices rise but the exchange rate is fixed. This effect is due to the fact that world prices do not have the same revaluation effects on UK overseas assets stocks as the exchange rate; as a result IPD does not rise after the first year.

A major oddity of the new model is apparent in Table 9A; this is an initial very strong response of the IPD balance to the rise in world prices. The effect comes via income from credits on overseas direct investment (YODI) - this is essentially due to a short run overshoot of the rate of return on these assets (RODI) to the rise in world consumer prices (WPC). This equation has proved problematic and will require further research. In the short run the major objective has been to restructure the whole IPD sector and this implies that a fine-tuning of certain equations will be required in the medium term.

Table 9A: World Prices Up 2%, Exchange Rate Fixed

(i) new model

	1	2	4	8	12
BAL (£bn)			2.1	-1.8	-0.2
BALV (£bn)			-0.6	-0.4	-0.3
BALI (£bn)			2.7	-1.4	0.1
BIPD (£bn)			2.5	-1.6	-0
CIPD (£bn)			2.5	-1.6	-0
DIPD (£bn)			0	0	-0
YODI (£bn)			2.6	-1.7	-0.1
YIDI (£bn)			0.1	0	-0
RODI % pts	3.6	2.2	1.1	-0.3	0
RIDI % pts	0.2	0.1	0.1	-0.1	-0.1
PPOX	0.1	0.2	0.4	0.9	1.2
PX	0.3	0.4	0.7	1.1	1.3
PM	0.7	1.1	1.3	1.5	1.6
PC	0	0.1	0.3	0.6	1.0
M	-0.1	-0.1	-0.1	0	0
X	0.1	0.2	0.4	0.4	0.3

(ii) old model

BAL (£bn)			0	0.4	0.6
BALV (£bn)			0.1	0.4	0.5
BALI (£bn)			0	0	0.2
BIPD (£bn)			0	0	0
PPOX	0	0.1	0.3	0.7	1.0
PX	0.3	0.4	0.6	0.9	1.2
PM	0.6	0.9	1.1	1.3	1.4
PC	0	0.1	0.2	0.5	0.9
M	-0.1	-0.2	-0.3	-0.4	-0.2
X	0.1	0.2	0.5	0.7	0.6

(viii) Oil price cut by $5 per barrel (Appendix 1 Table 10)

This simulation considers the impact of a $5 per barrel cut in the oil price, a substantial proportionate reduction (around a third) given that the base values in both vintages of the model are around $15-$17 per barrel. The Bank model treats North Sea oil output as exogenous so there is no oil output response to the change. There have been a number of changes to the model

that have affected its simulation properties in response to this shock: first, in the oil sector the equations for oil demand and for oil exports and imports have been considerably revised; second, there have been a number of changes to the price sector that have led the model to be more price-responsive to any change in the oil price (principally due to changes in the PCON equation). The net effect of these changes can be seen from Table 10A, which shows that output, GDPO, now rises by 1/2% rather than falling by 0.1%. The fall in oil price stimulates both manufacturing and other output as input costs are reduced. Prices now fall by substantially more: producer prices PPOX fall by up to 5% compared with only 0.5% previously; consumer prices fall by 5 1/2% compared with 0.3% before. Although the larger output responses might be seen as more plausible, such a large change in the response of prices is clearly of concern, and is currently under investigation.

It is worth noting that this is the only simulation which shows a significant exchange rate response, when the exchange rate is endogenous (see Appendix 1, Table E10). However, this largely reflects the artificial nature of the shock, whereby oil prices change in the UK, but are effectively assumed unchanged elsewhere, since other world prices are held constant. The resultant fall in UK prices relative to those overseas leads to a rise in the nominal exchange rate, leaving the real exchange rate little changed.

Table 10A: Oil price cut by $5 pb, exchange rate fixed

(i) New model

	1	2	4	8	12
NSO	0	0	0	0	0
XGO	-0.1	-0.4	-0.8	-2.1	-3.3
MGO	0.3	0.8	2.5	5.9	8.6
NOLD	0.3	0.8	2.3	6.0	8.7
BALO (£bn)			-0.4	-0.7	-0.7
BAL (£bn)			-0.3	-0.8	-0
BIPD (£bn)			0.5	0.2	-0.2
CIPD (£bn)			0	0.4	0.7
DIPD (£bn)			-0.6	0.2	0.9
IOIL (£bn)			-0.2	-0.2	-0.2
PPOX	-1.1	-1.9	-3.3	-4.9	-5.1
PC	-0.9	-1.6	-3.0	-5.0	-5.6
WS	-0.2	-1.2	-2.9	-4.9	-5.6
GDPO	0.1	0.3	0.4	0.6	0.6
PSBR (£bn)			1.8	3.7	3.6

(ii) Old model

	1	2	4	8	12
XGO	-0.1	-0.2	-0.3	-0.1	0.1
MGO	0.6	2.0	5.9	11.9	10.1
NOLD	0.6	1.6	4.4	8.5	7.2
BAL (£bn)			-0.4	-0.6	-0.2
PPOX	-0.1	-0.3	-0.7	-0.6	-0.5
PC	0	-0.1	-0.2	-0.3	-0.3
WS	0	0	-0.1	-0.3	-0.5
GDPO	0	-0.1	-0.1	-0.2	-0.1

(b) Other simulations with a fixed exchange rate

(i) Employers NI contributions cut by 1% (Appendix 1, Table 6)

In the model, this simulation necessitates cuts in the two contribution rate variables which encompass the split in the composite rates paid by employers on earnings above or below the upper earnings limit (NCRE, NURE). Over the three years of the simulation, the PSBR cost is essentially the same as for the 1p cut in the basic income tax rate. The output effect of the cut is however larger than for income tax as there is a larger stimulus to competitiveness via a direct reduction in relative unit labour costs. Wages do respond to take up a considerable portion of the cut in contributions in the short run, but despite this short run response, prices are cut initially in response to the effective lowering of unit labour costs and this feeds into a later downward response of wages (WS). By the end of the simulation a downward wage-price spiral appears to be developing.

(ii) Earnings raised by 1% in first quarter only (Appendix 1, Table 8)

This simulation was first considered in the Bank model when it contained a stronger wage-price spiral than does the present model. In it, the wage series are shocked by 1% by residual in the first quarter only (EMAN, EOTH, EGG), and are free to respond thereafter. In the equivalent simulation in the autumn 1987 model, by the twelfth quarter earnings were 2.3% higher and consumer prices 1.7% higher, with both accelerating. In the present model (Table 8 in Appendix 1) this no longer appears to be such a problem. Wages level off at 1.2% or so above base while retail prices excluding mortgage interest payments (RPIX, but close to consumer prices for simulation purposes) does not reach 1% above base within the three years. However, the simulation does show that there is still considerable "persistence" in wage price behaviour such that an induced upward shock to wage-setting is perpetuated rather than eradicated; this is unsurprising given the limited effect of variables other than prices in the earnings and price equations.

(iii) Domestic demand raised by 1%, exchange rate fixed (Table 11)

This type of simulation is typically used as a guide to issues such as the demand responsiveness of prices in the model and to the effects of higher demand on the external balance. In this case it has been undertaken by constraint; by raising equiproportionately government spending (G), investment (IMAN, IDS), and consumption (CD, CND). The 1% rise in demand (Table 11 below) is associated with rises in both output and import volumes of 0.8%. The current account is worsened by an average of £1.4 bn pa. As regards inflation, the increase in demand stimulates prices after an initial lag (in which unit labour costs are reduced). A moderate wage-price spiral ensues.

Table 11: Domestic demand raised by 1%, exchange rate fixed

	1	2	4	8	12
GDPO	0.8	0.9	0.9	0.8	0.8
M	0.6	0.8	0.9	0.8	0.8
PGDP	-0.2	-0.1	0	0.4	1.0
PC	-0.1	0	0.1	0.5	1.0
PPOX	0	-0.1	-0.1	0.1	0.6
WS	0	-0.1	0.1	0.6	1.1
LU (000s)	-6.6	-15.9	-35.5	-58.4	-64.8
BAL (£bn)			-1.2	-1.4	-1.6

(c) Output multipliers and PSBR costs

In the discussion of the government spending plus £500 mn simulation above, the output multipliers were discussed (see Table 7B). In this section we report a related analysis of the output effects of alternative tax changes. The effect of 1% point reductions in the basic rate of income tax, in the standard VAT rate, and in employer and employee National Insurance contribution rates are summarised in Table 12. In addition, comparable figures for a rise in current government spending are shown where appropriate.

The first column of the table shows the average annual PSBR cost (current prices) of raising GDP (output measure 1985 prices) by an average of 0.1% in simulation. These figures should only be regarded as very approximate guides; but they do make it clear that the implied multipliers are very small. The implied PSBR cost of the 0.1% output gain from income tax cuts is, for example, around three times as high, in relation to GDP, as the resulting output increase. The second column reports the annual average PSBR cost of a 1% point cut in the four policy instruments. These effectively show the relative sizes of the implicit tax bases: income tax has the largest base while VAT, levied on the main body of consumption, has the smallest. These figures broadly correspond with the estimates of the various tax bases shown in Table 13. They do not match exactly partly for behavioural reasons (interest rates are endogenous in these simulations, for example) and for institutional reasons (basic rate tax affects non-wage income differently from the way it affects wage income, for example).

Table 12: Output multipliers of tax (and spending) measures

	Average* annual PSBR cost of raising GDPO by 0.1%	Average* annual PSBR cost of 1% point cut in rate
Basic rate of income tax	1481	1875
VAT	1698	1448
Employer national insurance contributions	1101	1910
Employee national insurance contributions	1112	2220
Government consumption	321	n/a

* Over three year period

Table 13: Tax bases (1988 prices)*

Tax	1988 tax base (£ bn)
Basic rate of income tax	270
VAT	210
Employer NICs	185
Employee NICs	220

* Based on model proxies

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APPENDIX 1: MODEL SIMULATIONS

A) EXCHANGE RATE FIXED

1. Exchange rate depreciation of 10%
2. World trade + 5%
3. All interest rates + 1 percentage point
3s. All short interest rates + 1 percentage point
4. Standard rate of income tax - 1p
5. Standard VAT rate - 1p
6. Employer's NI contributions - 1 percentage point
7. Government spending +£500mn 1985 prices
8. All earnings + 1% in first quarter only
9. All world prices +2%
10. Oil price -$5 per barrel

B) EXCHANGE RATE FREE

E2. World trade + 5%
E3. All interest rates + 1 percentage point
E3s. All short interest rates + 1 percentage point
E4. Standard rate of income tax - 1p
E5. Standard VAT rate - 1p
E6. Employer's NI contributions - 1 percentage point
E7. Government spending +£500mn 1985 prices
E8. All earnings + 1% in first quarter only
E9. All world prices +2%
E10. Oil price -$5 per barrel

1. Exchange rate depreciation of 10%

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.1	0.3	0.6	0.9	0.9
DOMD	-0.1	-0.3	-0.4	-0.1	0.3
PGDP	-0.4	-0.2	1.1	4.0	6.5
RPI	0.4	1.2	2.4	4.5	6.4
RPIX	0.5	1.1	2.3	4.7	6.8
WS	0.1	0.6	2.1	4.8	7.1
LU 000s	-4	-13	-38	-102	-143
PSBR (£bn)	-	-	-1.0	-3.8	-6.1
KM4	0.1	0.0	-0.3	-0.5	-0.3
RCBR (%)	0.0	1.3	0.6	0.1	-0.3
BAL (£bn)	-	-	-0.7	2.0	2.3

2. World trade +5%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.5	0.9	1.3	1.5	1.6
DOMD	0.0	0.2	0.6	0.8	1.1
PGDP	-0.1	-0.2	-0.2	0.1	0.8
RPI	0.0	-0.1	-0.1	0.2	0.7
RPIX	0.0	-0.1	-0.1	0.1	0.6
WS	0.0	0.0	-0.1	0.4	1.3
LU 000s	-14	-29	-63	-128	-173
PSBR (£bn)	-	-	-0.9	-2.7	-4.6
KM4	0.1	0.2	0.5	0.9	1.4
RCBR (%)	0.0	0.1	0.4	0.3	-0.1
BAL (£bn)	-	-	5.0	4.5	4.3

3. All interest rates + 1%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	-0.2	-0.4	-0.7	-0.9
DOMD	-0.1	-0.4	-0.7	-1.1	-1.4
PGDP	0.0	0.0	-0.1	-0.2	-0.4
RPI	0.4	0.4	0.3	0.2	0.0
RPIX	0.0	0.0	0.0	0.0	-0.2
WS	0.0	0.0	0.0	-0.1	-0.4
LU 000s	0	3	12	35	58
PSBR (£bn)	-	-	0.7	1.5	2.5
KM4	0.0	-0.1	-0.3	-0.8	-1.3
RCBR (%)	1.0	1.0	1.0	1.0	1.0
BAL (£bn)	-	-	0.6	1.5	2.0

3s. All short interest rates + 1%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	-0.2	-0.3	-0.6	-0.8
DOMD	-0.1	-0.3	-0.6	-1.0	-1.3
PGDP	0.0	0.0	0.0	-0.2	-0.4
RPI	0.4	0.4	0.3	0.2	0.0
RPIX	0.0	0.0	0.0	0.0	-0.2
WS	0.0	0.0	0.0	-0.1	-0.4
LU 000s	0	3	10	31	52
PSBR (£bn)	-	-	0.7	1.5	2.5
KM4	0.0	-0.1	-0.2	-0.7	-1.1
RCBR (%)	1.0	1.0	1.0	1.0	1.0
BAL (£bn)	-	-	0.5	1.5	1.9

4. Income tax -1p, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.1	0.1	0.1	0.1	0.1
DOMD	0.1	0.2	0.2	0.2	0.2
PGDP	0.0	-0.1	-0.1	-0.1	0.0
RPI	0.1	0.1	0.1	0.1	0.2
RPIX	0.0	0.0	0.0	0.0	0.0
WS	0.0	0.0	-0.1	-0.1	-0.2
LU 000s	-1	-2	-5	-11	-15
PSBR (£bn)	-	-	1.5	1.9	2.2
KM4	0.0	0.0	0.0	0.0	0.1
RCBR (%)	0.0	0.1	0.2	0.3	0.3
BAL (£bn)	-	-	-0.3	-0.4	-0.5

5. VAT -1%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.1	0.1	0.1
DOMD	0.0	0.1	0.1	0.1	0.0
PGDP	0.2	0.1	-0.1	-0.5	-0.9
RPI	-0.2	-0.3	-0.5	-0.8	-1.1
RPIX	-0.2	-0.3	-0.6	-0.9	-1.2
WS	0.0	-0.3	-0.5	-0.9	-1.2
LU 000s	0	-2	-5	-12	-20
PSBR (£bn)	-	-	1.2	1.9	2.1
KM4	0.0	0.0	0.0	0.1	0.1
RCBR (%)	0.0	0.0	0.1	0.2	0.2
BAL (£bn)	-	-	-0.2	-0.2	-0.1

6. Employers' NI contributions -1%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.2	0.2	0.2
DOMD	0.1	0.2	0.3	0.2	0.1
PGDP	-0.2	-0.1	-0.2	-0.5	-0.9
RPI	0.0	-0.1	-0.1	-0.4	-0.6
RPIX	-0.1	-0.1	-0.1	-0.5	-0.8
WS	0.5	0.7	0.4	-0.1	-0.5
LU 000s	-1	-2	-7	-17	-27
PSBR (£bn)	-	-	1.2	2.0	2.4
KM4	0.0	0.0	0.0	0.1	0.2
RCBR (%)	0.0	0.0	0.2	0.3	0.3
BAL (£bn)	-	-	-0.3	-0.4	-0.3

7. G +£500mn, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.5	0.5	0.5	0.4	0.4
DOMD	0.5	0.6	0.6	0.5	0.5
PGDP	-0.3	-0.2	0.0	0.2	0.4
RPI	0.1	0.1	0.2	0.4	0.5
RPIX	0.0	0.1	0.1	0.3	0.4
WS	0.0	0.1	0.1	0.4	0.5
LU 000s	-4	-12	-30	-41	-40
PSBR (£bn)	-	-	1.1	1.4	1.7
KM4	0.0	0.0	-0.1	-0.2	-0.2
RCBR (%)	0.0	0.2	0.3	0.3	0.2
BAL (£bn)	-	-	-0.3	-0.6	-0.6

8. All earnings + 1% in first qtr only, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.0	0.0	-0.1
DOMD	0.1	0.2	0.2	0.2	0.1
PGDP	0.3	0.4	0.7	1.1	1.2
RPI	0.2	0.3	0.5	0.8	0.9
RPIX	0.2	0.3	0.5	0.8	0.9
WS	1.0	1.1	1.1	1.3	1.2
LU 000s	0	0	1	8	14
PSBR (£bn)	-	-	-0.5	-0.5	-0.4
KM4	0.1	0.1	0.0	0.1	0.2
RCBR (%)	0.0	0.0	0.0	-0.1	-0.1
BAL (£bn)	-	-	-0.3	-0.5	-0.6

9. All world prices +2%, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.2	0.3	0.2
DOMD	0.0	0.0	0.0	0.1	0.1
PGDP	-0.1	-0.2	0.0	0.5	0.9
RPI	0.0	0.1	0.3	0.6	1.0
RPIX	0.0	0.1	0.3	0.6	1.0
WS	0.0	0.1	0.3	0.7	1.1
LU 000s	-1	-3	-9	-25	-35
PSBR (£bn)	-	-	-0.2	-0.9	-1.0
KM4	0.1	0.2	0.2	0.1	0.2
RCBR (%)	0.0	0.0	0.1	0.0	0.0
BAL (£bn)	-	-	2.1	-1.8	-0.2

10. Oil price -$5 per barrel, EER fixed

(% differences from base except where stated)

	1	2	4	8	12
GDPD	0.1	0.3	0.4	0.6	0.6
DDMD	0.1	0.3	0.5	0.4	0.0
PGDP	-0.8	-1.6	-3.3	-5.4	-6.3
RPI	-0.9	-1.6	-2.9	-4.6	-5.3
RPIX	-0.9	-1.6	-3.0	-5.0	-5.6
WS	-0.2	-1.2	-2.9	-4.9	-5.6
LU 000s	0	-2	-12	-44	-78
PSBR (£bn)	-	-	1.8	3.7	3.6
KM4	-0.1	-0.1	0.1	0.5	0.3
RCBR (%)	0.0	-0.3	0.3	0.6	0.6
BAL (£bn)	-	-	-0.3	-0.8	0.0

E2. World trade +5%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPD	0.4	0.9	1.2	1.3	1.4
DDMD	0.0	0.3	0.6	0.8	1.0
PGDP	0.0	-0.1	-0.3	-0.6	-0.5
RPI	0.0	-0.2	-0.4	-0.7	-0.6
RPIX	0.0	-0.2	-0.5	-0.8	-0.7
WS	0.0	-0.1	-0.3	-0.5	-0.1
LU 000s	-14	-28	-57	-108	-142
PSBR (£bn)	-	-	-0.8	-2.0	-3.3
KM4	0.1	0.2	0.5	1.0	1.5
RCBR (%)	0.0	0.0	0.2	0.3	-0.1
BAL (£bn)	-	-	5.1	4.6	3.7
EER	0.8	1.6	2.4	2.4	2.3

E3. All interest rates + 1%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	-0.2	-0.4	-0.8	-1.0
DOMD	-0.1	-0.4	-0.7	-1.2	-1.4
PGDP	0.0	0.0	0.0	-0.5	-1.0
RPI	0.4	0.4	0.2	-0.2	-0.7
RPIX	0.0	0.0	-0.1	-0.4	-0.9
WS	0.0	0.0	-0.1	-0.5	-1.1
LU 000s	0	4	15	47	76
PSBR (£bn)	-	-	0.7	1.9	3.1
KM4	0.0	-0.1	-0.3	-0.8	-1.3
RCBR (%)	1.0	1.0	1.0	1.0	1.0
BAL (£bn)	-	-	0.7	1.5	1.9
EER	0.0	0.4	1.6	1.1	1.5

E3s. All short interest rates + 1%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	-0.2	-0.3	-0.7	-0.9
DOMD	-0.1	-0.3	-0.6	-1.0	-1.3
PGDP	0.0	0.0	0.0	-0.3	-0.7
RPI	0.4	0.4	0.2	0.0	-0.4
RPIX	0.0	0.0	0.0	-0.2	-0.6
WS	0.0	0.0	0.0	-0.3	-0.7
LU 000s	0	3	11	35	61
PSBR (£bn)	-	-	0.7	1.7	2.9
KM4	0.0	-0.1	-0.2	-0.7	-1.1
RCBR (%)	1.0	1.0	1.0	1.0	1.0
BAL (£bn)	-	-	0.6	1.4	1.9
EER	0.0	0.1	0.6	0.6	0.9

E4. Income tax -1p, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.1	0.1	0.1	0.2	0.2
DOMD	0.1	0.2	0.2	0.2	0.2
PGDP	0.0	0.0	0.0	0.1	0.2
RPI	0.1	0.1	0.2	0.3	0.5
RPIX	0.0	0.0	0.0	0.1	0.3
WS	0.0	0.0	0.0	0.0	0.2
LU 000s	-1	-2	-6	-14	-22
PSBR (£bn)	-	-	1.5	1.8	2.0
KM4	0.0	0.0	0.0	0.0	0.1
RCBR (%)	0.0	0.1	0.2	0.3	0.3
BAL (£bn)	-	-	-0.3	-0.4	-0.4
EER	-0.1	-0.3	-0.4	-0.6	-1.0

E5. VAT -1%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.1	0.1	0.1
DOMD	0.0	0.1	0.2	0.1	0.1
PGDP	0.2	0.1	-0.1	-0.6	-1.1
RPI	-0.2	-0.3	-0.5	-1.0	-1.4
RPIX	-0.2	0.3	-0.6	-1.1	-1.5
WS	0.0	-0.2	-0.5	-1.0	-1.5
LU 000s	0	-2	-4	-10	-13
PSBR (£bn)	-	-	1.2	1.9	2.3
KM4	0.0	0.0	0.0	0.1	0.1
RCBR (%)	0.0	0.0	0.1	0.2	0.2
BAL (£bn)	-	-	-0.2	-0.3	-0.2
EER	0.0	0.0	0.3	0.5	0.8

E6. Employers' NI contributions -1%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.2	0.2	0.2
DOMD	0.1	0.2	0.2	0.2	0.2
PGDP	-0.1	-0.1	-0.2	-0.5	-1.0
RPI	0.0	0.0	-0.1	-0.4	-0.8
RPIX	0.0	-0.1	-0.1	-0.5	-0.9
WS	0.5	0.7	0.4	-0.1	-0.6
LU 000s	-1	-2	-7	-17	-24
PSBR (£bn)	-	-	1.2	2.0	2.5
KM4	0.0	0.0	0.0	0.1	0.2
RCBR (%)	0.0	0.0	0.2	0.3	0.3
BAL (£bn)	-	-	-0.3	-0.4	-0.3
EER	0.0	-0.1	-0.1	0.3	0.7

E7. G +£500mn, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.5	0.5	0.5	0.5	0.5
OOMD	0.5	0.5	0.6	0.5	0.4
PGDP	-0.2	-0.2	0.0	0.4	0.8
RPI	0.1	0.1	0.3	0.6	1.0
RPIX	0.1	0.1	0.2	0.5	0.9
WS	0.0	0.1	0.2	0.5	0.9
LU 000s	-4	-12	-31	-46	-50
PSBR (£bn)	-	-	1.1	1.3	1.4
KM4	0.0	0.0	-0.1	-0.2	-0.2
RCBR (%)	0.0	0.2	0.4	0.4	0.2
BAL (£bn)	-	-	-0.5	-0.6	-0.5
EER	-0.1	-0.3	-0.5	-0.9	-1.6

E8. All earnings + 1% in first qtr only, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.1	0.1	0.1	0.1
DOMD	0.1	0.2	0.2	0.1	0.1
PGDP	0.3	0.5	0.7	1.4	1.9
RPI	0.2	0.3	0.7	1.3	1.7
RPIX	0.2	0.3	0.7	1.3	1.8
WS	1.0	1.2	1.2	1.7	2.1
LU 000s	0	0	0	-2	-5
PSBR (£bn)	-	-	-0.6	-0.8	-1.1
KM4	0.1	0.1	0.0	0.0	0.1
RCBR (%)	0.0	0.1	0.1	0.0	-0.1
BAL (£bn)	-	-	-0.3	-0.4	-0.3
EER	-0.1	-0.3	-1.1	-1.7	-2.0

E9. All world prices + 2%, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPO	0.0	0.0	0.0	0.1	0.1
DOMD	0.0	0.1	0.1	0.1	0.1
PGDP	0.0	-0.1	-0.3	-0.3	-0.3
RPI	-0.1	-0.2	-0.3	-0.2	-0.3
RPIX	-0.1	-0.2	-0.3	-0.3	-0.3
WS	0.0	-0.1	-0.3	-0.3	-0.3
LU 000s	0	1	0	-4	-8
PSBR (£bn)	-	-	0.1	-0.1	0.2
KM4	0.1	0.2	0.3	0.2	0.1
RCBR (%)	0.0	-0.3	-0.1	0.0	0.0
BAL (£bn)	-	-	2.2	-2.2	-0.5
EER	2.8	2.8	2.2	2.2	2.1

E10. Oil price -$5 per barrel, EER free

(% differences from base except where stated)

	1	2	4	8	12
GDPD	0.1	0.2	0.3	0.0	-0.3
DOMD	0.2	0.4	0.7	0.7	0.0
PGDP	-0.8	-1.5	-3.4	-7.1	-10.0
RPI	-0.9	-1.8	-3.6	-7.1	-9.5
RPIX	-1.0	-1.8	-3.7	-7.4	-10.0
WS	-0.2	-1.3	-3.3	-7.3	-10.0
LU 000s	0	0	-2	6	24
PSBR (£bn)	-	-	2.0	5.1	7.0
KM4	-0.1	-0.1	0.2	0.9	1.0
RCBR (%)	0.0	-0.5	-0.1	0.3	0.4
BAL (£bn)	-	-	0.1	-1.2	-1.8
EER	1.2	2.4	6.2	9.6	11.4

APPENDIX 2: MODEL MANUAL - AUTUMN 1989

1) Equation Listing

2) Flow of funds matrix

3) Alphabetical Index

SECTION 1

CONSUMERS' EXPENDITURE

AT CONSTANT PRICES

Non-durable items, Total

$$(1)\ \ln CND = \underset{(8.5)}{0.66516}\ \ln CND_{-1} + \underset{(3.7)}{0.27438}\ \ln CND_{-2} + \underset{(3.1)}{0.11651}\ \Delta \ln YDLH + \underset{(5.8)}{0.1978}\ \Delta \ln YDLH_{-1}$$

$$+ \underset{(-)}{0.0569314}\ \ln YDLH + \underset{(1.2)}{0.0083732}\ \ln\left[\frac{(VOHS-KHPT-KHPG)/PC}{YDLH}\right]_{-1}$$

$$+ \underset{(2.3)}{0.018411}\ \ln\left[\frac{(NFWJ+KHPT+KHPG)/PC}{YDLH}\right]_{-1} + \underset{(3.0)}{0.017877}\ D681$$

$$- \underset{(4.6)}{0.027012}\ D681_{-1} + \underset{(3.0)}{0.018091}\ D721_{-4} - \underset{(2.4)}{0.020097}\left(\frac{1}{3} D721_{-5} + \frac{2}{3} D721_{-6}\right)$$

$$+ \underset{(5.3)}{0.029969}\ D79 - \underset{(1.7)}{0.013259}\left(\frac{1}{4} D79_{-1} + \frac{3}{4} D79_{-2}\right)$$

$$- \underset{(1.6)}{0.037666}\ \ln\left[1 + \frac{RCBR}{100} - \ln\left(\frac{PC_{-1}}{PC_{-5}}\right)\right] - \underset{(0.4)}{0.016281}$$

$\bar{R}^2 = 0.997$ SE = 0.006 DW = 1.9 LM(4)=3.5 FCST(4)=15.7 1967 IV - 1985 IV

Alcohol and Tobacco

$$(691)\ \ln CAT = \underset{(2.2)}{0.3049023}\ \ln CAT_{-1} - \underset{(4.8)}{0.8271341}\ \ln(PAT/PCND)$$

$$+ \underset{(4.0)}{0.4834276}\ \ln CND + \underset{(0.8)}{0.7780162}$$

$\bar{R}^2 = 0.901$ SE = 0.015 DW = 1.4 LM(4)=9.6 FCST(4)=12.1 1978 I-1986 IV

Food

$$(280)\ \ln CF = \underset{(4.1)}{0.4202344}\ \ln CF_{-1} - \underset{(2.1)}{0.06917961}\ \ln(PF/PCND)$$

$$+ \underset{(4.1)}{0.09458419}\ \ln CND + \underset{(5.3)}{4.159025}$$

$\bar{R}^2 = 0.743$ SE = 0.012 DW = 1.9 LM(4)=26.7 FCST(4)=7.3 1968 II - 1986 IV

Durable goods

$$(2)\ \ln CD = \underset{(2.5)}{0.2194388}\ \ln CD_{-1} + \underset{(6.6)}{1.32624}\left[\frac{\ln YDLH + \ln YDLH_{-1}}{2}\right]$$

$$+ \underset{(5.9)}{0.2825243}\ D79 - \underset{(2.3)}{0.1198625}\ D79_{-1} + \underset{(2.0)}{0.09729404}\ D741_{-11}$$

$$+ \underset{(1.9)}{0.09223511}\ D721_{-4} - \underset{(2.5)}{0.1209031}\ D721_{-5}$$

$$- \underset{(4.3)}{0.6983179}\ \ln\left[1 + \frac{RCBR}{100} - \Delta_4 \ln PC_{-1}\right]_{-1}$$

$$- \underset{(3.3)}{0.076336}\ \ln RMD + \underset{(3.3)}{0.1491229}\ \ln\left[\frac{LHBB + LHPG + LZNA + LHPV}{PC}\right]_{-1}$$

$$+ \underset{(0.9)}{0.09761678}\ \ln\left[\frac{NLAJ/PC}{YDLH}\right]_{-2} - \underset{(5.4)}{8.845986}$$

$R^2 = 0.975$ SE = 0.047 DW = 2.2 LM(4)=6.4 FCST(4)=5.8 1964 I-1985 IV

Total consumption

(4) CONS = CND + CD

AT CURRENT PRICES

Total consumption

(103) C£ = CND.PCND + CD.PCD

Stock of durables

$$(105)\ KCD£ = \underset{(1634.7)}{0.9083874}\ KCD£_{-1}\left(\left(\frac{CD.PCD+0.13\ CND.PCND}{CD + 0.13\ CND}\right)/\left(\frac{CD.PCD+0.13\ CND.PCND}{CD + 0.13\ CND}\right)_{-1}\right)$$

$$+ \underset{(-)}{0.9530935}\ (CD.PCD + 0.13\ CND.PCND)$$

$R^2 = 0.999$ %SE = 0.004 DW = 0.5 LM(4)=24.0 FCST(4)=40.6 1975 I-1986 IV

SECTION 2

FIXED INVESTMENT

AT CONSTANT PRICES

Manufacturing

$$(688)\ \Delta \ln IMAN = \underset{(0.3)}{-0.0001385369} + \underset{(3.7)}{0.5739644}\ \Delta\left(\ln MPRM_{-1} - \frac{1}{9}\sum_{i=2}^{10} \ln MPRM_{-i}\right)_{-1}$$

$$- \underset{(3.8)}{0.2294357}\ RIMA_{-1} + \underset{(4.0)}{0.09270903}\ \Delta\, D842_{-3}$$

$$- \underset{(1.4)}{0.9535155}\ \Delta \ln((100 + (1 - TRYC/100).(RCBR + 1.5))/100)_{-4}$$

$$+ \underset{(3.0)}{0.552238}\ \Delta \ln MPRO_{-3} + \underset{(2.1)}{0.1953159}\ \Delta \ln IMAN_{-2}$$

$$+ \underset{(3.2)}{0.3322467}\ \Delta \ln IMAN_{-4}$$

Where:

$$RIMA = \ln IMAN - \left[-7.164762 + 1.486557 \ln MPRO\right.$$

$$+ 0.09365667 \ln\left[\frac{(ECMM.LEMF/HMFT)}{\left[\frac{1 - PVIC}{1-TRYC/100}\right].\left[\frac{PIFO}{PPOX}\right].\left[\frac{RD+RE+RR}{3}\right]+\left[\frac{4.RCCX}{KFX£}\right]-0.5\left[\frac{PIFO-PIFO_{-4}}{PIFO_{-4}}\right]}\right]$$

$$\left. - 0.7751758 \ln((100+(1-TRYC/100).((RUKG+1.5)-100.((PIFO/PIFO_{-4})-1)))/100)\right]$$

Where: $RD = (RDEBT.(1-TRYC/100))/(1-1.75.(1-TRYC/100).RDEBT)$

$RE = RDEBT/(1/(1-TRY/100))$

$RR = ((1-TRY/100).RDEBT.(0.1+(1-TRY/100).RDEBT)))/(0.07+(1-TRY/100).RDEBT)$

$RDEBT = 0.015+0.5(RUKG+RCBR)/100$

$\bar{R}^2 = 0.576$ SE = 0.033 DW = 2.2 LM(4)=6.8 FCST(4)=14.2 1971 III-1986 IV

Distribution and Services

$$(700)\ \Delta \ln IDS = \underset{(0.7)}{0.003300776} + \underset{(2.5)}{0.910243}\ \Delta \ln OOTH_{-4} + \underset{(2.2)}{0.8059095}\ \Delta \ln OOTH_{-6}$$

$$- \underset{(1.1)}{1.360136}\ \Delta \ln(((RUKG + 1.5).(1 - TRYC/100) + 100)/100)_{-1}$$

$$- \underset{(3.3)}{0.2530775}\ RIDS_{-1} + \underset{(5.8)}{0.1554095}\ \Delta D842_{-3}$$

Where:

$$RIDS = \ln IDS - [-14.44523 + 2.122301 \ln OOTH + 0.002158657\ TIME$$

$$- 2.097523 \ln(((RUKG + 1.5).(1 - TRYC/100) + 100)/100)]$$

$\bar{R}^2 = 0.528$ SE = 0.037 DW = 2.0 LM(4)=0.5 FCST(4)=3.7 1970 I-1986 IV

Other private sector

$$(600)\ IRES = \left(\frac{IMAN+IDS}{4}\right) * \left[\left(\frac{IRES}{IMAN+IDS}\right)_{-1}\right]$$

$$+ \frac{IRES_{-2} + (DPI_{-2} - DPI_{-1})\ IPC_{-2}}{IMAN_{-2} + IDS_{-2}}$$

$$+ \frac{IRES_{-3} + (DPI_{-3} - DPI_{-2})\ IPC_{-3} + (DPI_{-2} - DPI_{-1})\ IPC_{-2}}{IMAN_{-2} + IDS_{-2}}$$

$$+ \frac{IRES_{-4} + (DPI_{-4} - DPI_{-3})\ IPC_{-4} + (DPI_{-3} - DPI_{-2})\ IPC_{-3}\ (DPI_{-2} - DPI_{-1})\ IPC_{-1}}{IMAN_{-4} + IDS_{-4}}$$

$$+ (DPI_{-1} - DPI)\ IPC_{-1}$$

Capital Stock (Distribution and Services)

$$(698)\ KDS = \underset{(26767.9)}{0.9963605}\ KDS_{-1} + IDS$$

$\bar{R}^2 = 1.0$ SE = 0.0 DW = 0.3 1975 I-1986 IV

Private sector housing completions

$$(209)\ \ln IHPC = \underset{(3.8)}{0.3550638}\ \ln IHPC_{-1} + \underset{(4.6)}{0.4181131}\ \ln IHPC_{-2} + \underset{(4.0)}{0.4029023}\ \ln YDLH_{-1}$$

$$- \underset{(5.8)}{1.882987}\ \ln(1 + RCBR/100) + \underset{(2.8)}{0.2572731}\left[\frac{1}{4}\sum_{i=8}^{11} \ln\left(\frac{100.PAHM}{EMAN}\right)_{-i}\right]$$

$$+ \underset{(7.0)}{0.3164234}\ D79_{-2} - \underset{(3.2)}{3.340821}$$

$\bar{R}^2 = 0.867$ SE = 0.043 DW = 2.6 LM(4)=9.0 FCST(4)=8.2 1976 I-1986 IV

Private: Residential

$$(5)\ IHP = \underset{(5.7)}{0.4947437}\ IHP_{-1} + \underset{(4.5)}{0.02902678}\left[\frac{YDLH + YDLH_{-1}}{2}\right]_{-1} - \underset{(2.0)}{940.1271}\ RRI$$

$$+ \underset{(1.7)}{0.1062391}\Delta\left[\frac{LHBB+LHPG+LHPV+LZNA}{PC}\right]_{-1} + \underset{(3.5)}{21.97578}\ \Delta IHPC + \underset{(3.3)}{19.72098}\ \Delta IHPC_{-1}$$

$$+ \underset{(3.2)}{12.26156}\ IHPC_{-3} - \underset{(1.9)}{696.1916}$$

Where: $$RRI = \left[1+\left(\left(\frac{RZMG}{100}\right)\left(1-\left(\frac{TRY}{100}\ (1 - \frac{2}{9}\ (1 - D73B))\right)\right)\right)\right] - 1/5 \sum_{i=0}^{4}\left(\frac{PC}{PC_{-4}}\right)_{-i}$$

$\bar{R}^2 = 0.677$ %SE = 0.073 DW = 1.8 LM(4)=12.4 FCST(4)=3.9 1964 I-1986 IV

Private: total non-residential

(27) INP = IMAN + IDS + INS + IRES + ILBP - ICHJ

Private: total

(28) IFP = INP + IHP + ICHJ

Public

(29) IFG = ING + IHG - ILBP

Total

(30) IF = IFP + IFG

AT CURRENT PRICES

Private: residential

(116) IHP£ = IHP.PIHP

Private: total

(224) IFP£ = IF£ - IFG£

Public: total

(21) IFG£ = PIFG.IFG

Total

(118) IF£ = PIFO.(IF-IHP) + IHP£

Allocation within private sector

Personal sector

$$(222)\ \frac{IFJ£ - IHP£ - ICHJ.PILG}{IFP£-IHP£-ICHJ.PILG-INS£} = \underset{(6.4)}{0.5826064}\left[\frac{IFJ£ - IHP£ - ICHJ.PILG}{IFP£-IHP£-ICHJ.PILG-INS£}\right]_{-1} + \underset{(4.5)}{0.05580906}$$

$\bar{R}^2$ = 0.330 %SE = 0.227 DW = 2.1 LM(4)=6.6 FCST(4)=1.2 1966 II-1986 IV

Industrial and Commercial companies

$$(268)\ \frac{100.(IFI£-INS£)}{IFP£-IFJ£-INS£} = \underset{(0.7)}{-0.0006081702}\left[\frac{1}{4}\sum_{I=0}^{3}\left[\frac{GTPF+NTIF+YFAB-EIF}{PGDP}\right]_{-i}\right]$$

$$+ \underset{(1.3)}{0.0004111546}\left[\frac{1}{4}\sum_{I=0}^{3}\left[\frac{FFI-FNS+IFI£-INS£+III£}{PIFO}\right]_{-i}\right]$$

$$+ \underset{(4.2)}{0.524982}\left[\frac{100.(IFI£ - INS£)}{IFP£ - IFJ£ - INS£}\right]_{-1} + \underset{(2.1)}{0.2750317}\left[\frac{100.(IFI£ - INS£)}{IFP£ - IFJ£ - INS£}\right]_{-2}$$

$$+ \underset{(1.8)}{14.04984}$$

$\bar{R}^2$ = 0.752 %SE = 0.029 DW = 2.0 LM(4)=3.6 FCST(4)=4.4 1971 I-1986 IV

Financial companies

(422) IFF£ = IFP£ - IFJ£ - IFI£

SECTION 3

STOCKBUILDING SECTOR

AT CONSTANT PRICES

Manufacturers' stocks: level

$$\begin{aligned}(93)\ \ln KIIM = {} & \underset{(16.4)}{0.8987406}\ \ln KIIM_{-1} + \underset{(1.2)}{0.0702358}\ \ln KIIM_{-4} + \underset{(4.4)}{0.1572313}\ \ln MPRO_{-1} \\ & - \underset{(3.6)}{0.1220195}\ \ln MPRO_{-4} + \underset{(4.1)}{0.04314392}\ \ln(KLI/PEF)_{-3} \\ & - \underset{(4.1)}{0.0009170526}\ RCI2_{-2} - \underset{(1.2)}{0.4655705}\end{aligned}$$

$\bar{R}^2 = 0.978$ SE = 0.007 DW = 1.8 LM(4) = 7.7 1972 I-1986 IV

Manufacturers' stocks: stockbuilding

(52) $IIM = \Delta KIIM$

Non-manufacturers' stocks: level

$$\begin{aligned}(94)\ \ln KIIR = {} & \underset{(9.0)}{1.188584}\ \ln KIIR_{-1} - \underset{(2.7)}{0.3140874}\ \ln KIIR_{-2} + \underset{(3.7)}{0.1656256}\ \ln GDP_{-1} \\ & - \underset{(1.9)}{0.000396833}\ RCI2_{-1} - \underset{(1.4)}{0.0006568813}\ \Delta RCI2_{-1} - \underset{(2.1)}{0.498552}\end{aligned}$$

$\bar{R}^2 = 0.989$ SE = 0.009 DW = 2.0 LM(4) = 2.0 1972 I-1986 IV

Non-manufacturers' stocks: stockbuilding

(53) $IIR = \Delta KIIR$

Total stocks: stockbuilding

(64) $II = \Delta(KIIM + KIIR)$

Real cost of stockholding (lagged 2 quarters)

$$\begin{aligned}(43)\ RCI2 = {} & 100.\left[\frac{PS}{PEF}\right]_{-2}.\left[\left(\left(1 - \frac{TRYC_{-2}}{100}\right).\left(0.02 + \frac{RCBR_{-2}}{100}\right) - QDOT\right)\right. \\ & .\left(1 + \left(\left(1 - DIIP_{-2}\right).\frac{TRYC_{-2}}{100}\right)\Big/\left(1 - \frac{TRYC_{-2}}{100}\right)\right) \\ & \left. + \left(1 - DIIN_{-2}\right).\frac{TRYC_{-2}}{100}.QDOT\Big/\left(1 - \frac{TRYC_{-2}}{100}\right)\right]\end{aligned}$$

Where $QDOT = (PS - PS_{-4})/PS_{-4}$

AT CURRENT PRICES

Stock appreciation:

Total

(138) $YSA = \Delta PS.(KIIM + KIIR)_{-1}$

Industrial and commercial companies

(21) $YSAI = 0.8\ YSA$

Public sector

(215) $YSAG = 0.07\ YSA$

Personal sector

(214) $YSAJ = YSA - YSAG - YSAI$

Stockbuilding at current prices

Total

(107) $II£ = \Delta(PS.(KIIM + KIIR)) - YSA$

Industrial and commercial companies

(284) $III£ = \underset{(2.7)}{-\ 38.45827} + \underset{(30.4)}{0.9101022\ II£} - \underset{(2.0)}{49.44628\ Q1} + \underset{(1.9)}{47.93186\ Q2}$

$+ \underset{(0.8)}{18.99282\ Q3} - \underset{(-)}{17.4784\ Q4}$

$\bar{R}^2 = 0.932$ %SE = 2.747 DW=1.6 LM(4)=3.8 FCST(4)=20.6 1970 I-1986 IV

Personal sector

(211) $IIJ£ = \underset{(2.1)}{14.87519} + \underset{(-)}{0.09\ II£} - \underset{(0.2)}{0.02113365\ IIJ£_{-1}} - \underset{(3.4)}{0.319427\ IIJ£_{-2}}$

$+ \underset{(0.1)}{0.005275736\ IIJ£_{-3}} + \underset{(-)}{0.3352878\ IIJ£_{-4}}$

$\bar{R}^2 = 0.533$ %SE = 2.611 DW=1.4 LM(4)=9.3 FCST(4)=14.7 1970 I-1986 IV

Public sector

(213) $IIG£ = II£ - IIJ£ - (III£ + IIF£)$

Personal sector stock level

(216) $KIIJ = KIIJ_{-1} + IIJ£ + YSAJ$

SECTION 4

EXPORTS OF GOODS AND SERVICES

AT CONSTANT PRICES

Manufactures, inc erratics (SITC 5-8)

$$(34)\ \Delta \ln XGMA = \underset{(4.2)}{1.758835} + \underset{(5.2)}{0.69966}\ \Delta \ln WTMU + \underset{(4.1)}{0.2605547}\ (\ln WTMU - \ln XGMA)_{-1}$$

$$- \underset{(3.5)}{0.05224462}\ (\ln RULC + \ln RULC_{-1})$$

$\bar{R}^2 = 0.515$ SE = 0.021 DW = 2.2 LM(4)=2.0 FCST(6)=13.9 1976 III- 1986 IV

Crude oil and oil products (SITC div 33)

$$(278)\ \Delta XGO = \underset{(5.1)}{0.4981517}\ (162.15\ NSO - XGO_{-1}) - \underset{(4.1)}{0.3471516}\ NOLD + \underset{(2.3)}{0.1866556}\ NOLD_{-1}$$

$\bar{R}^2 = 0.554$ %SE = 2.487 DW = 1.7 LM(4)=2.2 FCST(6)=5.5 1980 I - 1986 IV

Other fuels (SITC 3 less div 33)

$$(277)\ \Delta \ln XGOF = \Delta \ln XGNM$$

Exports of non-fuel, non-manufactures (SITC 0-2 + 4 + 9)

$$(468)\ (\ln XGNM - \ln WTMU) = \underset{(406.9)}{3.13929} - \underset{(1.6)}{0.1206101}\ \ln(PXNM.EER/WPC)$$

$\bar{R}^2 = 0.38$ SE = 0.044 DW = 1.7 LM(4)=2.1 FCST(6)=13.4 1976 I - 1986 IV

Total non-oil visible exports (SITC 0-9, less div 33)

$$(474)\ XGNO = XGOF + XGMA + XGNM$$

Total visible exports (SITC 0-9)

$$(36)\ XG = XGNO + XGO$$

Services excluding shipping

$$(46)\ \ln XSOT = \underset{(3.3)}{1.292766} + \underset{(5.4)}{0.8576662}\ \ln WGDP_{-1} - \underset{(4.4)}{0.4791753}\ \ln(PXS/PMS)_{-1} + \underset{(3.5)}{0.3902756}\ \ln XSOT_{-1}$$

$\bar{R}^2 = 0.950$ SE = 0.025 DW = 2.0 LM(4)=3.8 FCST(6)=14.6 1975 I - 1986 IV

Total services

(40) XS = XSSH + XSOT

Total goods and services

(41) X = XG + XS

AT CURRENT PRICES

Total visible exports

(108) XG£ = PXGN.XGNO + PXGO.XGO

Services

(109) XS£ = XS.PXS

Total

(110) X£ = XG£ + XS£

SECTION 5

IMPORTS OF GODDS AND SERVICES

AT CONSTANT PRICES

Food, drink and tobacco (SITC 0+1)

(42) $\Delta \ln MGFD = \Delta \ln (CF + CAT)$

Basics and miscellaneous (SITC 2+4+9)

(9) $\Delta \ln MGBM = \underset{(4.6)}{-1.1220608} - \underset{(4.6)}{0.4445225} (\ln MGBM - \ln MPRO)_{-1}$

$\underset{(3.7)}{-0.2007075} \ln (PMBM/PPOX) + \Delta \ln (MPRO + IIBM)$

$\bar{R}^2 = 0.266$ SE = 0.053 DW = 2.1 1971 I - 1985 IV

Manufactures including erratics (SITC 5-8)

(188) MGMA = (MAND + IIFW - MRGN.MPRM)/1.055

Total non-oil visible exports (SITC 0-9 less div 33)

(79) MGNO = MGOF + MGMA + MGBM + MGFD

Total visible imports (SITC 0-9)

(51) MG = MGNO + MGO

Services excluding shipping

(44) $\ln MSOT = \underset{(2.9)}{-4.685743} + \underset{(3.1)}{0.63725} \ln (0.716998\ EF - 0.7313347\ II)$

$\underset{(2.3)}{+0.35887} \ln (PXS/PMS) + \underset{(7.3)}{0.69358} \ln MSOT_{-1}$

$\bar{R}^2 = 0.963$ SE = 0.036 DW = 2.4 1970 III - 1981 IV

Services

(55) MS = MSSH + MSOT

Total goods and services

(56) $M = MG + MS$

Derivation of fuel imports

Net demand for crude oil

$$(143)\ \ln NDG2 = \underset{(871.6)}{0.8065637}\ \ln MPRO_{-1} + \underset{(4.5)}{0.1241218}\ DUM1 + 0.0197 \ln \left(\frac{PCL}{PMGO}\right)$$

$$+ 0.0345 \ln \left(\frac{PCL}{PMGO}\right)_{-1} + 0.0443 \ln \left(\frac{PCL}{PMGO}\right)_{-2} + 0.0492 \ln \left(\frac{PCL}{PMGO}\right)_{-3}$$

$$+ 0.0492 \ln \left(\frac{PCL}{PMGO}\right)_{-4} + 0.0443 \ln \left(\frac{PCL}{PMGO}\right)_{-5} + 0.0345 \ln \left(\frac{PCL}{PMGO}\right)_{-6}$$

$$+ 0.0197 \ln \left(\frac{PCL}{PMGO}\right)_{-7} + 0.2584628$$

$\bar{R}^2 = 0.819$ SE = 0.060 DW = 1.974 1972 I - 1986 II

Imports of other fuels (SITC 3 less div 33)

(663) $\Delta \ln MGOF = \Delta \ln MGBM$

Imports of crude oil and oil products (SITC div 33)

(651) $MGO = NDG2 - 162.15\ NSO + XGO$

At current prices

Total visible imports

(112) $MG£ = PMGM.MGNO + PMGO.MGO$

Imports of services: total

(113) $MS£ = MS.PMS$

Imports: total

(114) $M£ = MG£ + MS£$

SECTION 6

GDP IDENTITIES AND OUTPUT COMPONENTS

GROSS DOMESTIC PRODUCT

AT CONSTANT PRICES

Total final expenditure

(70) EF = CONS + IF + II + G + X

Domestic demand (expenditure based)

(309) DOMD = CONS + G + IF + II

Domestic demand (output based)

(452) DDOB = GDPO - (X - M) + FCA

Non-oil domestic demand (output based)

(456) DDNO = DDOB - NOLD

Gross domestic product

Expenditure-based

(341) GDPE = EF - M - FCA

Average estimate

(68) GDP = GDPE - ADJ

Income based

(342) GDPY = GDPE - $\frac{\text{RESE}}{\text{PGDP}}$

Output-based

(343) GDPO = 3.GDP - GDPE - GDPY

AT CURRENT PRICES

Total final expenditure

(119) EF£ = C£ + IF£ + G£ + X£ + II£

GDP, expenditure-based

(121) GDP£ = EF£ - M£ - FCA£

Nominal GDP: average estimate at market prices

(15) GDPN = GDP.PGDP + FCA£

FACTOR COST ADJUSTMENT

At constant prices

(67) FCA = 0.06038 G + 0.06891 IF + 0.49826 CAT
+ 0.15287 CD + 0.00033 CF
+ 0.15927 (CND - CAT - CF) + 0.03739 X

At current prices

(120) FCA£ = TE - ESAB

Ratio

(201) PFCA = FCA£/FCA

AGGREGATE INCOME FROM RENT

(134) lnYR = -0.6553196 + 0.7399522 $lnYR_{-1}$ + 0.1950358 ln(1 + RCBR/100)
(6.0) (-) (-)
+ 0.2600478 ln(GDPY.PGDP)
(6.2)

$\bar{R}^2$ = 0.999 SE = 0.010 DW = 1.1 LM(4)=11.7 FCST(4)=19.4 1977 I-1986 IV

COMPOSITION OF OUTPUT

Manufacturing production (£85 million)

(47) MPRO = MPRM + MPRX

Manufacturing production (index)

(159) PROM = MPRO/181.72

Output of 'other' sector

(425) OOTH = GDPO - (MPRO + 0.6 G + ONSO)

Derivation of output of total manufactures

Proxy for demand for manufactured goods

(455) lnMAND = ln(0.122 CND + 0.8 CD + 0.163 G + 0.24 (IHG+IHP)
+ 0.54 (ING+INP) + 0.18 IIM + 0.744 IIR + XGMA
+ 0.25 (GDPO-GDPE)) + 0.1587809
(39.2)

$\bar{R}^2$ = 0.000 SE = 0.032 DW = 0.4 LM(4)=37.7 FCST(4)=3.4 1971 I-1986 IV

Allocation to domestic demand output (excluding food, drink and tobacco)

$$(457)\ \ln(MPRM.MRGN - 0.75\ XGMA) = \underset{(10.4)}{0.7377441}\ \ln(MPRM.MRGN - 0.75\ XGMA)_{-1}$$

$$+\ \underset{(1.5)}{0.09528598}\ \ln(MPRM.MRGN - 0.75\ XGMA)_{-3} + \underset{(13.5)}{0.8795389}\ \ln(MAND-XGMA)$$

$$\underset{(-)}{-0.71256898}\ \ln(MAND-XGMA)_{-1} \underset{(-)}{-0.08348496} \left[\frac{1}{4}\sum_{i=1}^{4} \ln\left(\frac{ECMM.LEMF/MPRO}{WLCL/EER}\right)_{-i}\right]$$

$$-\ \underset{(1.2)}{0.09758912}\ (\ln MPRM_{-1} - \frac{1}{9}\sum_{i=2}^{10} \ln MPRM_{-i}) \underset{(3.0)}{-0.0009387412}\ TIME + \underset{(2.8)}{0.3991556}$$

$\bar{R}^2 = 0.971$ SE = 0.019 DW = 2.3 LM(4)=7.1 FCST(4)=4.0 1972 II-1986 IV

Output of food, drink and tobacco

$$(458)\ \Delta \ln MPRX = 0.66\ \Delta \ln MPRM$$

Transformed CBI index of capacity utilisation

$$(256)\ \ln CUCI = \underset{(4.5)}{1.369919} + \underset{(4.3)}{0.2857813}\ (\ln MPRM - \frac{1}{9}\sum_{i=2}^{10} \ln MPRM_{-i})$$

$$\underset{(9.6)}{0.6837244}\ \ln CUCI_{-1} + \underset{(5.0)}{0.4517367}\ \Delta \ln MPRM$$

$\bar{R}^2 = 0.901$ SE = 0.016 DW = 2.1 LM(4)=3.1 FCST(4) = 3.3 1974 II-1987 II

SECTION 7

LABOUR MARKET

EMPLOYMENT AND UNEMPLOYMENT

Employment

Non-trading public sector

(427) $\Delta \ln LEG = 0.2\ \Delta \ln G + 0.3\ \Delta \ln G_{-1} + 0.3\ \Delta \ln G_{-2} + 0.2\ \Delta \ln G_{-3} - 0.00375$

Manufacturing Industry

Total hours worked

$$\begin{aligned}(300)\ \ln HMFT = {} & \underset{(3.6)}{0.8232357} + \underset{(5.9)}{0.5084739}\ \ln HMFT_{-1} + \underset{(2.9)}{0.3358546}\ \ln HMFT_{-2} \\ & - \underset{(1.2)}{0.08343731}\ \ln HMFT_{-3} + \underset{(10.1)}{0.4164184}\ \ln MPRO \\ & - \underset{(-)}{0.1773095}\ \ln MPRO_{-2} - \underset{(0.4)}{0.005314705}\ \ln RCCM \\ & - \underset{(1.1)}{0.02537637}\left[\ln\left(\frac{ECMM.LEMF}{HMFT}\right) - \ln(0.12031\ PMBM + 0.71856\ PMGM \right. \\ & \left. + 0.16113\ PMGO)\right] - \underset{(2.4)}{0.00107402}\ TIME - \underset{(1.7)}{0.001129986}\ D80T \\ & - \underset{(5.4)}{0.05107232}\ D741\end{aligned}$$

$\bar{R}^2 = 0.997$ SE = 0.008 DW = 1.6 LM(4) = 7.4 FCST(4) = 0.7 1971 III-1986 IV

Employment

$$\begin{aligned}(428)\ \ln LEMF = {} & \underset{(45.2)}{0.799186}\ \ln LEMF_{-1} + \underset{(19.8)}{0.4848463}\ \ln HMFT - \underset{(-)}{0.2840323}\ \ln HMFT_{-1} \\ & + \underset{(3.2)}{0.007683119}\ D721 - \underset{(3.1)}{0.00789719}\ D721_{-1} + \underset{(10.6)}{0.03029718}\ D741 \\ & - \underset{(5.4)}{0.01670278}\ D741 + \underset{(4.7)}{0.000097}\ TIME - \underset{(11.3)}{0.7589688}\end{aligned}$$

$\bar{R}^2 = 0.999$ SE = 0.002 DW = 1.0 1970 I - 1986 IV

Average hours worked

(265) HMF = HMFT/LEMF

"Other" excluding self-employed (including public corporations)

$$(426)\ \ln(LOTH + LSE) = \underset{(11.7)}{1.377899}\ \ln(LOTH + LSE)_{-1} - \underset{(4.4)}{0.4699641}\ \ln(LOTH + LSE)_{-2}$$

$$- \underset{(0.2)}{0.003386965}\ \ln\left[\frac{\left(\frac{YWS + YEC + YECS}{YWS}\right).18.9486\ EOTH + \frac{TSET}{LOTH}}{(GDP£-3.ADJ.PGDP+RESE-MPRO.PPOX-0.6G£-NSO.POIL-PGAS.NSG)/OOTH}\right]$$

$$+ \underset{(-)}{0.0920651}\ \ln OOTH - \underset{(1.5)}{0.0001791}\ D80T - \underset{(0.6)}{0.06942857}$$

$\bar{R}^2 = 0.994$ SE = 0.003 DW = 2.2 1975 I - 1986 IV

Total employees in employment

(74) LE = LEG + LEMF + LOTH

Unemployment

Numbers registered, excluding school-leavers and adult students

$$(75)\ \Delta(LU + LSMU) = \underset{(5.4)}{0.5556869}\ \Delta(LU + LSMU)_{-1} + \underset{(1.4)}{0.1567547}\ \Delta POWA$$

$$- \underset{(9.4)}{0.828356}\ \Delta(LEMF - LSMM) + \underset{(3.0)}{0.3858206}\ \Delta(LEMF - LSMM)_{-1}$$

$$- \underset{(2.2)}{0.1065747}\ \Delta\ (LOTH + LSE + LEG - LSMO) - \underset{(5.3)}{0.1850671}\ NRST$$

$$+ \underset{(-)}{0.1028393}\ NRST_{-1}$$

$\bar{R}^2 = 0.928$ %SE = 0.699 DW = 2.0 1971 IV - 1988 II

Rate of unemployment

$$(76)\ \ UR = 100.\ \left(\frac{LU}{LE + LU + LSE + LWRT}\right)$$

AVERAGE EARNINGS

Average earnings: whole economy

CSO measure

(269) $\Delta \ln WS = \Delta \ln ETDE$

DOE measure

(273) $ETDE = (1/19.739837)(LEG.19.3241\ EGG + LEMF.21.8088\ EMAN + LOTH.18.9486\ EOTH)/LE$

Average earnings: self-employed

(358) $\Delta \ln WSE = \Delta \ln WS + \Delta \ln \left[\frac{PGDP}{ULC}\right]$

Average weekly earnings: manufacturing (NOPT(6)=0 See 7.6)

$$\begin{aligned}(607)\ \ln EMAN = {} & \underset{(14.8)}{0.7310348}\ \ln EMAN_{-1} + \underset{(3.9)}{0.09943354}\ \frac{1}{8}\sum_{i=2}^{9} \ln\left[\frac{MPRO}{LEMF}\right]_{-i} \\ & + \underset{(1.3)}{0.0002097999}\left[\frac{LE + LSE + LU}{LU}\right] \\ & + \underset{(3.5)}{0.3143238}\ \ln PC_{-1} \underset{(2.3)}{-0.1946732}\ \ln PC_{-2} + \underset{(2.5)}{0.07044415}\ \ln EGG_{-3} \\ & - \underset{(1.1)}{0.04866362}\ \ln\left[TXA + \left[\frac{TXB.TRYE}{100}\right]/19.739837\ ETDE\right]_{-1} \\ & - \underset{(9.6)}{0.06187844}\ D741 - \underset{(0.4)}{0.01296625}\ DMIP \\ & - \underset{(3.9)}{0.1288083}\ DMIP_{-1} - \underset{(4.3)}{0.9927595}\ \ln\left[\frac{DEYW + YECO + YECN + YECS}{DEYW}\right] \\ & + \underset{(-)}{0.9927595}\ \ln\left[\frac{DEYW + YECO + YECN + YECS}{DEYW}\right]_{-1} \\ & + \underset{(8.3)}{0.2489683}\ (\ln(PCE/100) - \ln PC) + \underset{(-)}{0.08377}\ \ln EOTH_{-1} + \underset{(3.1)}{0.4000442}\end{aligned}$$

Where: $TXA = 1 - \left[\frac{TRYE}{100} + \frac{YJCN}{DEYW}\right]$

$TXB = \left[\frac{100.TARR}{TRYE} + TPAL\right] / NCPA$

$DEYW = 19.739837\ ETDE.(LOTH + LEG + LEMF)/1000$

$TRYE = TRY\ (1 - (2/9)(1 - D73B))$

$\bar{R}^2 = 0.999$ SE = 0.006 DW = 1.8 1969 I - 1985 IV

Average earnings: Non-trading Public Sector (NOPT(6) = 0) See 7.6

$$(160)\ \ln EGG = \underset{(3.3)}{0.3352237}\ \ln EGG_{-1} + \underset{(1.8)}{0.2133864}\ \ln EGG_{-3}$$

$$+ \underset{(1.5)}{0.1850629}\ \ln EGG_{-4} + \underset{(3.1)}{0.04097038}\ DCLG + \underset{(1.5)}{0.03507758}\ DCTH$$

$$+ \sum_{i=1}^{8} \alpha_i \ln EMAN_{-i} + \sum_{i=0}^{2} \beta_i \left[\frac{LE + LSE + LU}{LU}\right]_{-i}$$

$$- \underset{(3.2)}{0.2604075}\ DGIP + \underset{(1.0)}{0.06733644}$$

Where: α_{1-8} = $\underset{(6.4)}{0.959619}$; 0; $\underset{(1.6)}{-0.4659658}$; $\underset{(1.5)}{-0.5342225}$; $\underset{(2.1)}{0.5739724}$; 0; 0; $\underset{(2.6)}{-0.2855974}$

β_{0-2} = $\underset{(0.1)}{-0.0002815901}$; $\underset{(0.7)}{-0.002272039}$; $\underset{(1.6)}{0.003008633}$

$\bar{R}^2 = 0.999$ SE = 0.020 DW = 1.7 1969 I - 1985 IV

Average earnings: 'other sector' (NOPT(6) = 0) See 7.6

$$(204)\ \ln EOTH = \underset{(-)}{0.46006}\ \ln EOTH_{-1} + \underset{(2.6)}{0.2914205}\ \ln EOTH_{-2} - \underset{(2.7)}{0.2594557}\ \ln EOTH_{-3}$$

$$+ \underset{(2.5)}{0.2505385}\ 1/8 \sum_{i=2}^{9} \ln\left[\frac{GDPO}{LE + LSE}\right]_{-i} + \underset{(5.2)}{0.9972711}\ \ln PC_{-1}$$

$$- \underset{(4.4)}{0.776462}\ \ln PC_{-2} + \underset{(3.9)}{0.5617645}\ \ln EMAN_{-1}$$

$$- \underset{(2.0)}{0.2745994}\ \ln EMAN_{-2} + \underset{(1.9)}{0.08287733}\ (\ln(PCE/100) - \ln PC)$$

$$- \underset{(1.9)}{0.761249}\ \ln\left[\frac{DEYW + YECO + YECN + YECS + TSET}{DEYW}\right]$$

$$+ \underset{(-)}{0.761249}\ \ln\left[\frac{DEYW + YECO + YECN + YECS + TSET}{DEYW}\right]_{-1} + \underset{(3.0)}{0.7354439}$$

$\bar{R}^2 = 0.999$ SE = 0.013 DW = 1.8 1969 I - 1985 IV

Where DEYW is the same as in the EMAN equation.

Employment costs per employee in manufacturing

$$(355)\ ECMM = \frac{(YWS + YEC + YECS)\ 2.9717.EMAN}{YWS}$$

Employment costs per unit of output, excluding North Sea Oil

$$(77)\ ULC = \frac{YWS + YEC + YECS + TSET}{GDPO - ONSO}$$

Real cost of capital

$$(451)\ RCCM = ((ECMM.LEMF)/HMFT)/(((1-PVIC)/(1-TRYC/100)))$$

$$.PIFO\ (((\sum_{i=0}^{3} (RCBR_{-i} + 2))/400.(1-TRYC/100) + (4.RCCX/KFX£)$$

$$- 1/8\ (PIFO/PIFO_{-4} - 1))$$

Alternative Earnings Equations (Using NOPT(6) = 1)

Constant Real Pre-Tax Earnings

$$(607)\ EMAN = EMAN_{-4} * (PC/PC_{-4})$$

$$(160)\ EGG = EGG_{-4} * (PC/PC_{-4})$$

$$(204)\ EOTH = EOTH_{-4} * (PC/PC_{-4})$$

Alternative Wage Equations (Using NOPT(6) = 2)

Constant Real Post Tax Wages

$$(607)\ EMAN = EMAN_{-4} * (PC/PC_{-4}) * (TX_{-4}/TX)$$

$$(160)\ EGG = EGG_{-4} * (PC/PC_{-4}) * (TX_{-4}/TX)$$

$$(204)\ EOTH = EOTH_{-4} * (PC/PC_{-4}) * (TX_{-4}/TX)$$

here

$$TX = (1.0 - ((TRY/100 + (YJCN/YWS)) - (1.0/WS)$$

$$* (((((100.0 * TARR)/TRY) + TPAL)/NCPA)*(TRY/100))))$$

SECTION 8

EXCHANGE RATES AND INTEREST RATES

EXCHANGE RATES

Exchange rate equation (NOPT(1)=1)

$$(3)\ \Delta \ln\left[\frac{EER.PPOX}{WPP}\right] = \underset{(2.7)}{0.451195}\ \Delta \ln\left[\frac{EER.PPOX}{WPP}\right]_{-1} + \underset{(2.0)}{0.954398}\ \Delta\left[\frac{BAL}{GDPN}\right]$$

$$+ \underset{(1.6)}{0.676103}\ \Delta\left[\left|\frac{\frac{RUKG}{100} - \left(PC/PC_{-4}\right)^{-1}}{\left(PC/PC_{-4}\right)}\right|\right.$$

$$\left. - \left|\frac{\frac{RUSG}{100} - \left(PCUS/PCUS_{-4}\right)^{-1}}{\left(PCUS/PCUS_{-4}\right)}\right|\right]_{-2}$$

$$- \underset{(1.5)}{0.00358954}\ \Delta CPBR - \underset{(4.1)}{0.585891}\ RER8_{-1} + \underset{(0.1)}{0.00034714}$$

Where:

$$RER8 = \ln\left[\frac{EER.PPOX}{WPP}\right] - \left[0.123174 + 1.07652\left[\frac{BAL}{GDPN}\right] - 0.00112176\ CPBR\right.$$

$$\left. + 0.635284\left[\left|\frac{\frac{RUKG}{100} - \left(PC/PC_{-4}\right)^{-1}}{\left(PC/PC_{-4}\right)}\right| - \left|\frac{\frac{RUSG}{100} - \left(PCUS/PCUS_{-4}\right)^{-1}}{\left(PCUS/PCUS_{-4}\right)}\right|\right]\right]$$

$R^2 = 0.474$ SE = 0.032 DW = 1.7 LM(4) = 2.7 1979 IV-1988 II

Accumulation of PSBR as a % of GDPN (from 1979 Q1)

(436) CPBR = $CPBR_{-1}$ + 100.PSBR/GDPN

£/$, index of quarterly average

(31) ERUK = (WER/(EER/0.9961355)

Effective rate excluding the dollar

(23) ERND = {[EER * ((100/ERUK)**(-0.2044))]

**(1/(1 - 0.2044))}/0.99819

Alternative exchange rate equation (NOPT(1)=0)

$$(3)\ \Delta \ln\left[\frac{EER.PPOX}{WPP}\right] = \underset{(1.3)}{0.219261}\ \Delta \ln\left[\frac{EER.PPOX}{WPP}\right]_{-1} + \underset{(1.2)}{1.24516}\ \Delta \ln\left[\frac{PPOX}{WPP/100}\right]_{-1}$$

$$+ \underset{(1.8)}{0.963738}\ \Delta \left[\frac{BAL}{GDPN}\right] - \underset{(1.6)}{0.246836}\ RER5_{-1} - \underset{(0.6)}{0.00475859}$$

Where:

$$RER5 = \ln\left[\frac{EER.PPOX}{WPP}\right] - \left[0.016395 + 2.00812\left[\frac{BAL}{GDPN}\right]\right.$$

$$\left. + 0.518305\left[\left[\frac{RUKG}{\left(\frac{PC/PC_{-4}}{PC/PC_{-4}}\right)} - 1\right]\right] - \left[\frac{RUSG}{100} - \left[\frac{\left(\frac{PCUS/PCUS_{-4}}{PCUS/PCUS_{-4}}\right)}{} - 1\right]\right]\right]$$

$R^2 = 0.274$ SE = 0.037 DW = 1.9 LM(4)=2.9 1979 III-1988 II

INTEREST RATES

Local authority three-month deposit rate

$$(234)\ RLA = \underset{(3.6)}{0.2847601}\ REU\$ + \underset{(7.0)}{0.6336016}\ RLA_{-1} + \underset{(2.0)}{9.674914}\ \Delta \ln ERUK_{-1}$$

$$+ \underset{(2.8)}{25.96145}\ (\ln GDP_{-1} - 1/9 \sum_{i=2}^{10} \ln GDP_{-i}) + \underset{(1.4)}{34.2805}\ \Delta^2 \ln PPOX_{-1}$$

$$+ \underset{(1.3)}{10.60268}\ \Delta^2 \ln KM3_{-1} + \underset{(2.3)}{23.81598} \left[0.4 \left(\frac{PSBR}{GDPN}\right) + 0.3 \left(\frac{PSBR}{GDPN}\right)_{-1}\right.$$

$$\left. + 0.2 \left(\frac{PSBR}{GDPN}\right)_{-2} + 0.1 \left(\frac{PSBR}{GDPN}\right)_{-3}\right] - \underset{(0.3)}{0.3642757}$$

$\bar{R}^2 = 0.821$ SEE = 1.382 DW = 1.74 1972 I - 1982 IV

Clearing banks' base rate

(140) RCBR = RLA

Yield on 20-year government stock

$$(311)\ \Delta RUKG = \underset{(5.6)}{0.3155152}\ \Delta RLA - \underset{(2.6)}{0.09259948}\ (RUKG - RLA)_{-1}$$

$$- \underset{(2.9)}{0.06743253} \left[\frac{100.(EER - EER_{-1})}{EER_{-1}}\right]$$

$\bar{R}^2 = 0.510$ %SE = 168.6 DW = 1.6 LM(4)=4.0 FCST(4)=1.1 1972 II-1987 II

Building societies' net share rate, quarterly average

$$(237)\ RZSN = \left[1 - \frac{TRY}{100}\right] * RZSG$$

Building societies' gross share rate, quarterly average

$$(236)\ \ln RZSG = \underset{(0.7)}{0.0080498} + \underset{(-)}{0.57767}\ \ln RZSG_{-1} + \underset{(5.0)}{0.42233}\ \ln RLA$$

$\bar{R}^2 = 0.819$ SE = 0.063 DW = 1.55 1980 I - 1987 II

Building societies' gross mortgage rate, quarterly average

$$(238)\ \ln RZMG = \underset{(2.7)}{0.0421146} + \underset{(-)}{0.60198}\ \ln RZMG_{-1} + \underset{(23.3)}{0.92485}\ \ln \left[RZSN/\left(1 - \frac{TCR}{100}\right)\right]$$

$$- 0.52683\ \ln \left[RZSN/\left(1 - \frac{TCR}{100}\right)\right]_{-1}$$

$\bar{R}^2 = 0.979$ SE = 0.018 DW = 1.74 1980 I - 1987 II

SECTION 9

PRICES

WORLD PRICES AND UK IMPORT PRICES

AVI for imports of food, drink and tobacco (SITC 0+1)

$$(92)\ \ln PMFD = \underset{(3.5)}{-0.7475388} + \underset{(12.8)}{0.6284098}\ \ln PMFD_{-1} + \underset{(3.5)}{0.1624099}\ \ln(WPFD.ERUK) + \underset{(3.9)}{0.1702812}\ \ln(WPP/EER)_{(3.9)}$$

$\bar{R}^2 = 0.991$ SE = 0.016 DW = 2.2 LM(4)=9.0 FCST(6)=5.9 1976 I - 1986 IV

AVI for imports of basics and miscellaneous (SITC 2+4+9)

$$(9)\ \ln PMBM = \underset{(2.3)}{-0.6712858} + \underset{(8.0)}{1.142764}\ \ln PMBM_{-1} - \underset{(2.7)}{0.3105055}\ \ln PMBM_{-2} + \underset{(3.1)}{0.3302665}\ \ln(WPIC.ERUK) - \underset{(1.5)}{0.1851493}\ \ln(WPIC.ERUK)_{-1} + \underset{(2.2)}{0.3484412}\ \ln(WPP/EER) - \underset{(1.9)}{0.3055036}\ \ln(WPP/EER)_{-1}$$

$\bar{R}^2 = 0.982$ SE = 0.027 DW = 2.3 LM(4)=10.9 FCST(6)=2.6 1976 II-1986 IV

AVI for imports of manufactures, inc erratics (SITC 5-8)

$$(186)\ \ln PMGM = \underset{(7.8)}{-3.510717} + \underset{(1.5)}{0.1581915}\ \ln PMGM_{-1} + \underset{(7.8)}{0.764371}\ \ln UMGM$$

$\bar{R}^2 = 0.992$ SE = 0.023 DW = 1.8 LM(4)=2.4 FCST(6)=3.6 1975 I - 1986 IV

UVI for imports of manufactures, including erratics, (SITC 5-8)

$$(189)\ \Delta \ln UMGM = \underset{(2.2)}{0.3344606} + \underset{(11.8)}{0.3985015}\ \Delta \ln(WPX/EER) + \underset{(3.9)}{0.1511967}\ \Delta \ln(WPX/EER)_{-1} + \underset{(2.9)}{0.317406}\ \Delta \ln PPOX - \underset{(2.2)}{0.07203683}\ \ln\left(\frac{UMGM}{WPX/EER}\right)_{-1}$$

$\bar{R}^2 = 0.805$ SE = 0.009 DW = 2.1 LM(4)=3.4 FCST(6)=4.8 1975 I - 1986 IV

AVI for total non-oil visible imports (SITC 0-9, less div 33)

$$(117)\ PMGN = \frac{(PMOF.MGOF + PMGM.MGMA + PMBM.MGBM + PMFD.MGFD)}{(MGOF + MGMA + MGBM + MGFD)}$$

AVI for imports of crude oil and oil products (SITC div 33)

(111) PMGO = PMO$.ERUK

Dollar equivalent of PMGO

(61) PMO$ = PFO$

AVI, imports of other fuels (SITC 3 less div 33)

(101) Δ lnPMOF = 0.5 Δ lnPMGO + 0.5 Δ ln(WPP/EER)

AVI for total visible imports (SITC 0-9)

(95) PMG = MG£/MG

AVI for imports of services

$$(96)\ \ln PMS = \underset{(5.6)}{0.3873727} \ln\left(\frac{WPC}{EER}\right) - \underset{(2.0)}{0.1857831} \ln\left(\frac{WPC}{EER}\right)_{-1}$$

$$+ \underset{(3.9)}{0.4233198}\ \ln PXS - \underset{(1.6)}{0.164797}\ \ln PXS_{-2}$$

$$+ \underset{(3.5)}{0.4886366}\ \ln PMS_{-1} - \underset{(0.9)}{0.004296084}$$

$\bar{R}^2 = 0.996$ SE = 0.018 DW = 2.1 LM(4)=6.5 FCST(4)=3.9 1975 I - 1986 IV

AVI for total imports of goods and services

(125) PM = M£/M

DOMESTIC PRICES

Taxes used in domestic price equations

Tax rate on consumption of other non-durables

$$(705)\ TCON=\frac{(0.494\ AVAT+0.014\ TAT+0.521\ TRES-0.596\ ESAB+0.72\ THCO+0.684\ TRAT)}{(CON-(0.494AVAT+0.014TAT+0.521TRES-0.596ESAB+0.72THCO+0.684TRAT))}$$

Where CON = CND.PCND-CAT.PAT-CF.PF

Tax rate on consumption of alcohol and tobacco

$$(703)\ TCAT=\frac{(0.135\ AVAT+0.972\ TAT+0.021\ TRES-0.02\ ESAB+0.034\ THCO+0.032\ TRAT)}{(CAT.PAT-(0.135\ AVAT+0.972\ TAT+0.021\ TRES-0.02\ ESAB+0.034\ THCO+0.032\ TRAT}$$

Tax rate on consumption of food

$$(704)\ TCF=\frac{(0.039\ AVAT+0.003\ TAT+0.062\ TRES-0.257\ ESAB+0.046\ THCO+0.043\ TRAT)}{(CF.PF-(0.039\ AVAT+0.003\ TAT+0.062\ TRES-0.257\ ESAB+0.046\ THCO+0.043\ TRAT}$$

Tax rate on durables

$$(702)\ TCD=\frac{(0.128\ AVAT+0.002\ TAT+0.113\ TRES-0.02\ ESAB+0.035\ THCO+0.033\ TRAT)}{(CD.PCD-(0.128\ AVAT+0.002\ TAT+0.113\ TRES-0.02\ ESAB+0.035\ THCO+0.033\ TRAT}$$

Tax rate on government consumption

$$(136)\ TPG=\frac{(0.111\ AVAT+0.004\ TAT+0.047\ TRES-0.056\ ESAB+0.068\ THCO+0.138\ TRAT)}{(G.PG-(0.111\ AVAT+0.004\ TAT+0.047\ TRES-0.056\ ESAB+0.068\ THCO+0.138\ TRAT)}$$

Tax rate on fixed investment

$$(157)\ TPIF=\frac{(0.093\ AVAT+0.005\ TAT+0.236\ TRES-0.051\ ESAB+0.097\ THCO+0.07\ TRAT)}{(IF.PIF-(0.093\ AVAT+0.005\ TAT+0.236\ TRES-0.051\ ESAB+0.097\ THCO+0.07\ TRAT}$$

Wholesale price of manufacturing output (excluding food, drink and tobacco)

$$\begin{aligned}(599)\ \Delta\ lnPPOX = {} & 0.674465\ \Delta\ lnPPOX_{-1} + 0.1251815\ \Delta\ ln(ECMM.LEMF/MPRO) \\ & \quad (12.7) \qquad\qquad\qquad\qquad\qquad (3.2) \\ & + 0.1096165\ \Delta\ [0.181\ lnPMBM + 0.585\ lnPMGM + 0.213\ lnPMGO \\ & \quad (7.9) \\ & + 0.021\ lnPMFD] + 0.2665863\ \Delta\ ln(1 + CUCI/100) \\ & \qquad\qquad\qquad\qquad\qquad\qquad (4.0) \\ & - 0.08675299\ RES2_{-1} + 0.0094334\ Q1 \\ & \quad (1.8) \qquad\qquad\qquad\qquad (6.4)\end{aligned}$$

Where:

$$\begin{aligned}RES2 = lnPPOX - \Big[& -2.152892 + 0.5062354\ ln(ECMM.LEMF/MPRO) \\ & + 0.3756394\ ln(((LOTH.EOTH.(YWS+YEC+YECS+TSET)/YWS)/OOTH)/31.145) \\ & + 0.1181252\ (0.181\ lnPMBM + 0.585\ lnPMGM + 0.213\ lnPMGO + 0.021\ lnPMFD) \\ & - 0.1534248\ ln\left[\frac{ECMM.LEMF/MPRO}{WLCL/EER}\right] + 0.8860117\ ln(1 + CUCI/100)\Big]\end{aligned}$$

$\bar{R}^2 = 0.911$ SE = 0.004 DW = 2.1 LM(4)=5.4 FCST(8)=40.9 1973 II-1985 IV

Consumer price deflators

Non-durables, total

(80) PCND = (PAT.CAT + PF.CF + PCON (CND - CF - CAT))/CND

Non-durables, excluding food, drink and tobacco

$$(708)\ \ln PCON = \underset{(7.9)}{0.3018882} + \underset{(4.9)}{0.5261626}\ \ln PCON_{-1} + \underset{(2.0)}{0.1669185}\ \ln PCON_{-2}$$

$$+ \underset{(6.3)}{0.4167519}\ \ln(PPOX.(1+TCON)) - \underset{(-)}{0.2857722}\ \ln(PPOX.(1+TCON))_{-1}$$

$$+ \underset{(7.1)}{0.1594629}\ \ln[(((((LOTH.EOTH.(YWS + YEC + YECS + TSET)/$$

$$YWS)/OOTH)/626.5725)/0.04971).(1 + TCON)] + \underset{(8.5)}{0.1785109}$$

$$\ln((CND - CAT - CF)/KDS)_{-1} + \underset{(5.0)}{0.01647635}\ \ln(PMGO.(1 + TCON))$$

$\bar{R}^2 = 0.999$ SE = 0.006 DW = 2.1 LM(4)=3.2 FCST(4)=2.6 1971 I-1986 IV

Drink and Tobacco

$$(693)\ \ln PAT = \underset{(3.9)}{-0.1093574} + \underset{(9.5)}{1.151636}\ \ln PAT_{-1} - \underset{(-)}{0.3012741}\ \ln PAT_{-2}$$

$$+ \underset{(2.4)}{0.06397165}\ \ln(PPOX\ (1+TCAT)) + \underset{(3.0)}{0.08566642}\ \ln(PPOX\ (1 + TCAT))_{-1}$$

$\bar{R}^2 = 0.999$ SE = 0.018 DW = 2.0 LM(4)=0.4 FCST(4)=0.5 1970 IV-1986 IV

Food

$$(313)\ \ln PF = \underset{(2.1)}{-0.00891675} + \underset{(6.5)}{0.8087599}\ \ln PF_{-1} - \underset{(3.2)}{0.3366451}\ \ln PF_{-2}$$

$$+ \underset{(4.8)}{0.3972173}\ \ln[PPOX\ (1 + TCF)] + \underset{(2.7)}{0.1495104}\ \ln[PMFD\ (1 + TCF)]$$

$$- \underset{(-)}{0.0188425}\ \ln[PMFD\ (1 + TCF)]_{-1} + 0.02484304\ (1 - D75A_{-8})$$

$\bar{R}^2 = 0.999$ SE = 0.011 DW = 2.1 LM(4) = 5.4 FCST(4)=1.2 1971 I-1986 IV

Durables

$$(81)\ \ln PCD = \underset{(2.5)}{0.05699191} + \underset{(9.4)}{1.126209}\ \ln PCD_{-1} - \underset{(2.2)}{0.2500092}\ \ln PCD_{-2}$$

$$+ \underset{(3.3)}{0.2631241}\ \ln[(0.5\ PPOX + 0.5\ PMGM)(1 + TCD)]$$

$$- \underset{(-)}{0.1393239}\ \ln[(0.5\ PPOX + 0.5\ PMGM)(1 + TCD)]_{-2}$$

$$- \underset{(2.5)}{0.000620722}\ TIME$$

$\bar{R}^2 = 0.998$ SE = 0.021 DW = 1.9 LM(4)=8.0 FCST(4)=5.7 1971 I-1986 IV

Total consumption

$$(82)\ PC = (CND.PCND + CD.PCD)/CONS$$

Retail price index (all items excluding mortgage interest)

$$(139)\ \Delta \ln RPIX = \Delta \ln PC - \underset{(4.9)}{0.004579539}\ Q1 + \underset{(15.3)}{0.01420464}\ Q2$$

$$- \underset{(7.5)}{0.00698132}\ Q3 - \underset{(-)}{0.002643781}\ Q4$$

$\bar{R}^2 = 0.918$ SE = 0.003 DW = 1.7 1982 I-1987 IV

Retail price index (all items)

$$(158)\ RPI = RPI_{-4}\ (0.958\ (RPIX/RPIX_{-4}) + 0.042\ (MORT/MORT_{-4}))$$

Where:

$$MORT = RZMG.\left[1 - \left(\frac{TRY}{100}\left(1 - \frac{2}{9}\left(1 - D73B\right)\right)\right)\right].(KHPT + KHPG).EXP(-13.64707$$

$$- 0.01752155\ D80T)$$

Deflator for public sector current expenditure on goods and services

$$(91)\ \ln PG = \underset{(3.7)}{-0.02068978} + \underset{(10.6)}{0.6726582}\ \ln PG_{-1} + \underset{(10.9)}{0.4894852}\ \ln WAGE$$

$$\underset{(4.8)}{-0.2881373}\ \ln WAGE_{-1} + \underset{(3.0)}{0.1775698}\ \ln OTHER - \underset{(2.4)}{0.1383583}\ \ln OTHER_{-1}$$

$$+ \underset{(2.5)}{0.1021195}\ \ln PPOX + \underset{(-)}{0.3273418}\ \ln\left(1 + \frac{1}{4}\sum_{i=0}^{3} TPG_{-i}\right)$$

Where: WAGE = ((EGG.LEG.(YWS+YEC+YECS)/YWS)/G)/31.313

OTHER = ((LOTH.EOTH.(YWS+YEC+YECS+TSET)/YWS)/OOTH)/31.1425

$\bar{R}^2 = 0.999$ SE = 0.008 DW = 2.3 LM(4)=3.4 FCST(4)=7.1 1971 I - 1986 IV

Deflators for fixed investment

Deflator for fixed investment other than residential

$$(675)\ \Delta \ln PIFO = \underset{(2.2)}{0.1809934}\ \Delta \ln(ECMM.LEMF/MPRO) + \underset{(5.4)}{0.7835665}\ \Delta \ln PPOX$$

$$+ \underset{(1.4)}{0.107932}\ \Delta \ln UMGM - \underset{(2.3)}{0.09179732}\ (\ln PIFO - (\ln PPOX +$$

$$+ \ln(1 + \tfrac{1}{4} \sum_{i=0}^{3} TPIF_{-i}))_{-1} - \underset{(3.7)}{0.01471125}\ Q1$$

$\bar{R}^2 = 0.557$ SE = 0.013 DW = 2.0 LM(4)=5.3 FCST(4)=2.0 1971 IV - 1986 IV

Price of Houses (mix adjusted)

$$(16)\ \Delta \ln PAHM = \underset{(2.8)}{15.3883}\ (\Delta \ln PAHM_{-1})^3 + \underset{(3.6)}{0.3258784}\ \Delta \ln PAHM_{-2}$$

$$+ \underset{(2.1)}{0.2673972}\ 1/3\ (2.\Delta \ln RPDI + \Delta \ln RPDI_{-2}) + \underset{(3.7)}{0.3298618}\ \ln\left(\frac{RPDI}{KOHS}\right)_{-1}$$

$$+ \underset{(6.6)}{0.1202981}\ \ln\left(\frac{KHBB + KZNA + KHPG + KHPV}{PAHM.KOHS}\right)_{-2} + \underset{(3.2)}{1.196309}\ \Delta \ln PC$$

$$+ \underset{(3.2)}{0.9289525}\ \Delta \ln\left(\frac{KHBB + KZNA + KHPG + KHPV}{PC}\right)$$

$$+ \underset{(3.3)}{0.03472409}\ \ln\left(\frac{KHBB + KZNA + KHPG + KHPV}{KOHS}\right)_{-4}$$

$$- \underset{(2.1)}{0.01434915}\ DBNK - \underset{(0.5)}{0.0016839}\ Q1 + \underset{(4.4)}{0.0146865}\ Q2 + \underset{(5.9)}{0.0193449}\ Q3$$

$$- \underset{(3.4)}{0.01005834}\ GIGH - \underset{(4.9)}{0.7736859}$$

Note: the effect of the seasonal dummies is that for the period for 1985Q1 onwards, and is 0.75 the size of the estimated effect prior to that.

$\bar{R}^2 = 0.800$ SE = 0.012 DW = 1.7 LM(4) = 5.7 FCST(4) = 4.2 1967 I - 1987 II

Private residential investment

$$(86)\ \ln PIHP = \underset{(0.9)}{0.007831294} + \underset{(15.9)}{0.7394356}\ \ln PIHP_{-1} + \underset{(7.0)}{0.1615955}\ \ln(PAHM.(1 + TPIF))_{-1}$$

$$+ \underset{(4.5)}{0.3846823}\ \ln(ULC.(1 + TPIF))_{-1} - \underset{(4.7)}{0.3473394}\ \ln(ULC.(1 + TPIF))_{-2}$$

$$+ \underset{(2.8)}{0.07351258}\ \ln(PMGM.(1 + TPIF))_{-4} + \underset{(4.2)}{0.05463012}\ D842$$

$\bar{R}^2 = 0.999$ SE = 0.013 DW = 2.0 LM(4)=9.3 FCST(4)=14.5 1971 II - 1986 IV

Total fixed investment

(90) PIF = IF£/IF

Deflator for public sector fixed investment

(676) Δ lnPIFG = Δ lnPIF

Public (Transfers of land and existing buildings)

(187) Δ lnPILG = Δ lnPIHP

Deflator for Private sector North Sea Fixed Investment

(13) Δ lnPINS = Δ lnPIFO

Deflator for stock levels

$$\Delta \ln PS = \underset{(9.6)}{0.9748975}\ \Delta \ln PPOX + \underset{(2.9)}{0.1047564}\ \Delta \ln PMG - \underset{(2.8)}{0.2019674}\ (\ln PS - \ln PPOX)_{-1} - \underset{(2.2)}{0.008635717}$$

$\bar{R}^2 = 0.756$ SE = 0.007 DW = 1.6 LM(4)=5.6 FCST(4)=1.8 1976 I-1986 IV

Deflator for total final expenditure

(123) PEF = EF£/EF

Deflator for gross domestic product

(126) PGDP = GDP£/GDPE

Inflation Rate Expectations

(183) $\ln(PCE/100) = C + \alpha_1 P3 + \alpha_2 P2 + \alpha_3 P1 + \alpha_4 \ln PC$

Where:

$P1 = C + \alpha_1 \ln PC + \alpha_2 \ln PC_{-1} + \alpha_3 \ln PC_{-2} + \alpha_4 \ln PC_{-3}$

$P2 = C + \alpha_1 P1 + \alpha_2 \ln PC + \alpha_3 \ln PC_{-1} + \alpha_4 \ln PC_{-2}$

$P3 = C + \alpha_1 P2 + \alpha_2 P1 + \alpha_3 \ln PC + \alpha_4 \ln PC_{-1}$

$C = \underset{(1.7)}{0.01126535}$ $\alpha_{1-4} = \underset{(14.0)}{1.671782};\ \underset{(2.6)}{-0.5940006};\ \underset{(0.0)}{-0.006684532};\ \underset{(0.6)}{-0.072982}$

$\bar{R}^2 = 0.999$ SE = 0.009 DW = 2.0 LM(4)=0.7 FCST(4)=3.7 1968 II-1986 IV

EXPORT PRICES

AVI for exports of non-fuel, non-manufacturing (SITC 0-2+4+9)

$$(459)\ \Delta \ln PXNM = \underset{(1.0)}{0.005021859} + \underset{(1.1)}{0.2550631}\ \Delta \ln PPOX + \underset{(4.1)}{0.304768}\Delta \ln(PMFD^{0.71}.PMBM^{0.29}) - \underset{(2.3)}{0.1002487} \ln\left[\frac{PXNM}{PMFD^{0.71}.PMBM^{0.29}}\right]_{-1}$$

SE = 0.017 $\bar{R}^2$ = 0.466 DW = 2.5 LM(4)=5.5 FCST(6)=7.1 1971 I - 1986 IV

AVI for exports of manufactures, inc erratics (SITC 5-8)

$$(363)\ \ln PXGM = \underset{(62.1)}{-4.300681} + \underset{(56.9)}{0.9325892}\ \ln UXGM + \underset{(13.2)}{0.87687}u_{-1}$$

$\bar{R}^2$ = 0.991 SE = 0.007 DW = 1.8 LM(4)=1.6 FCST(6)=21.4 1975 I-1986 IV

UVI for exports of manufactures, inc erratics (SITC, 5-8)

$$(282)\ \Delta \ln UXGM = \underset{(5.2)}{1.322563} + \underset{(4.5)}{0.5305146}\ \Delta \ln PPOX + \underset{(6.0)}{0.1003846}\left[\ln\left[\frac{WPX^{0.675}.WPP^{0.325}}{EER}\right] - \ln PPOX_{-1}\right] + \underset{(5.1)}{0.286487}\ (\ln PPOX - \ln UXGM)_{-1}$$

$\bar{R}^2$ = 0.736 SE = 0.008 DW = 2.4 LM(4)=4.6 FCST(6)=2.8 1975 I-1986 IV

AVI for total non-oil visible exports (SITC 0 - 9, less div, 33)

$$(58)\ PXGN = \frac{(PXOF.XGOF + PXGM.XGMA + PXNM.XGNM)}{(XGOF + XGMA + XGNM)}$$

AVI for exports of crude oil and oil products (SITC div 33)

(315) PXGO = PXO$.ERUK

Dollar equivalent of PXGO

(57) PXO$ = PFO$

AVI for exports of other fuels (SITC 3 less div 33)

(314) Δ lnPXOF = 0.5 Δ lnPXGO + 0.5 Δ lnPPOX

AVI for total visible exports (SITC 0-9)

(99) PXG = XG£/XG

AVI for exports of services

(100) ln PXS = 0.2234932 lnPC + 0.3871352 lnPMS
(3.5) (5.0)

- 0.2380316 $\ln PMS_{-1}$ + 0.6274032 $\ln PXS_{-1}$ - 0.003618169
(-) (7.7) (0.8)

$\bar{R}^2$ = 0.998 SE = 0.014 DW = 1.9 LM(4)=3.9 FCST(4)=9.4 1975 I-1986 IV

AVI for total exports of goods and services

(124) PX = X£/X

EXTERNAL COMPETITIVENESS

Relative unit labour costs

(670) RULC = [(ECMM.LEMF/MPRO)/(WLCL/EER)]/1.0152688

Effective Export Competitiveness

$$(671)\ XCME = Exp\left[\sum_{i=0}^{12}\left(\alpha_i\ \ln RULC\right)/-0.391704\right]$$

Where:

α_{0-12} = - 0.05224; - 0.09088; - 0.06720; - 0.04969; - 0.03674; - 0.02717;

- 0.02009; - 0.01486; - 0.01098; - 0.008123; - 0.006006; - 0.004441;

- 0.003284;

$\Sigma\alpha_i$ = - 0.391704;

Effective Import Competitiveness

$$(417)\ MCME = Exp\left[\sum_{i=1}^{12}\alpha_i\ \ln\left(\frac{ECMM.LEMF/MPRO}{WLCL/EER}\right)_{-i}\ /\ -0.39426\right]$$

Where:

α_{1-12} = -0.02087; -0.03627; -0.04763; -0.05800; -0.04624; -0.03865

-0.03404; -0.02952; -0.02546; -0.02203; -0.01906; -0.01649;

Σ_{α_i} = -0.39426

SECTION 10

PERSONAL SECTOR INCOME AND EXPENDITURE

MISCELLANEOUS VARIABLES IN THE DETERMINATION OF INCOME

Rate of unemployment benefit

(611) $RUB = (1- Q2)RUB_{-1} + Q2.RUB_{-1} (RPI_{-2}/RPI_{-6} + 2.RPI_{-3}/RPI_{-7})/3$

Ratio of rate of other current grants to initial estimate

(303) $RJGO = (1-Q2)\ RJGO_{-1} + Q2.RJGO_{-1} (RPI_{-2}/RPI_{-6} + 2.RPI_{-3}/RPI_{-7})/$

$(RPIA_{-2}/RPIA_{-6} + 2.RPIA_{-3}/RPIA_{-7})$

INCOME/RECEIPTS (PRE-TAX)

Total income from wages and salaries

(145) $YWS = WS.LE/1000$

Self-employed

(135) $YSE = LSE.WSE$

Dividends and gross interest receipts, other than from building societies (households)

(142) $YHOO = 0.365\ (0.8755\ EIDV + ACTC) + 0.14\ EDBT + 0.777\ ((RCBR - 7.35)/400)\ *$

$(1/2 \sum_{i=0}^{1} (GLAJ - KZJ))_{-i} - 0.541\ ((RCBR + 7)/400)\ *$

$(1/2 \sum_{i=0}^{1} (KBMS - KHBB))_{-i}$

Payments of interest to building societies on mortgage lending

(174) $LZMI = [RZMG\ (KZNA + KZNA_{-1}) + (RZMG + 4)\ (KZNU + KZNU_{-1})]/800$

Gross interest payments (households)

$$(446)\ EIP = 0.459\ ((RCBR + 7)/400)\ 1/2 \sum_{i=0}^{1} (KBMS - KHBB)_{-i}$$

$$+ LZMI + (RZMG/400)\ 1/2 \sum_{i=0}^{1} (KHBB + KHPV + KHPG)_{-i}$$

$$+ 0.4\ ((RCBR + 14.7)/400)\ 1/2 \sum_{i=0}^{1} KRTC_{-i}$$

Life assurance and pension funds receipts of rent, dividends and interest

$$(539)\ YVO = 0.04\ YODI + 0.3\ YOPO + 0.635\ (0.8755\ EIDV + ACTC)$$

$$+ 0.16\ EDBT + \frac{RZMG}{400}\ (1/2 \sum_{i=0}^{1} KHPV_{-i})$$

$$+ 0.1304\ YVO_{-1} \left[\frac{YRJ}{YRJ}\right]_{-1} + \frac{RLA}{400}\ (1/2 \sum_{i=0}^{1} KZSV_{-i})$$

Persons' receipts of interest on shares and deposits

$$(122)\ LZSI = 0.97\ (RZSN/400)(0.5 \sum_{i=0}^{1} KZJ_{-i})$$

Dividends and net interest (Personal sector)

$$(146)\ YDIJ = YHOO - EIP + YVO + LZSI/(1 - \frac{TCR}{100})$$

Total rent

$$(147)\ YRJ = 0.6561\ YR$$

"Other" income (Personal sector)

$$(148)\ YJO = YRJ + YSE + YDIJ$$

Employers' contributions; other than national insurance

$$(150)\ \Delta\ lnYECO = \underset{(1.4)}{-0.1337806} + \underset{(4.2)}{1.157329}\ \Delta\ lnYWS - \underset{(4.3)}{3.131846}\ \Delta\ lnLE$$

$$- \underset{(2.4)}{0.0809938}\ ln(YECO/YWS)_{-1}$$

$$- \underset{(3.1)}{0.01163671}\ ln\left[MAX\ \left[1,\ (LVJ - YECO)_{-1}\right]\right]$$

$\bar{R}^2 = 0.591$ SE = 0.020 DW = 1.8 LM(4)=11.6 FCST(4)=3.2 1975 III-1986 IV

Total employers' contributions (LAPFs and national insurance)

(149) YEC = YECN + YECO

Income from wages, salaries and private pension schemes

(432) YJTW = YWS + YECO - LVJ + YVO - TYV - 0.6016 WS + 0.0004 YWS

Income from public sector current grants

(319) YJG = RJGO.YJGA + 0.013 RUB (LU - LUA)

Total pre-tax income

(155) YJ = YWS + YEC + YJG + YJO

INCOME TAX RATES, ALLOWANCES AND COVERAGE

Average higher rate

$$(657)\ TRYU = (1-Q2)\ TRYU_{-1} + Q2.TRYU_{-1}\left[(RPI_{-1}/RPI_{-5} + 2.RPI_{-2}/RPI_{-6})/3\right]^{-1.75}$$

Average rate of personal allowance

$$(54)\ RPAL = (1-Q2)\ RPAL_{-1} + Q2.RPAL_{-1}(RPI_{-1}/RPI_{-5} + 2.RPI_{-2}/RPI_{-6})/3$$

Total number claiming personal allowances

$$(50)\ \Delta_4\ lnNCPA = \Delta_4\ ln(LE + LSE)$$

Aggregate value of allowances

(442) TPAL = NCPA.RPAL

Implicit average tax rate on household income excluding current grants

(430) RHT = 100 (TYJ - TGG - TYV)/YJT

PROXIES FOR TAXABLE INCOMES AND RELATED ITEMS

Self-employment income on which tax payable in current quarter

$$(433)\ YSEL = \sum_{i=5}^{9} \alpha_i\ (YSE - 0.1\ (IFP£ - IHP£ - ICHJ.PILG))_{-i}$$

α_{5-9} = 0.05; 0.20; 0.50; 0.20; 0.05

Receipts of dividends and gross interest (not taxed at source) on which tax payable in current quarter

$$(437)\ YHOL = \sum_{i=5}^{9} \alpha_i\ (YHOO - 0.365\ (0.8755\ EIDV + ACTC))_{-i}$$

α_{5-9} = 0.05; 0.20; 0.50; 0.20; 0.05

Total taxable income

(304) $YJT = YJTW + 0.85\ YSEL + YHOL + LZSI/(1 - TCR/100) + 0.8549\ EIDV + ACTC - FRAM \left[LZMI + \frac{RZMG}{400}(KHBB + KHPG + KHPV)\right]$

INCOME TAX PAYMENTS

Tax on current grants excluding unemployment benefit

(290) $TGG = TGR.YJG/100$

Proxy for payments of surtax and higher rate tax

(441) $TYJU = \frac{TRYU}{100}.\frac{1.03}{1.75}((LE + LSE).0.001).[(YJT - TPAL)/((LE + LSE).0.001)]^{2.75}$

Total payments of income tax

(169) $TYJ = TGG + TYV + (LZSI/(1 - TCR/100))\ (TCR/100) + TYJU + TYJI + TYJC - TARR + 0.365\ ACTC$

Where $TYJC = \left[0.85\ YSEL + YHOL - TPAL - FRAM\ (LZMI + \frac{RZMG}{400}(KHBB + KHPG + KHPV))\right].\frac{TRY}{100} + \exp[0.9974\ \ln(YJTW.TRY/100)]$

NATIONAL INSURANCE RATES OF CONTRIBUTION AND RELATED ITEMS

Lower earnings limit

(292) $NLEL = (1 - Q2)\ NLEL_{-1} + Q2.NLEL_{-1}\ (RPI_{-4}/RPI_{-8})$

Upper earnings limit

(305) $NUEL = (1 - Q2)\ NUEL_{-1} + Q2.NUEL_{-1}\ (RPI_{-4}/RPI_{-8})$

Flat rate: self employed

(301) $NFLT = (1 - Q2)\ NFLT_{-1} + Q2.NFLT_{-1}\ (RPI_{-4}/RPI_{-8})$

Lower earnings limit; self employed

(308) $NLES = (1 - Q2)\ NLES_{-1} + Q2.NLES_{-1}\ (RPI_{-4}/RPI_{-8})$

Gross employers' contributions

(250) GNEC = NCRE.(1-PRUE).YWS + ((D853.LNUE.NURE.13.NUEL)/1000)
+ (1 - D853).NURE.PRUE.YWS

Gross employees' contributions

(263) GNJC = NCRJ.(1-PRUE).YWS + ((LNUE.NURJ.13.NUEL)/1000)

Employers' contracted out rebate

(271) NRCE = NECR.NECO [(1-LNUE/LE).((YWS.(1 - PRUE)
/(LE - LNUE)) - 13.NLEL/1000) + (LNUE/LE).13.(NUEL-NLEL)/1000]

Employees' contracted out rebate

(275) NRCJ = NJCR.NECO [(1-LNUE/LE).((YWS (1 - PRUE)
/(LE - LNUE)) - 13.NLEL/1000) + (LNUE/LE).13.(NUEL-NLEL)/1000]

Self employed contributions

(270) NPSE = 0.6 (13.NFLT.LSE/1000) + 0.3 [NRSE(YSE (1-PRUE)
- (13.NLES.LSE/1000))]$_{-4}$

Total NI Contributions: employers

(151) YECN = YECN$_{-4}$ + (GNEC - GNEC$_{-4}$) - 1.490761 (NRCE - NRCE$_{-4}$)
(21.9)

$\bar{R}^2$ = 0.921 %SE = -0.591 DW = 0.4 LM(4)=48.6 FCST(4)=0.6 1977 I-1986 IV

Total NI Contributions: employees and self-employed

(351) YJCN = YJCN$_{-4}$ + (GNJC-GNJC$_{-4}$) - 1.423871 (NRCJ-NRCJ$_{-4}$) + (NPSE-NPSE$_{-4}$)
(18.2)

$\bar{R}^2$ = 0.854 %SE = -0.401 DW = 1.1 LM(4)=9.3 FCST(4)=2.0 1977 I-1986 IV

Total NI contributions

(243) ENIH = YECN + YJCN

PERSONAL SECTOR DISPOSABLE INCOME, SAVING, WEALTH AND ACQUISITION OF FINANCIAL ASSETS

Personal disposable income

(170) YD = YJ - EJTA - TYJ - ENIH

Saving

(172) SJ = YD - C£

Saving ratio

(260) SR = 100.SJ/YD

Real personal disposable income

(293) RPDI = YD/PC

Net receipts of life assurance and pension funds from the household sector

(494) LVJ = YECO + YVO - TYV + 0.1072 YWS - 3.6632 WS

Real household disposable income adjusted for inflationary losses on net liquid assets

$$(590)\ YDLH = \frac{1}{PC}\left(YD - LVJ - NLAJ_{-1}\left(1/8 \sum_{i=0}^{7} \frac{PC - PC_{-1}}{PC_{-1}}_{-i}\right)\right)$$

Net acquisition of financial assets

(227) FJ = SJ + FTKJ - (IFJ£ + IIJ£ + YSAJ)

Household gross income gearing (%)

(22) GIGH = (100.EIP)/(YD - LVJ - 0.5683WS)

Owner occupied housing stock (thousands)

(223) KOHS = 0.99469 $KOHS_{-1}$ + 0.0142974 IHP + 0.0761861 ICHJ + 71.76156

Value of owner occupied housing stock (£ million)

(212) VOHS = 35.416394 PAHM.KOHS

Net liquid assets stock

(318) NLAJ = GLAJ - (KBMS - KHBB)

Gross liquid assets stock

$$(193)\ \Delta \ln(GLAJ/PC) = \underset{(4.3)}{-0.1289658} \underset{(12.1)}{- 0.8147597}\ \Delta \ln PC + \underset{(3.3)}{0.1831415} \left[\ln\left[1 + \frac{ORR}{100}\right] - \ln\left[1 + \frac{RUKG}{100}\right]\right]_{-1} - \underset{(5.6)}{0.09258848} \ln\left[\left[\frac{GLAJ}{PC}\right] / \left[\frac{NWJ - VOHS}{PC} + \frac{VOHS}{PAHM}\right]\right]_{-1}$$

Where:

$$ORR = \left[(0.777\ (RCBR - 7.35) . \left[1 - \frac{TRY}{100}\right]\right] . \left[\frac{GLAJ - KZJ}{GLAJ}\right] + (RZSN.KZJ/GLAJ)$$

$\bar{R}^2 = 0.870$ SE = 0.005 DW = 1.6 LM(4)=6.7 FCST(4)=10.6 1975 I-1986 IV

Tangible wealth

$$(210)\ (TWJ - VOHS - KCD£ - KIIJ) = \underset{(91.6)}{0.9852147}\ (TWJ - VOHS - KCD£ - KIIJ)_{-1} (PILG/PILG_{-1}) + \underset{(0.8)}{605.3099}$$

$\bar{R}^2 = 0.994$ %SE = 0.026 DW = 0.8 LM(4)=20.0 FCST(4)=4.0 1975 I-1986 IV

Net financial wealth

$$(328)\ NFWJ = NFWJ_{-1} - LHBB - LHPG - LHPV - LZNA + \Delta NLAJ - \Delta KRTC + NCJ + LGJ + BLGJ - (CPII + IPCB + CPIV + IPV + IPBB + IP\$B + IP£B + IPI + IPO + IPG) + LVJ + AAJ + ((NFWJ - NLAJ + KHBB + KHPG + KZNA + KHPV + KRTC - 0.72\ KM0)_{-1} * 0.6\ ((SPUK - SPUK_{-1})/SPUK_{-1}))$$

Total net wealth

$$(279)\ NWJ = NFWJ + TWJ$$

SECTION 11

COMPANY SECTOR INCOME AND EXPENDITURE

INDUSTRIAL AND COMMERCIAL COMPANIES APPROPRIATION ACCOUNT

Gross trading profits

(19) YITP = GDP£ + YSA - YWS - YEC - YGTA - YR - YSE - RESE - GTPF

Receipts of rent

(25) YRI = 0.0937 YR

Non-trading income

(26) NTRI = 0.00235 (RCBR - 1.0)(KLI + KLI_{-1})/2.0

+ (RLA/400)((KZI + KZI_{-1})/2.0)

Income from abroad

(39) YIAB = 0.92 YODI + 0.23 YOPO

Proxy for Non-North Sea ICCs' taxable profits

(161) YIT = (YITP - NGTP + YRI + NTRI + YIAB) - (EIOI - ANRP - INSB)

- 0.8 (1 - DCAP)(IFI£ - INS£) - (1 - $D821_{-9}$)((PS - PS_{-4})

/PS_{-4})*($KIX£_{-4}$)/4.0) - .65 $\sum_{i=0}^{3}$ ($DCAP_{-(i*4)}$ $\alpha_{(i*4)}$ $(IFI£ - INS£)_{-(i*4)}$)

α_i = 0.25; 0.1875; 0.1406; 0.1055;

Payments of income tax or mainstream corporation tax (Non-North Sea)

$$(185)\ TYIM = 0.25\ ((0.8 \sum_{i=2}^{5} YI_{-i} + 0.2 \sum_{i=6}^{9} YI_{-i})\ Q2$$

$$+ (0.8 \sum_{i=3}^{6} YI_{-i} + 0.2 \sum_{i=7}^{10} YI_{-i})\ Q3$$

$$+ (0.8 \sum_{i=4}^{7} YI_{-i} + 0.2 \sum_{i=8}^{11} YI_{-i})\ Q4$$

$$+ (0.8 \sum_{i=5}^{8} YI_{-i} + 0.2 \sum_{i=9}^{12} YI_{-i})\ Q1) + TIMA$$

Where: YI = ((0.3/0.52) TRYC/100) * (YIT - YITA)

Payments of Advance Corporation Tax

(266) AITP = 0.8 ACTP

Total direct tax payments (All ICCS)

(168) TYI = TYIM + AITP + TPR + TCNS

Payments of dividends on ordinary shares

(66) EIDV = GDIV (1.0 - ((TRY/100)D73B))

Gross payments of dividends on ordinary shares

$$(71)\ \ln GDIV = \sum_{i=1}^{4} \alpha_i \ln GDIV_{-i} + \underset{(-)}{0.2993953} \ln(YITP - YSAI + YRI + NTRI + YIAB$$

$$- EIAB - EIOI - TYI + (D73B\ ((TRY/100)/(1 - (TRY/100)))$$

$$.EIDV)) - \underset{(1.8)}{0.3532509}$$

Where:

$$\alpha_{1-4} = \underset{(2.5)}{0.2771519};\ \ 0;\ \ \underset{(1.4)}{0.1431593};\ \ \underset{(2.8)}{0.2802935}$$

$\bar{R}^2 = 0.897$ SE = 0.124 DW = 1.9 LM(4) = 5.3 FCST(4) = 6.9 1980 I-1986 IV

'Other' interest payments

$$(83)\ \Delta(EIOI - YGDI - ANRP) = \underset{(3.8)}{0.001062479}\ \Delta(((KBLI + KBLI_{-1})/2.0)(RCBR + 2.3)) + \underset{(4.5)}{45.66146}\ \Delta(RCBR + 2.3)$$

$\bar{R}^2 = 0.648$ %SE = 1.745 DW = 2.0 LM(4)=3.6 FCST(4)=14.6 1975 IV - 1986 IV

Profits due abroad

(97) EIAB = EIBO + YIOL

Non-oil profits due abroad

$$(156)\ lnEIBO = \underset{(4.8)}{0.3440245}\ ln(YITP - NGTP - YSAI + YIAB + YRI + NTRI) + \underset{(4.5)}{0.4856055}\ lnEIBO_{-1}$$

$\bar{R}^2 = 0.735$ SE = 0.398 DW = 2.2 LM(4)=6.4 FCST(4)=0.9 1971 I-1986 IV

Net capital transfers

(306) FTKI = - (FTKG + FTKO + FTKJ + FTKF)

ICCS SAVING AND ACQUISITION OF FINANCIAL ASSETS

Saving

(267) SCI = YITP + YRI + NTRI + YIAB - EIDV - EIOI - EIAB - TYI

Net acquisition of financial assets

(737) FFI = SCI + FTKI - (IFI£ + III£ + YSAI)

Proxy for net income gearing of non-North Sea ICCs

(555) NIGX = (EIOI - ANRP - INSB - NTRI)/[YITP - NGTP - YSAI + YRI + YIAB - EIAB + YIOL - TYI + TPR + TCNS + FTKI]

Non-North Sea ICCs' net capital stock at replacement cost

$$(538)\ (KFX£ - IFI£ + INS£)/1000 = \underset{(367.5)}{0.9897668}\ (PIFO/PIFO_{-1}).(KFX£/1000)_{-1}$$

$\bar{R}^2 = 0.998$ %SE = 0.025 DW = 1.7 LM(4)=7.9 FCST(4)=6.2 1971 I-1986 IV

Non-North Sea ICCs' level of stocks at current prices

(548) $KIX£ = III£ + YSAI + KIX£_{-1}$

Non-North Sea ICCs capital consumption at replacement cost

(536) $RCCX = \underset{(65.4)}{0.01739261}\ (PIFO/PIFO_{-1}).KFX£_{-1} - \underset{(7.5)}{343.2831}$

$\bar{R}^2 = 0.987$ %SE = 0.057 DW = 0.3 LM(4)=38.9 FCST(4)=1.6 1973 I-1986 IV

Non-North Sea ICCs pre-tax real rate of return

(481) $PRRX = ((YITP - NGTP - YSAI + YRI - RCCX)\ 400)/$

$((KFX£ + KFX£_{-1} + KIX£ + KIX£_{-1})/2.0)$

FINANCIAL COMPANIES' INCOME AND APPROPRIATION ACCOUNT

Gross trading profits

(769) $GTPF = -1176 \left[18.9486\ \frac{EOTH}{1520}\right]$

Rent and Non-Trading Income

(771) $NTIF = EIOI + EIF + EIDV - YRI - NTRI - YIAB - YFAB + EIAB + EFAB$

$+ ACTC - YGRA + EDBT - YDIJ + BIPD + YR - YRJ$

Income from abroad

(391) $YFAB = 0.04\ YODI + 0.3\ YOPO + 0.1266935\ YOBA$

Proxy for taxable profits

(400) $YFT = (GTPF + NTIF + YFAB) - EIF - 0.8\ (1 - DCAP)\ IFF£$

$$- 0.54 \sum_{i=0}^{3} [DCAP_{-(i*4)}\ \alpha_{(i*4)}\ IFF£_{-(i*4)}]$$

$\alpha_i = 0.25;\ 0.1875;\ 0.1406;\ 0.1055$

Payments of income tax and mainstream corporation tax

$$(406)\ TYFM = 0.25\ ((0.8\ (\sum_{i=2}^{5} YF_{-i}) + 0.2\ (\sum_{i=6}^{9} YF_{-i}))\ Q2$$

$$+ (0.8\ (\sum_{i=3}^{6} YF_{-i}) + 0.2\ (\sum_{i=7}^{10} YF_{-i}))\ Q3$$

$$+ (0.8\ (\sum_{i=4}^{7} YF_{-i}) + 0.2\ (\sum_{i=8}^{11} YF_{-i}))\ Q4$$

$$+ (0.8\ (\sum_{i=5}^{8} YF_{-i}) + 0.2\ (\sum_{i=9}^{12} YF_{-i}))\ Q1) + TFMA$$

Where:

YF = ((0.1/0.52)(TRYC/100)) (YFT - YFTA)

Payments of advanced corporation tax

(408) AFTP = ACTP - AITP

Direct Tax Payments

(420) TYF = TYFM + AFTP

Dividend and Interest Payments

$$(392)\ EIF = 0.035\ (GTPF + NTIF + YFAB) + 0.63\ ((RCBR - 2.0)/400) * ((KDBJ + KDBJ_{-1})/2.0) + 0.74\ ((RCBR - 1.0)/400) * ((K£BO + K£BO_{-1})/2.0) + 0.73\ ((RCBR - 0.7)/400) * ((KBI + KBI_{-1})/2.0) + 1.108\ LZSI/(1 - \frac{TCR}{100}) - 43.07 + \frac{RLA}{400}\ (1/2 \sum_{i=0}^{1} (KZI + KZB + KZSV)_{-i})$$

Profits due abroad

(397) EFAB = 0.1 (GTPF + NTIF + YFAB - EIF - TYF)

SAVING AND ACQUISITION OF FINANCIAL ASSETS

Saving

(421) SCF = GTPF + NTIF + YFAB - EIF - EFAB - TYF

Net Acquisition of Financial Assets

(424) FFV = SCF + FTKF - (IFF£ + IIF£) - FFB

TOTAL COMPANY SECTOR

Payments of Advanced Corporation Tax

$$(200)\ ACTP = \underset{(34.6)}{0.98963}\ (D73B.\left[\frac{TRY/100}{1-TRY/100}\right].1.03\ EIDV)_{-1} + \underset{(2.6)}{0.32473}\ u_{-1}$$

$\bar{R}^2 = 0.973$ SE = 38.4 1963 III - 1981 IV

Net acquisition of financial assets

(228) FC = FFI + FFV + FFB

SECTION 12

PUBLIC SECTOR INCOME AND EXPENDITURE, EXPENDITURE TAXES, OIL AND OIL TAXES

PUBLIC SECTOR INCOME AND EXPENDITURE

Public corporations gross trading surplus

(190) $YGTA = YSAG + 0.108\ (YITP - YSAI - NGTP)$

Income from rent, dividends and interest

(192) $YGRA = 0.2374\ YR + 0.0025.RUKG\ (KLNG + KLNG_{-1})/2$

$+ ANRP + YGDI + 0.065\ EIDV + 0.17\ YOPO$

$+ ((RCBR-0.25)/400)(KBID+KBID_{-1})/2$

Advance corporation tax credited to the personal sector

(133) $ACTC = 0.8755 \left[D73B.\left[\frac{TRY/100}{1 - TRY/100}\right].EIDV\right]$

Total current receipts

(196) $YGC = YGTA + YGRA + TYJ + TYI + TYF - ACTC + TE + ENIH$

Current expenditure on goods and services

(115) $G£ = G.PG$

Debt interest payments

(197) $\Delta EDBT = 0.12\ EDBT_{-1} \left[\frac{\Delta RLA}{RLA_{-1}}\right] + \frac{RUKG_{-2}}{400}\ (BLGJ + BLGI$

$+ BGSO + BLGV)_{-2} + \frac{RLA}{400}\ (BSGJ + BSGI + BSGV - IDCG + XOGO)$

Total current expenditure

(199) $EGC = G£ + ESAB + YJG + EGTA + EDBT$

Saving

(208) $SG = YGC - EGC$

Net acquisition of financial assets

(230) $FG = SG + FTKG - (IFG£ + IIG£ + YSAG)$

Public expenditure planning total proxy

(683) $EGPT = G£ + ESAB + YJG + EGTA + PIFG\ (ING - IPC + 0.9045\ IHG - ILBP)$

$- LGJ - LGV - LGI - LGO + LHPG + IPG + ADJP$

TAXES ON EXPENDITURE

Value added tax and purchase tax (excluding that on cars) - accruals

$$(78)\quad \left[\ln\left[\frac{AVAT - A}{PV - (AVAT - A)}\right]^{/(VATS/100)}\right] = \underset{(191.4)}{-\ 1.263105} + 0.5 \ln \left[\left[\frac{AVAT - A}{PV - (AVAT - A)}\right]^{/(VATS/100)}\right]_{-1} - 0.5 \ln (1 + (VATS/100)) + 0.1 \ln V$$

Where: $A = 0.6 \,.\, R \,.\, (G£ - 0.001\ ((YWS + YEC + YECS)/YWS) \,.\, 19.3241\ EGG \,.\, LEG)$

$+ 0.88.R.(CD.PCD) + R.(CAT.PAT) + (0.15 + 0.067\ D821_{-9})R.(CF.PF)$

$+ 0.36.R.IHP£.D821_{-10} + 0.16.R.IF£$

$P = (C£ - (CD.PCD) - (CAT.PAT) - 0.7975\ YRJ - (CF.PF))/V$

$V = CONS - CD - CAT - (0.7975\ YRJ/PC) - CF$

$R = VATS/(VATS + 100)$

$\bar{R}^2 = 0.860$ SE = 0.037 DW = 0.9 LM(4)=26.5 FCST(4)=7.0 1979 I-1986 IV

Local authority rates

(205) $\ln TRAT = - 1.2267 + 0.95 \ln G£$

Taxes on Alcohol and Tobacco

Revenue from Alcohol and Tobacco Tax

(694) $TAT = CAT.CEAT + 0.01\ (0.324\ CAT.PAT.RDT)$

Average duty rate on alcohol and tobacco

(692) $CEAT = Q2\ ((CEAT_{-1} + CEAT_{-2} + CEAT_{-3} + CEAT_{-4})/4.0 * (1 + ((PC_{-1} - PC_{-5})/PC_{-5})) + (1 - Q2)\ CEAT_{-1}$

Taxes on hydrocarbon oils

Revenue from hydrocarbon oil duty

(202) $THCO = CEOL.NOLD$

Average specific duty on crude oil

(722) $CEOL = Q2\ ((CEOL_{-1} + CEOL_{-2} + CEOL_{-3} + CEOL_{-4})/4.0) * (1 + ((PC_{-1} - PC_{-5})/PC_{-5})) + (1 - Q2)\ CEOL_{-1}$

Other expenditure taxes including motor vehicle duty, stamp duty, protective duties and car tax

(701) lnTRES = - 7.438378 + 1.31565 ln(EF£ - X£)
(11.4) (22.7)

$\bar{R}^2$ = 0.950 SE = 0.054 DW = 1.1 1980 I-1986 IV

Total taxes on expenditure

(195) TE = TAT + THCO + TRAT + TSET + YECS + AVAT + TRES

NORTH SEA SECTOR

Gross trading profits (Private Sector)

(254) NGTP = NSGR - NSTC

Gross revenue (Private Sector)

(261) NSGR = POIL.NSO + NSG.PGAS

Total Costs

(262) $NSTC = NSTC_{-4}\left[\frac{PGDP}{PGDP_{-4}}\right]\left[(1 - D75A_{-6}) + D75A_{-6}\left[\frac{NSO + 1}{NSO_{-4} + 1}\right]\right]$

Saving

(253) SNS = NGTP - TPR - TCNS - YIOL - INSB - ANRP

Net acquisition of financial assets

(252) FNS = SNS - INS£

Price of North Sea oil

(685) Δ lnPOIL = Δ ln(PFO$.ERUK)

Price of gas

(288) Δln PGAS = 0.14 Δ ln [max (PXGO,1)] + [0.602 + MIN
[[0.0172 D80T, 0.258]] Δ ln PPOX

Fixed Investment

(285) INS£ = INS.PINS

Payments of Petroleum Revenue Tax

$$(686)\ TPR = \left[\frac{RTPR_{-1}}{100}\right] (NGTP - ANRP - BITP.KATP - D811_{-1}\ 0.15\ NSGR_{-1})_{-1}$$

$$+ 0.15\ [D811 \left[\frac{RTPR}{100}\right] (NGTP - ANRP - BITP.KATP - D811_{-1}\ 0.15\ NSGR_{-1})$$

$$- D811_{-2} \left[\frac{RTPR_{-2}}{100}\right] (NGTP - ANRP - BITP.KATP - D811_{-1}\ 0.15\ NSGR_{-1})_{-2}]$$

Proxy for stock of unused capital allowances to be set against PRT

$$(235)\ KATP = UPLT.INS£ + [(1 - BITP_{-1})\ KATP_{-1}]$$

Proxy for 'bite' of capital allowance against PRT

$$(232)\ BITP = 1 - \exp(-0.8(NGTP - ANRP)/KATP)$$

Payments of North Sea Mainstream Corporation Tax

$$(272)\ TCNS = (1-Q2)\ TCNS_{-1} + 1/4\ Q2 \sum_{i=2}^{5} \frac{TRYC}{100} (NGTP - ANRP - TPR - BITC.KATC)_{-i}$$

Proxy for stock of unused capital allowances to be set against North Sea MCT

$$(152)\ KATC = (1 - DCAP)\ INS£ + \sum_{i=0}^{3} [DCAP_{-i*4}\ \alpha_i\ INS£_{-i*4}] + KATC_{-1}\ (1-BITC_{-1})$$

$$\alpha_{0-3} = 0.25;\ \ 0.1875;\ \ 0.1406;\ \ 0.1055$$

Proxy for 'bite' of capital allowances against North Sea MCT

$$(153)\ BITC = 1 - \exp(-(NGTP - TPR - ANRP)/KATC)$$

North Sea oil and gas royalties (Private Sector)

$$(18)\ ANRP = \frac{RNSR}{100} (POIL.NSO + PGAS.NSG)$$

Inward oil investment

$$(562)\ IOIL = 0.42\ YIOL$$

Net output of North Sea oil and gas

$$(641)\ \Delta\ln ONSO = \Delta\ln (162.15\ NSO + 49.52\ NSG)$$

SECTION 13

THE BALANCE OF PAYMENTS

INTEREST, PROFITS AND DIVIDENDS

CREDITS

Non-bank direct investment (oil and non-oil)

Stock

$$(329)\ KODI = KODI_{-1}\left[\left[\frac{ERUK}{ERUK_{-1}}\right]^{0.4}\left[\frac{ERND_{-1}}{ERND}\right]^{0.6}\right] + ODII + ILOV$$

Rate of return

$$(356)\ RODI = \underset{(3.6)}{4.785044} + \underset{(4.5)}{0.4948242}\ RODI_{-1} + \underset{(3.9)}{1.721411}\left[\frac{100.(WPC - WPC_{-4})}{WPC_{-4}}\right] - \underset{(3.6)}{1.538365}\left[\frac{100.(WPC - WPC_{-4})}{WPC_{-4}}\right]_{-1} + \underset{(1.8)}{0.2131561}\left[\frac{100.(WGDP - WGDP_{-4})}{WGDP_{-4}}\right]$$

$\bar{R}^2 = 0.734$ %SE = 0.136 DW = 2.1 1972 II-1987 II

Flow

$$(414)\ YODI = \frac{RODI}{400}.\left[\frac{KODI + KODI_{-1}}{2}\right]$$

Monetary sector

Stock

$$(324)\ KOBA = KOBA_{-1}\left[\left[\frac{ERUK}{ERUK_{-1}}\right]^{0.6}\left[\frac{ERND_{-1}}{ERND}\right]^{0.3}\right] - L£BO - L\$BO + ILOB$$

Rate of return

$$(353)\ ROBA = RIBA + SDBA$$

Flow

$$(413)\ YOBA = \frac{ROBA}{400}\left[\frac{KOBA + KOBA_{-1}}{2}\right]$$

Non-bank portfolio and miscellaneous

Stock

$$(335)\ KOPO = KOPO_{-1}\left[\left[\frac{ERUK}{ERUK_{-1}}\right]^{0.5}\left[\frac{ERND_{-1}}{ERND}\right]^{0.5}\left[\frac{RWG_{-1}}{RWG}\right]^{0.2}\left[\frac{SPW}{SPW_{-1}}\right]^{0.5}\right] - CFO - IPOO$$

Rate of return

$$(357)\ ROPO = \underset{(6.3)}{0.4961716}\ ROPO_{-1} + \underset{(3.8)}{0.167305}\ RWG + \underset{(2.7)}{0.3124561}\ WODY$$

$\bar{R}^2 = 0.941$ %SE = 0.041 DW = 1.7 1980 I-1987 II

Flow

$$(429)\ YOPO = \frac{ROPO}{400}\left[\frac{KOPO + KOPO_{-1}}{2}\right]$$

Total credits

$$(289)\ CIPD = YODI + YOPO + YOBA$$

DEBITS

Non-bank, non-oil direct investment

Stock

$$(321)\ KIDI = KIDI_{-1} + IDIO - IOIL + ILIB$$

Flow

$$(361)\ YIDI = EIAB + EFAB - YIOL$$

Rate of return

$$(349)\ RIDI = 400.YIDI/\left[\frac{KIDI + KIDI_{-1}}{2}\right]$$

Oil direct investment

Stock

$$(322)\ KIOL = KIOL_{-1} + IOIL$$

Flow

$$(375)\ YIOL = \underset{(2.2)}{0.1033384}\ (NGTP - TCNS - TPR - ANRP) + \underset{(6.2)}{0.2892275}\ (NGTP - TCNS - TPR - ANRP)_{-1}$$

$\bar{R}^2 = 0.511$ %SE = 0.257 DW = 2.0 LM(4)=6.4 FCST(4)=7.5 1980 I-1986 IV

Rate of return

$$(350)\quad RIOL = 400.YIOL/\left[\frac{KIOL + KIOL_{-1}}{2}\right]$$

Monetary sector

Stock

$$(320)\quad KIBA = KIBA_{-1}\left[\left[\frac{ERUK}{ERUK_{-1}}\right]^{0.6}\left[\frac{ERND_{-1}}{ERND}\right]^{0.3}\right] + D£BO + LZO + D\$BO - L\$BO - ILIB$$

Rate of return

$$(348)\quad \Delta RIBA = \underset{(5.3)}{-0.5562619} + \underset{(2.4)}{0.08654249}\,(RLA - RIBA_{-1}) + \underset{(7.6)}{0.3056702}\,(REU\$ - RIBA)_{-1}$$

$\bar{R}^2 = 0.717$ %SE = -3.668 DW = 2.0 1980 I-1987 II

Flow

$$(360)\quad YIBA = \frac{RIBA}{400}\left[\frac{KIBA + KIBA_{-1}}{2}\right]$$

Portfolio and miscellaneous

Stock

$$(323)\quad KIPO = KIPO_{-1}\left[\left[\frac{ERUK}{ERUK_{-1}}\right]^{0.26}\left[\frac{ERND_{-1}}{ERND}\right]^{0.14}\left[\frac{RUKG_{-1}}{RUKG}\right]^{0.3}\left[\frac{SPUK}{SPUK_{-1}}\right]^{0.3}\right] + BGSO$$

$$+ LGO + CROO + XOGO + IPOI$$

Rate of return

$$(352)\quad \Delta RIPO = \underset{(0.1)}{0.009679952} + \underset{(1.1)}{0.1363668}\,\Delta RUKG - \underset{(2.4)}{0.2898222}\,RRIP_{-1}$$

$$+ \underset{(2.5)}{0.1317067}\,\Delta REU\$_{-1}$$

Where: RRIP = RIPO - [0.5700824 RUKG + 0.05880803 (GDIV/SPUK)]

$\bar{R}^2 = 0.390$ %SE = -8.298 DW = 2.3 LM(4)=8.8 FCST(4)=1.5 1980 I-1987 II

Flow

$$(398)\quad YIPO = \frac{RIPO}{400}\left[\frac{KIPO + KIPO_{-1}}{2}\right]$$

Total debits

$$(294)\quad DIPD = YIDI + YIOL + YIPO + YIBA$$

Net UK external assets

$$(312)\quad KNEA = KODI + KOPO + KOBA - KIDI - KIOL - KIPO - KIBA$$

CURRENT ACCOUNT OF BALANCE OF PAYMENTS, SUMMARY (BOP BASIS)

Visible balance

(298) BALV = XG£ - MG£

Oil balance

(325) BALO = PXGO.XGO - PMGO.MGO

Non-oil visible balance

(164) BALN = BALV - BALO

Manufactures balance

(106) BALM = PXGM.XGMA - PMGM.MGMA

Balance of services

(242) BALS = XS£ - MS£

Net interest, profits and dividends

(130) BIPD = CIPD - DIPD

Net private and government transfers

(131) BTAB = - (EGTA + EJTA)

Invisibles balance

(245) BALI = BALS + BIPD + BTAB

Current balance

(132) BAL = BALV + BALI

Net acquisition of financial assets by overseas sector

(231) FO = FTKO - BAL

WORLD VARIABLES RELATING TO THE IPD SECTOR

World share price

(336) $100.\Delta \ln SPW = \underset{(5.1)}{10.98104} - \underset{(3.6)}{0.6659141}\ REU\$$

$\bar{R}^2 = 0.294$ SE = 0.037 DW = 1.6 1980 I-1987 II

World long bond yield (10 year)

$$(359)\quad RWG = \underset{(1.9)}{0.6310757} + \underset{(14.7)}{0.8211506}\ RWG_{-1} + \underset{(5.7)}{0.1741529}\ REU\$ - \underset{(2.3)}{0.08452948}\ REU\$_{-1}$$

$\bar{R}^2 = 0.942$ %SE = 0.041 DW = 2.0 1972 III-1987 II

World dividend yield

$$(310)\quad WODY = \underset{(18.2)}{0.8625683}\ WODY_{-1} + \underset{(2.3)}{0.03067936}\ RWG + \underset{(1.8)}{0.0169622}\ REU\$_{-1} - \underset{(5.9)}{0.02529719}\ (100.\Delta\ \ln SPW)$$

$\bar{R}^2 = 0.990$ %SE = 0.024 DW = 1.6 1980 I-1987 II

SECTION 14

NON-BANK PRIVATE SECTOR FLOW OF FUNDS

PERSONAL SECTOR FLOW OF FUNDS

Accruals adjustment

(489) $AAJ = -0.1\ \Delta AVAT - 0.1\Delta\ (YECN + YJCN) - 0.067\ \Delta YECS + TRAT$

$$(-0.07\ Q1 + 0.035\ Q2 - 0.0525\ Q3 + 0.0875\ Q4)$$

Deposits with OFIs

(493) $DVJ = 0.004\ DBJ$

Miscellaneous transactions

(499) $LVOJ = 0.2\ (LDJ - LZNU)$

Stock of bank advances

$$(264)\ \Delta \ln\left(\frac{KBMS - KHBB + 0.7\ KZNU}{PC}\right) = \underset{(3.2)}{-\ 1.7369107} - \underset{(2.6)}{0.07976}\ \ln\left[\frac{(KBMS - KHBB + 0.7\ KZNU)}{NWJ}\right]_{-1}$$

$$+ \underset{(2.6)}{0.14253}\ \ln\left[\frac{C£ + IIJ£ + IFJ£}{PC}\right]_{-1}$$

$$- \underset{(8.6)}{0.64950}\ \ln(PC/PC_{-4}) - \underset{(3.4)}{0.01284}\ DBAC$$

$\bar{R}^2 = 0.64$ SE = 0.024 DW = 1.8 1967 I - 1981 IV

Bank lending, other than for house purchase

(731) $LDJ = -\ \Delta\ (KBMS - KHBB)$

Bank lending, other than for house purchase: in foreign currency

(69) $LD\$J = 0.01\ LDJ$

Domestic bank deposits

(460) $DBJ = \Delta\ GLAJ - BSGJ - DVJ - \Delta KZJ + LZNU$

Public sector, other short debt

$$(734)\quad BSGJ = 0.3 \sum_{i=0}^{3} \alpha_i \, PSBR_{-i}$$

$\alpha_{0-3} = 0.4;\ 0.3;\ 0.2;\ 0.1$

Public sector long debt

(735) BLGJ = FJ - LGJ - AAJ - ΔKZJ - DVJ - LVJ + LRCG + LRCI + LZNA + LHBB
+ LHPG + LHPV - LVOJ + CPII + IPCB + CPIV + IPV + IPBB + IP$B
+ IP£B + IPI + IPO + IPG - LDJ - RESJ - NCJ - BSGJ - DBJ + LZNU

Notes and coin

(733) NCJ = -0.9 NCG

Stock of the proxy for retail trade credit

(445) KRTC = $KRTC_{-1}$ - LVOJ + LRCI + LRCG

Stock of personal sector deposits with OFIs and banks

(393) KDBJ = $KDBJ_{-1}$ + DVJ + DBJ

INDUSTRIAL AND COMMERCIAL COMPANIES FLOW OF FUNDS

Miscellaneous transactions

(740) LVOI = 0.1 (LDI - IDCG)

Bank lending

(745) (LDI - IDCG) = -266.1858 - 0.3634589 Δ [((YWS + YEC + YECS + TSET)/LE).
(2.4) (1.8)
(LE - LEG)] - 0.1889865 Δ (MGBM.PMBM + MGMA.PMGM)
(0.8)
- 0.5209177.III£ - 772.2603 MAX (0, (RLA - (RCBR + 1)))
(2.6) (3.8)
- 1.331032 Δ (TYI - TCNS - TPR) + 9.890746 ((RCBR + 2)
(1.8) (0.5)
- 100.(ln(PCE/100) - lnPC)

$\bar{R}^2 = 0.491$ SE = 357.9 DW = 1.86 1970 I - 1979 IV

Bank lending in foreign currency

(165) LD$I = 0.18 (LDI - IDCG)

Domestic bank deposits

(461) DBI = FFI - LGI + AAB + AAV + AAJ + AAG - LZI - DVI - LRCI - LVOI - CPII
- IPI + ILIV - ODII + IDIO + ILIB + CROO + CROB - LDI + NCJ + NCG V
+ NCV - BSGI - BLGI + IDCG + RESG + RESO + RESJ + RESB + RESV + RESE
+ CROV

Public sector, other short debt

(746) BSGI = 0.1 DBI

Public sector, long debt

(747) BLGI = 0.05 DBI

Proxy for stock of liquid assets

(38) KLI = DBI + LZI + DVI + BSGI + KLI_{-1}

Proxy for stock of liabilities

(85) KBLI = IDCG - LDI - LGI + $KBLI_{-1}$

Stock of ICCs deposits with Banks

(394) KBI = KBI_{-1} + DBI

OTHER (THAN BANKS) FINANCIAL INSTITUTIONS FLOW OF FUNDS

Bank lending

(462) $$LDV = \frac{GDP£}{28065}\left[\sum_{i=0}^{7} \alpha_i \, (RUKG - RLA - 0.95\,(100.(\ln(PCE/100)-\ln PC)_{-i}\right]$$

α_{0-7} = -10; -5; 2; 2; 2; 2; 2; 5

Bank lending in foreign currency

(219) LD$V = 0.25 LDV

Bank deposits

(761) DBV = - FG - FO - FJ - FFI - FFB - RESE - LGV - AAV + LZV + LVG + LVJ
- LZNA - LHPV + LVOJ + LVOI + LVOB - CPIV - IPV - ILIV - ILOV - NCV
- LDV - RESV - BSGV - BLGV + DVJ + DVG + DVO + DVI - CROV - LZNU

Public sector 'other' short debt

(762) $BSGV = 0.1\ DBV + (0.5 * 1/3)(LZSD - LZNA)$

Public sector long debt

$$(763)\ BLGV = \sum_{i=0}^{3} (PSBR-BGSO-CFO-XOGO-BSGJ-BSGI-BSGV-BLGJ-BLGI+BZG-LZG)_{-i} - \sum_{i=1}^{3} BLGV_{-i}$$

BUILDING SOCIETIES AND LOANS FOR HOUSE PURCHASE

Composite Tax Rate

(634) $TCR = (25.5/30.0)\ TRY$

DEPOSITS WITH BUILDING SOCIETIES

Stocks

Personal sector

(776) $lnKZJ = 1.10319\ lnKZJ_{-1} - 0.15896\ lnKZJ_{-2} + 0.50584\ ln(GLAJ + KZNU) - 0.45007\ ln(GLAJ + KZNU)_{-1} + 0.0044791\ RZSG - 0.0044791\ RLA - 0.028323$

ICC's

(765) $KZI = KZI_{-1} + LZI$

Banks'

(772) $KZB = KZB_{-1} + LZB$

Insurance companies and pension funds

(682) $KZSV = KZSV_{-1} + LZSV$

Public sector

(6) $KZG = KZG_{-1} + LZG$

Overseas

(8) $KZO = KZO_{-1} + LZO$

Total deposits with building societies

(10) KZSD = KZJ + KZI + KZB + KZSV + KZG + KZO

Flows

Net increase in shares, deposits and wholesale funds

(491) LZSD = ΔKZSD

Deposits with building societies other than those from other OFIs

(778) LZV = LZSD - LZSV

Flow of personal sector shares and deposits with building societies

(7) LZJ = KZJ - KZJ_{-1}

LOANS FOR HOUSE PURCHASE

Flows

OFI's

(498) LHPV = SHMV.LHPT

Banks

(497) LHBB = SHMB.LHPT

Public sector

(466) LHPG = 0.33 (ICHJ.PILG)

Net mortgage advances of principal

(496) LZNA = LHPT - LHBB - LHPV

Stocks

Mortgage advances outstanding

(14) KZNA = $KZNA_{-1}$ + LZNA

Building societies unsecured lending

(419) KZNU = $KZNU_{-1}$ + LZNU

Banks'

(182) KHBB = $KHBB_{-1}$ + LHBB

OFI's

(477) KHPV = $KHPV_{-1}$ + LHPV

Public sector

(181) KHPG = $KHPG_{-1}$ + LHPG

Total private mortgage lending

$$(62)\ \Delta \ln KHPT = \underset{(3.6)}{0.00773912} - \underset{(2.3)}{0.0788039}\,[\ln KHPT_{-1} - FITV_{-1}] + \underset{(9.4)}{0.650179}\,\Delta \ln KHPT_{-1} + \underset{(3.6)}{0.156819}\,\Delta \ln KHPT_{-4} + \underset{(1.7)}{0.0349698}\,\Delta \ln RPDI_{-1}$$

$$- \underset{(3.7)}{0.89395}\,\Delta \ln(PAHM/PC) + \underset{(4.2)}{0.978382}\,\Delta \ln(PAHM/PC)_{-1}$$

$$- \underset{(2.6)}{0.0472075}\,\Delta \ln(PAHM/PC)_{-3} - \underset{(4.4)}{0.0257415}\,\Delta \ln\left(RZMG\left(1 - \frac{TRY}{100}\right)\right)$$

$$+ \underset{(4.4)}{0.126817}\,\Delta \ln ZLVF + \underset{(4.0)}{0.955534}\,\Delta\Delta \ln PAHM - \underset{(4.0)}{0.953883}\,\Delta\Delta\, GCIF$$

$\bar{R}^2$ = SE = 0.003 DW = 1970 II - 1987 II

Where:

$$FITV = \ln VOHS + 1/9 \sum_{i=0}^{8} \ln RPDI_{-i} - 11.86211 - 0.759071 \ln(PAHM/PC)$$

$$- 0.0852346 \ln\left(RZMG\left(1 - \frac{TRY}{100}\right)\right) + 0.39509 \ln ZLVF - 1.11289\, GCIF$$

$$+ 0.00294495\, ZDOW$$

Geometric cumulation of inflation

$$(194)\ GCIF = 0.95\, GCIF_{-1} + \Delta \ln PC$$

Flow of total private mortgage lending

$$(102)\ LHPT = \Delta KHPT$$

Stock of building societies capital issues

$$(403)\ KPIZ = KPIZ_{-1} - CPIZ$$

Stock of other monetary sector £ lending to building societies

$$(255)\ KL£Z = KL£Z_{-1} + LD£Z$$

Proxy for liquidity position

$$(241)\ ZLIQ = 100 \left[1 - \left(\frac{KZNA + KZNU}{KZSD + KPIZ + KL£Z}\right)\right]$$

SECTION 15

OVERSEAS SECTOR FLOW OF FUNDS (CAPITAL ACCOUNT)

Deposits with OFIs

(479) DVO = 0

Portfolio investment

(480) IPO = IPOI + IPOO

Inward investment (overseas)

(412) $100.(IDIO - IOIL)/WPC = \underset{(0.4)}{-90.45212} + \underset{(5.3)}{11.40239}\ WGDP - \underset{(1.5)}{3.85376}\ RULC_{-1}$

$\bar{R}^2 = 0.234$ SE = 299.2 DW = 2.2 1966 I - 1987 IV

Outward direct investment (ICCs)

(411) $\frac{ODII}{PGDP} = \underset{(6.1)}{-3447.5807} + \underset{(8.4)}{35.5593}\ (100.GDPO/GDPO\ (1980))$

$\bar{R}^2 = 0.450$ SE = 395.8 DW = 1.6 1966 I = 1987 II

Overseas column Residual

(486) CROO = -0.009 (X£ + M£)

Bank lending in sterling

(482) L£BO = - 0.026 (X£ + M£)

Net bank lending in foreign currency

(483) D$BO = SWI + LD$B + BD$B + IP$B + ILOB

Sterling deposits with UK banks

(484) $\frac{D£BO}{X£ + M£} = 0.0144 - 0.0974\ (DCES/GDP£)_{-1} + 0.0007\ \Delta\ (RLA - REU\$)$

$$+ 0.5\ \frac{\Delta\ CONF}{X£ + M£}$$

Unidentified (Balancing item)

$$(485)\ \frac{RESO}{X£ + M£} = 0.00494\ \Delta\ (RLA - REU\$) - 0.1364\ (DCES/(X£ + M£))$$

$$- 1.9704\ \Delta\ \left[\frac{(PXNM.\ XGNM)}{X£ + M£} + 0.66862\ \Delta\ \frac{(MGFD.PMFD + MGBM.PMBM + MGMA.PMGM)}{X£ + M£}\right] + 0.5\ \frac{\Delta\ CONF}{X£ + M£} + 0.01715$$

Gilt edged stocks

(470) BGSO = 0.1 (BLGV + BLGJ + BLGI)

Reserves etc

(471) CFO = FO - LGO - LZO - DVO - IPO + ODII + ILOB + ILOV - IDIO - CROO

- L£BO - D$BO - D£BO - RESO - BGSO - XOGO

CONF iterates to the value that ensures CFOA=-CFO by means of the alogorithm

(220) CONF = CONF + (CFOA + CFO)/4

Stock of overseas deposits with banks

(395) $K£BO = K£BO_{-1} + D£BO$

SECTION 16

PUBLIC SECTOR AND MONETARY SECTOR FLOW OF FUNDS

PUBLIC SECTOR

Accruals adjustment

(764) $AAG = \Delta AVAT + 0.5\ \Delta\ (YECN + YJCN) + 0.33\ \Delta\ YECS + [ANRP - 0.5\ (ANRP_{-1} + ANRP_{-2})]$

Borrowing requirement

(233) $PSBR = - FG + AAG + LZG + DVG + LVG + LRCG + LHPG + RESG - LGO - LGI - LGJ - LGV + IPG$

Stock of M0

(259) $\Delta\ lnKM0 = \underset{(3.4)}{0.008558349} + \underset{(6.1)}{0.0466994}\ \Delta D681_{-12} + \underset{(2.2)}{0.2977676}\ \Delta\Delta\ lnPC_{-1} + \underset{(4.1)}{0.4037796}\ \Delta\ lnKM0_{-1} - \underset{(3.0)}{0.1776887}\ JRES$

Where: $JRES = lnKM0_{-1} - lnC£ + 0.5621558 + 0.001382596\ CRSN$

$\bar{R}^2 = 0.485$ SE = 0.010 DW = 2.3 LM(4)=4.9 1970 III-1986 IV

Accumulation of RZSN since 1963 Q1

(274) $CRSN = CRSN_{-1} + RZSN$

Flow of notes and coin

(473) $NCG = 0.85\ (KM0_{-1} - KM0)$

Bank finance of PSBR

(476) $LBG = FG - AAG - LZG - DVG - LVG - LRCG - LHPG - IPG - RESG + BGSO + CFO + XOGO - NCG + BSGJ + BSGI + BSGV - IDCG + BLGV + BLGI + BLGJ + LGO + LGV + LGI + LGJ$

Net lending to private and overseas sectors

(247) KLNG = $KLNG_{-1}$ - LGO - LGJ - LGI - LGV + LHPG

Stock of issue department commercial bills

(239) KBID = $KBID_{-1}$ + IDCG

MONETARY SECTOR FLOW OF FUNDS

Portfolio investment

(753) IPB = IPBB + IP$B + IP£B

Bank lending to private sector

Total

(755) LDB = - LDJ - LDI - LDV

Sterling

(757) LD£B = LDB - LD$B

Foreign currency

(758) LD$B = - LD$J - LD$I - LD$V

Domestic bank deposits

Total

(756) DBB = - DBI - DBJ - DBV

Sterling

(759) BD£B = DBB - BD$B

Foreign currency

(760) BD$B = - LD$B - 0.5 (- FO + IPO + IP$B - ODII - ILOV + IDIO + ILIB
+ CROO + RESO)

Unidentified

(748) RESB = RESS + FFB - AAB - IPBB - IPCB - ILIB

MONETARY AGGREGATES

Domestic credit expansion

(364) DCES = IP£B - L£BO + LHBB + LD£B - LBG + BGSO + CFO + XOGO - NCG

Money supply

M3, flow

(299) M3 = - NCG - BD£B

M3, stock

(296) KM3 = $KM3_{-1}$ + M3

M4, flow

(587) M4 = M3 + LZJ + LZI + LZSV + BD£Z

M4, stock

(559) KM4 = $KM4_{-1}$ + M4

Velocity of M4

(164) M4VL = 8(GDPN/(KM4 + $KM4_{-1}$))

FLOW OF FUNDS MATRIX

Item		Public Sector	O'seas Sector	Personal Sector	ICCs	Banking Sector	OFIs	Unallo-cated
Financial surplus/deficit	1	FG	FO	FJ	FFI	FFB	*FFV	RESE
FINANCIAL TRANSACTIONS (receipts -, payments +)								
Public sector lending	2	*LGG	LGO	LGJ	LGI		LGV	
Accruals adjustment	3	AAG		AAJ	*AAI	AAB	AAV	
Deposits with:								
Building societies	4	LZG	LZO	*LZJ	LZI	LZB	-LZV	
NSB/TSB/HP companies etc	5	DVG	DVO	DVJ	DVI		*DVV	
Life assurance & pension funds receipts	6	LVG		LVJ			*LVV	
Credit extended by retailers	7	LRCG		*LRCJ	LRCI			
Loans for house purchase by:								
Building societies	8			*LHZJ			LZNA	
Banks	9			*LHBJ		LHBB		
Other	10	LHPG		*LHPJ			LHPV	
Miscellaneous private sector transactions	11			LVOJ	LVOI	LVOB	*LVOV	
Portfolio (capital issues) (investment)	12	IPG	IPO	*IPJ	CPII IPI	IPCB IPB(a)	CPIV IPV	
Outward investment	13.1		*ODIO		ODII	ILOB	ILOV	
Inward investment	13.2		IDIO		*IDII	ILIB	ILIV	
Overseas column residual	14		CROO		*CROI	CROB	CROV	
Bank lending:								
in £ to overseas	15		L£BO			B£OB		
Total bank lending to private sector	16			LDJ	LDI	*LDB	LDV	
In £ to UK private sector	16.1			~LD£J	~LD£I	*LD£B	~LD£V	
In currency to UK priv sector	16.2			LD$J	LD$I	*LD$B	LD$V	
Banks net currency lending to overseas	17		D$BO			*D$BB		
Bank deposits: non-resident £	18		D£BO			*D£BB		
Total domestic bank deposits	19			DBJ	**DBI	**DBB	**DBV	
£ domestic	19.1					*BD£B		
Currency domestic	19.2					BD$B		
Sub-total = sum 2 to 19	20							
Unidentified = 1-20-22	21	RESG	RESO	RESJ	*RESI	RESB	RESV	RESE
Public sector borrowing requirement = 26+31+32	22	-PSBR						
FINANCE OF THE PSBR								
Overseas take up of gilts	23	*BGSG	BGSO					
Reserves etc	24	*CFG	**CFO					
Other external finance	25	*XOGG	XOGO					
Total external finance = 23+24+25	26							
Domestic non-banks:								
Notes & coin	27	NCG		NCJ	*NCI		NCV	
Other short debt	28	*BSGG		BSGJ	BSGI		BSGV	
Long debt	29	*BLGG		**BLGJ	BLGI		BLGV	
Issue Dept commercial bills	30	IDCG			*IDCI			
Total domestic non-bank finance = 27+28+29+30	31							
Bank finance of PSBR	32	**LBG				*LBGB		

* Row residual
** Column residual
~ Non-model variable; calculated line 16 - line 16.1
(a) Disaggregation:
investment in banks, IPBB
in non-banks in sterling, IP£B
in non-banks in foreign currency, IP$B

ALPHABETICAL VARIABLE LISTING

Code	Definition	Data Unit	Defined by (b)	Page (file)
AAB	Accruals adjustment: banks	£mn	x(738)	
AAG	Accruals adjustment: public	£mn	t(764)	16.1(S5)
AAJ	Accruals adjustment: persons	£mn	t(489)	14.1(S5)
AAV	Accruals adjustment: OFIs	£mn	x(739)	
ACTC	Advance corporation tax credits	£mn	b(133)	12.1(S18)
ACTP	Payments of advance corporation tax: total	£mn	b(200)	11.5(S2)
ADJ	Difference between the expenditure and average estimates of GDP	85£mn	x(598)	
ADJP	Net adjustments required to obtain public sector planning totals	£mn	x(684)	
AFTP	Financial companies payments of advance corporation tax	£mn	i(408)	11.5(S19)
AITP	Payments of advance corporation tax: ICCs	£mn	t(266)	11.2(S19)
ANRP	Accruals of North Sea Oil Royalties (Private sector)	£mn	t(18)	12.4(S21)
AVAT	Accruals of VAT and purchase tax (excluding that on cars)	£mn	b(78)	12.2(S21)
BAL	Current balance of payments	£mn	i(132)	13.4(S23)
BALI	Invisible balance	£mn	i(245)	13.4(S23)
BALM	Manufactures balance	£mn	i(106)	13.4(S23)
BALN	Non-oil visible balance	£mn	i(164)	13.4(S23)
BALO	Balance on petroleum and petroleum products	£mn	i(325)	13.4(S23)
BALS	Balance on services	£mn	i(242)	13.4(S23)
BALV	Visible trade balance	£mn	i(298)	13.4(S23)
BDEB	Domestic bank deposits (sterling): banks	£mn	i(759)	16.2(S5)
BDEZ	Flow of building societies' £ deposits with banks	£mn	x(554)	
BDSB	Domestic bank deposits (foreign currencies): banks	£mn	t(760)	16.2(S5)
BOSO	Overseas take-up of gilts: overseas	£mn	i(470)	15.2(S5)
BIPD	Interest, profits and dividends (net)	£mn	i(130)	13.4(S23)
BITC	"Bite" of capital allowances against North Sea		t(153)	12.4(S25)
BITP	"Bite" of capital allowances against Petroleum Revenue Tax		t(232)	12.4(S25)
BLGI	Long debt: ICCs	£mn	t(747)	14.3(S5)
BLGJ	Long debt: persons	£mn	i(735)	14.2(S5)
BLGV	Long debt: OFIs	£mn	t(763)	14.4(S5)
BSGI	Other short debt: ICCs	£mn	b(746)	14.3(S5)
BSGJ	Other short debt: persons	£mn	b(734)	14.2(S5)
BSGV	Other short debt: OFIs	£mn	b(762)	14.4(S5)
BTAB	Net private and government transfers abroad	£mn	i(131)	13.4(S23)
BZG	Flow of building society purchases of public sector debt	£mn	x(541)	
CE	Total consumers' expenditure	£mn	i(103)	1.2(S0)
CAT	Consumption of alcohol and tobacco	85£mn	b(691)	1.1(S0)
CD	Consumers' expenditure on durable goods	85£mn	b(2)	1.2(S0)
CEAT	Average specific duty rate on alcohol and tobacco	£/85£	t(692)	12.2(S2)
CEOL	Average specific duty rate on hydrocarbon oil	£/85£	t(722)	12.2(S2)
CF	Consumers' expenditure on food	85£mn	b(280)	1.1(S0)
CFO	Reserves etc: overseas	£mn	i(471)	15.2(S5)
CFOA	Change in reserves etc, increase +ve	£mn	x(283)	
CIPD	Total IPD credits	£mn	i(289)	13.2(S22)
CND	Consumers' expenditure on non-durable items	85£mn	b(1)	1.1(S0)
CONF	Proxy for external confidence		i(220)	15.2(S23)
CONS	Total consumers' expenditure	85£mn	b(4)	1.2(S0)
CPBR	Accumulation of PSBR as a % of GDPN (from 1979 Q1)	%	i(436)	8.1(S13)
CPII	Capital issues (UK): ICCs	£mn	x(500)	
CPIV	Capital issues (UK): OFIs	£mn	x(725)	
CPIZ	Building societies capital issues	£mn	x(399)	
CROB	Overseas residual: banks	£mn	x(744)	
CROO	Overseas residual: overseas	£mn	t(486)	15.1(S2)
CROV	Overseas resudual: OFIs	£mn	x(512)	
CRSN	Accumulation of RZSN since 1963 Q1	%	i(274)	16.1(S3)
CUCI	Transformed CBI index of capacity utilisation		b(256)	6.3(S10)
D681	Dummy for 1968 Q1		x(508)	
D721	Dummy for 1972 Q3		x(509)	
D73B	Dummy for 1973 Q2		x(545)	
D741	Dummy from 1974 Q2		x(523)	
D75A	Dummy from 1975 Q1		x(552)	
D79	Dummy for 1979 Q2		x(549)	
D80T	Time trend from 1980 Q1		x(695)	
D811	Dummy from 1981 Q1		x(602)	
D821	Dummy from 1982 Q1		x(681)	
D842	Dummy for 1984 Q2		x(450)	

D853	Dummy for introduction of 1985 budget changes		x(316)	
DFBO	Non-resident bank deposits (sterling): overseas	£mn	t(484)	15.1(S19)
DSBO	Banks net currency lending to overseas: overseas	£mn	i(483)	15.1(S5)
DBAC	Dummy variable		x(750)	
DBB	Domestic bank deposits (sterling and foreign currency):banks	£mn	i(756)	16.2(S5)
DBI	Domestic bank deposits (sterling and foreign currency):ICCs	£mn	i(461)	14.3(S5)
DBJ	Domestic bank deposits (sterling and foreign currency):persons	£mn	i(460)	14.1(S5)
DBNK	Dummy for the return of banks to the housing market		x(522)	
DBV	Domestic bank deposits (sterling and foreign currency):OFIs	£mn	i(761)	14.3(S5)
DCAP	Dummy variable		x(754)	
DCES	Sterling domestic credit expansion	£mn	i(364)	16.2(S5)
DCLG	Dummy for the CLEGG commission		x(521)	
DCTH	Dummy for public catch-up		x(525)	
DDNO	Non-oil domestic demand (output based)	85£mn	i(456)	6.1(S2)
DDOB	Domestic demand (output based)	85£mn	i(452)	6.1(S2)
DGIP	Incomes policy variable for public		x(519)	
DIIN	Dummy for period of nominal tax relief on stocks		x(524)	
DIIP	Dummy for period of physical tax relief on stocks		x(546)	
DIPD	Total IPD debits	£mn	i(294)	13.3(S22)
DMIP	Incomes policy variable for manufacturing		x(529)	
DOMD	Domestic Demand (expenditure based)	85£mn	i(309)	6.1(S2)
DPI	Privatisation dummy for investment		x(396)	
DVG	Deposits with: OFIs public	£mn	x(463)	
DVI	Deposits with: ICCs	£mn	x(492)	
DVJ	Deposits with: persons	£mn	b(493)	14.1(S5)
DVO	Deposits with NSB/TSB/HP companies: overseas	£mn	i(479)	15.1(S2)
ECMM	Employment costs per employee, manufacturing	£mn/1000	i(355)	7.5(S18)
EDBT	Public sector debt interest payments	£mn	t(197)	12.1(S20)
EDMS	Dm/$ exchange rate , quarterly average	dm/$	x(605)	
EER	Effective UK exchange rate index	1985=1	b(3)	8.1(S13)
EF	Total final expenditure	85£mn	i(70)	6.1(S9)
EF£	Total final expenditure	£mn	i(119)	6.1(S9)
EFAB	Financial companies profits due abroad	£mn	t(397)	11.5(S19)
EGC	Public sector current expenditure	£mn	i(199)	12.1(S20)
EGG	Average earnings in public sector	1985=100	b(160)	7.4(S12)
EGPT	Public expenditure planning total	£mn	i(683)	12.1(S20)
EGTA	Net public sector transfers abroad	£mn	x(609)	
EIAB	ICCs profits due abroad	£mn	i(97)	11.3(S19)
EIBO	ICCs non-oil profits due abroad	£mn	b(156)	11.3(S19)
EIDV	ICCs payments of dividends on ordinary shares	£mn	t(66)	11.2(S19)
EIF	Financial companies payments of dividends and interest	£mn	t(392)	11.5(S19)
EIOI	ICCs other interest payments	£mn	t(83)	11.3(S19)
EIP	Households' gross interest payments	£mn	b(446)	10.2(S18)
EJTA	Personal sector net transfers abroad	£mn	x(563)	
EMAN	Index of average earnings in manufacturing	1985=100	b(607)	7.3(S12)
ENIH	National insurance payments	£mn	i(243)	10.5(S18)
EOTH	Average earnings in manufacturing	1985=100	b(204)	7.4(S12)
ERND	Non-dollar effective exchange rate	1985=100	t(23)	8.1(S13)
ERUK	UK exchange rate against US$ (Index)	1985=1	i(31)	8.1(S13)
ESAB	Subsidies	£mn	x(635)	
ETDE	Actual average quarterly wages and salaries (DoE measure)	1985=100	b(273)	7.3(S12)
FC	Net acquisition of financial assets: companies	£mn	i(228)	11.5(S19)
FCA	Factor cost adjustment	85£mn	b(67)	6.2(S9)
FCA£	Factor cost adjustment	£mn	i(120)	6.2(S9)
FFB	Net acquisition of financial assets: banks	£mn	x(751)	
FFI	Net acquisition of financial assets: ICCs	£mn	i(737)	11.3(S19)
FFV	Net acquisition of financial assets: financial companies	£mn	i(424)	11.5(S19)
FG	Net acquisition of financial assets: public sector	£mn	i(230)	12.1(S20)
FJ	Net acquisition of financial assets: persons	£mn	i(227)	10.6(S18)
FNS	Net acquisition of financial assets: North sea companies	£mn	i(252)	12.3(S25)
FO	Net acquisition of financial assets: overseas	£mn	i(231)	13.4(S23)
FRAM	Fraction of mortgage interest payments eligible for relief		x(37)	
FTKF	Net capital transfers: financial companies	£mn	x(387)	
FTKG	Net capital transfers: public	£mn	x(621)	
FTKI	Net capital transfers: ICCs	£mn	i(306)	11.3(S19)
FTKJ	Net capital transfers: persons	£mn	x(618)	
FTKO	Net capital transfers: overseas	£mn	x(622)	
G	Public authorities' current expenditure on goods and services	85£mn	x(586)	
G£	Public authorities' current expenditure on goods and services	£mn	i(115)	12.1(S20)
GCIF	Geometric cumulation of inflation (inflation expectations)		t(194)	14.6(S1)
GDIV	ICCs gross payments of dividends on ordinary shares	£mn	t(71)	11.2(S19)

GDP	Gross domestic product (average estimate)	85£mn	i(68)	6.1(S9)
GDP£	Gross domestic product (expenditure estimate)	£mn	i(121)	6.1(S9)
GDPE	Gross domestic product (expenditure estimate)	85£mn	i(341)	6.1(S9)
GDPN	Nominal Gross Domestic Product at market prices (average measure)	£mn	i(15)	6.1(S9)
GDPO	Gross domestic product (output estimate)	85£mn	i(343)	6.1(S9)
GDPY	Gross domestic product (income estimate)	85£mn	i(342)	6.1(S9)
GIGH	Household income gearing ratio		i(22)	10.6(S18)
GLAJ	Stock of persons' gross liquid assets	£mn	b(193)	10.7(S18)
GNEC	Gross employers contributions		i(250)	10.5(S18)
GNJC	Gross employees contributions		i(263)	10.5(S18)
GTPF	Gross trading profits of financial companies	£mn	t(769)	11.4(S19)
HMF	Actual average hours worked per operative in manufacturing ind'	hrs/wk	b(265)	7.2(S11)
HMFT	Total hours worked in manufacturing industry	000s hrs/wk	b(300)	7.1(S11)
ICHJ	Personal sector purchases of council houses	85£mn	x(218)	
IDCG	Issue Department take-up of commercial bills: public	£mn	x(475)	
IDCV	Issue Department take-up of commercial bills: OFIs	£mn	x(601)	
IDIO	Inward Investment (Including inward unremmited profits):Overseas	£mn	b(412)	15.1(S5)
IDS	Investment in distribution and services	85£mn	b(700)	2.2(S2)
IF	Total fixed investment	85£mn	i(30)	2.3(S6)
IF£	Gross fixed investment	£mn	i(118)	2.4(S6)
IFF£	Financial companies fixed investment	£mn	i(422)	2.4(S6)
IFG	Public sector fixed investment	85£mn	i(29)	2.3(S2)
IFG£	Public sector fixed investment	£mn	i(221)	2.4(S6)
IFI£	ICCs fixed investment	£mn	b(268)	2.4(S6)
IFJ£	Personal sector fixed investment	£mn	b(222)	2.4(S6)
IFP	Total private sector fixed investment	85£mn	i(28)	2.3(S6)
IFP£	Total private sector fixed investment	£mn	i(224)	2.4(S6)
IHG	Public sector residential fixed investment	85£mn	x(589)	
IHP	Private sector residential fixed investment	85£mn	b(5)	2.3(S6)
IHP£	Private sector residential fixed investment	£mn	i(116)	2.4(S6)
IHPC	Private sector housing completions (GB)	000s	b(209)	2.3(S6)
II	Total stockbuilding	85£mn	i(64)	3.1(S6)
II£	Total stockbuilding	£mn	i(107)	3.2(S6)
IIF£	Financial companies stockbuilding	£mn	x(423)	
IIG£	Public sector stockbuilding	£mn	i(213)	3.2(S6)
III£	ICCs stockbuilding	£mn	b(284)	3.2(S6)
IIJ£	Personal sector stockbuilding	£mn	b(211)	3.2(S6)
IIM	Manufacturers' stockbuilding	85£mn	i(52)	3.1(S6)
IIR	Non-manufacturers' stockbuilding	85£mn	i(53)	3.1(S6)
ILBP	Net pur. pub sec existing land & build by the priv sector	85£mn	x(217)	
ILIB	Inward direct investment: banks	£mn	x(742)	
ILIV	Inward direct investment: OFIs	£mn	x(415)	
ILOB	Outward direct investment: banks	£mn	x(741)	
ILOV	Outward direct investment: OFIs	£mn	x(416)	
IMAN	Investment in manufacturing	85£mn	b(688)	2.1(S2)
ING	Public sector non-residential fixed investment	85£mn	x(588)	
INP	Private sector non-residential fixed investment	85£mn	i(27)	2.3(S6)
INS	Fixed investment in North Sea sector	85£mn	x(597)	
INS£	Fixed investment in North Sea sector	£mn	i(285)	12.3(S25)
INSB	Interest payments due in UK on account of North Sea borrowing	£mn	x(281)	
IOIL	Inward oil investment	£mn	t(562)	12.4(S25)
IP£B	Portfolio investment (non-bank £ shares): banks	£mn	x(729)	
IP£Z	Flow of banks' purchases of building society £ investments	£mn	x(593)	
IPSB	Portfolio investment (non-bank F/C shares): banks	£mn	x(728)	
IPB	Portfolio investment: banks (total)	£mn	i(753)	16.2(S2)
IPBB	Portfolio investment (shares in banks): banks	£mn	x(727)	
IPC	PC's investment in BPV other	£mn	x(354)	
IPCB	Capital issues (UK): banks	£mn	x(724)	
IPG	Portfolio investment: public	£mn	x(467)	
IPI	Portfolio investment: ICCs	£mn	x(730)	
IPO	Portfolio investment: overseas	£mn	i(480)	15.1(S2)
IPOI	Inward portfolio investment	£mn	x(302)	
IPOO	Outward portfolio investment	£mn	x(307)	
IPV	Portfolio investment: OFIs	£mn	x(726)	
IPZO	Overseas take-up of building society capital issues	£mn	x(60)	
IRES	Other private sector fixed investment excluding the North Sea	85£mn	t(600)	2.2(S2)
K£BO	Stock of overseas sector deposits with banks	£mn	i(395)	15.2(S19)
KATC	Proxy for stock of unused allowances against TPR		b(152)	12.4(S25)
KATP	Proxy for stock of unused allowances against corporation tax		b(235)	12.4(S25)
KBI	Stock of ICCs deposits with banks	£mn	i(394)	14.3(S5)
KBID	Stock of issue department commercial bills	£mn	i(239)	16.2(S20)

KBLI	Proxy for ICCs liabilities	£mn	i(85)	14.3(S5)
KBMS	Stock of bank advances to persons	£mn	b(264)	14.1(S1)
KCD£	Proxy for the stock of consumer durables	£mn	t(105)	1.2(S18)
KDBJ	Stock of personal sector deposits with OFIs and banks	£mn	i(393)	14.2(S5)
KDS	Capital stock in distribution and services	85£mn	b(698)	2.2(S2)
KFX£	Non-North Sea ICCs net capital stock at replacement cost	£mn	b(538)	11.3(S19)
KHBB	Stock of bank loans for house purchase	£mn	i(182)	14.5(S1)
KHPG	Stock of public sector housing loans excl council house sales	£mn	i(181)	14.5(S1)
KHPT	Total private mortgage lending (stock)	£mn	b(62)	14.6(S1)
KHPV	Stock of lending for house purchase: OFIs	£mn	i(477)	14.5(S1)
KIBA	Stock of borrowing from overseas by UK banks & MFIs plus bks dir inv	£mn	t(320)	13.3(S22)
KIDI	Stock of inward non-oil direct investment, excl banks	£mn	i(321)	13.2(S22)
KIIJ	Value of personal sector stocks	85£mn	i(216)	3.2(S6)
KIIM	Stock level: manufacturers'	85£mn	b(93)	3.1(S6)
KIIR	Stock level: non-manufacturers'	85£mn	b(94)	3.1(S6)
KIOL	Stock of inward oil direct investment	£mn	i(322)	13.2(S22)
KIPO	Stock of portfolio & miscellaneous liabilities	£mn	t(323)	13.3(S22)
KIX£	Non-North Sea ICCs level of stocks at current prices	£mn	i(548)	11.4(S19)
KL£Z	Stock of other monetary sector £ lending to building societies	£mn	i(255)	14.6(S3)
KLI	Proxy for ICCs stock of liquid assets	£mn	i(38)	14.3(S5)
KLNG	Stock of net public sector lending to private and overseas sector	£mn	i(247)	16.2(S20)
KM0	Stock of M0	£mn	b(259)	16.2(S3)
KM3	Stock of M3	£mn	i(296)	16.3(S3)
KM4	Stock of M4	£mn	i(559)	16.3(S3)
KNEA	Net external asset position	£mn	i(312)	13.3(S22)
KOBA	Stock of lending abroad by UK banks & MFIs	£mn	t(324)	13.1(S22)
KODI	Stock of outward direct investment, excl banks	£mn	t(329)	13.1(S22)
KOHS	Stock of owner-occupied housing	£mn	t(223)	10.6(S6)
KOPO	Stock of portfolio & miscellaneous assets	£mn	t(335)	13.2(S22)
KPIZ	Stock of building societies capital issues	£mn	i(403)	14.6(S1)
KRTC	Proxy for stock of retail trade credit	£mn	i(445)	14.2(S5)
KZB	Stock of banks deposits with building societies	£mn	i(772)	14.4(S1)
KZG	Stock of public sector deposits with building societies	£mn	i(6)	14.4(S1)
KZI	Stock of ICC's deposits with building societies	£mn	i(765)	14.4(S1)
KZJ	Stock of personal sector deposits with building societies	£mn	b(776)	14.4(S1)
KZNA	Stock of L2NA	£mn	i(14)	14.5(S1)
KZNU	Stock of building society unsecured lending	£mn	i(419)	14.5(S1)
KZO	Stock of overseas deposits with building societies	£mn	i(8)	14.4(S1)
KZSD	Stock of L2SD	£mn	i(10)	14.5(S1)
KZSV	Stock of OFI's deposits with building societies	£mn	i(682)	14.4(S1)
L£BO	Bank lending in sterling to overseas: overseas	£mn	t(482)	15.1(S7)
LSBO	Banks' foreign currency lending to overseas (gross)	£mn	x(434)	
LBG	Bank finance of the PSBR: public	£mn	i(476)	16.1(S5)
LD£B	Bank lending in sterling to UK private sector: banks	£mn	i(757)	16.2(S5)
LD£Z	Flow of banks' syndicated £ lending to building society	£mn	x(570)	
LD$B	Bank lending in foreign currency to UK private sector:banks	£mn	i(758)	16.2(S5)
LD$I	Bank lending in Foreign Currency to UK Private sector:ICCs	£mn	i(165)	14.3(S5)
LD$J	Bank lending in Foreign Currency to UK Private sector:persons	£mn	i(69)	14.1(S5)
LD$V	Bank lending in Foreign Currency to UK Private sector:OFIs	£mn	i(219)	14.3(S5)
LDB	Bank lending to UK private sector: banks	£mn	i(755)	16.2(S5)
LDI	Bank lending to UK private sector: ICCs	£mn	b(745)	14.2(S5)
LDJ	Bank lending to UK private sector: persons	£mn	t(731)	14.1(S5)
LDV	Bank lending to UK private sector: OFIs	£mn	t(462)	14.3(S5)
LE	Employees in employment (UK)	000s	i(74)	7.2(S11)
LEG	Employment in non-trading public sector (including HM forces)	000s	b(427)	7.1(S11)
LEMF	Employment in manufacturing industry	000s	b(428)	7.1(S11)
LGI	Public sector lending: ICCs	£mn	x(608)	
LGJ	Public sector lending: persons	£mn	x(488)	
LGO	Public sector lending: overseas	£mn	x(478)	
LGV	Public sector lending: OFIs	£mn	x(766)	
LHBB	Loans for house purchase by banks: banks	£mn	i(497)	14.5(S1)
LHPG	Loans for house purchase by other: public	£mn	t(466)	14.5(S1)
LHPT	Total private mortgage lending (flow)	£mn	i(102)	14.6(S1)
LHPV	Loans for house purchase by other: OFIs	£mn	i(498)	14.5(S1)
LNUE	Number of people earning more than upper earnings limit	000s	x(291)	
LOTH	Empl 'other' sector (nationalised industries and private services)	000s	b(426)	7.2(S11)
LRCG	Credit extended by retailers: public	£mn	x(465)	
LRCI	Credit extended by retailers: ICCs	£mn	x(495)	
LSE	Number of self-employed	000s	x(659)	
LSMM	The effect of special employment measures on manufacturing employ'	000s	x(533)	
LSMO	The effect of special employment measures on other employment	000s	x(540)	

LSMU	The effect of special employment measures on unemployment	000s	x(532)	
LU	Number unemployed excl school-leavers and adult students (UK)	000s	b(75)	7.2(S11)
LUA	Initial estimate of number unemployed (UK)	000s	x(566)	
LVG	Life assurance and pension fund receipts: public	£mn	x(464)	
LVJ	Life assurance and pension fund receipts: persons	£mn	t(494)	10.6(S18)
LVOB	Miscellaneous private sector transactions: banks	£mn	x(752)	
LVOI	Miscellaneous private sector transactions: ICCs	£mn	t(740)	14.2(S5)
LVOJ	Miscellaneous private sector transactions: persons	£mn	t(499)	14.1(S5)
LWRT	Individuals on work related and government training schemes	000s	x(257)	
LZB	Deposits with building societies: banks	£mn	x(652)	
LZCB	Flow of building societies' purchases of commercial bills	£mn	x(579)	
LZG	Flow of public sector £ deposits with building societies	£mn	x(575)	
LZI	Deposits with building societies: ICCs	£mn	x(490)	
LZJ	Flow of personal sector shares & deposits with building socs	£mn	i(7)	14.5(S1)
LZMI	Building societies' receipts of mortgage interest	£mn	t(174)	10.1(S1)
LZNA	Net advances on mortgages by building societies: OFIs	£mn	i(496)	14.5(S1)
LZNU	Building society unsecured lending	£mn	x(418)	
LZO	Flow of overseas £ deposits with building societies	£mn	x(595)	
LZSD	Total deposits with Building societies	£mn	i(491)	14.5(S1)
LZSI	Personal sector net receipts of building society interest	£mn	t(122)	10.2(S1)
LZSV	Deposits with building societies: Insurance cos & pension funds	£mn	x(679)	
LZV	Deposits with building societies excluding those from other OFIs	£mn	i(778)	14.5(S1)
M	Imports of goods and services	85£mn	i(56)	5.2(S8)
M3	Flow of M3	£mn	i(299)	16.3(S3)
M4	Flow of M4	£mn	i(587)	16.3(S3)
M4VL	Velocity of M4	%	i(560)	16.3(S9)
ML	Imports of goods and services	£mn	i(114)	5.2(S8)
MAND	Proxy for the demand for total manufactured goods	85£mn	b(455)	6.2(S10)
MCME	Effective manufacturing import competitiveness		i(417)	9.9(S14)
MG	Total visible imports	85£mn	i(51)	5.1(S8)
MGL	Total visible imports	£mn	i(112)	5.2(S8)
MGBM	Imports of basic materials and miscellaneous	85£mn	b(9)	5.1(S8)
MGFD	Imports of food, drink and tobacco	85£mn	t(42)	5.1(S8)
MGMA	Imports of all manufactures	85£mn	i(188)	5.1(S8)
MGNO	Total non-oil visible exports	85£mn	i(79)	5.1(S8)
MGO	Imports of crude oil and oil products	85£mn	i(651)	5.2(S8)
MGOF	Imports of other fuels	85£mn	t(663)	5.2(S8)
MPRM	Proxy for production of finished manufactured goods	85£mn	b(457)	6.3(S10)
MPRO	Manufacturing production	85£mn	i(47)	6.2(S10)
MPRX	Output of food, drink and tobacco	85£mn	t(458)	6.3(S10)
MRGN	Ratio of gross to net output in manufacturing		x(710)	
MS	Imports of services	85£mn	i(55)	5.1(S8)
MSL	Imports of services	£mn	i(113)	5.2(S8)
MSOT	Imports of services excluding shipping	85£mn	b(44)	5.1(S8)
MSSH	Imports of services shipping	85£mn	x(104)	
NADJ	Discrepancy between FOF and banking stats £NNDLS	£mn	x(514)	
NCG	Notes and coin: public	£mn	i(473)	16.1(S3)
NCJ	Notes and coin: persons	£mn	t(733)	14.2(S3)
NCPA	Total number claiming personal allowances		t(50)	10.3(S18)
NCRE	Composite rate paid on earnings below upper limit		x(339)	
NCRJ	Employees rate paid on earnings below upper limit		x(326)	
NCV	Notes and coin: OFIs	£mn	x(17)	
NECO	Number of employees contracting out	000s	x(615)	
NECR	Employers contracted out rebate rate		x(331)	
NFLT	Flat Rate: Self employed		t(301)	10.4(S2)
NFWJ	Net Financial Wealth: Persons	£mn	i(328)	10.7(S18)
NGTP	Gross trading profits NSea comp (excl pub sec)	£mn	i(254)	12.3(S25)
NIGX	Proxy for net income gearing of non-North Sea ICCs	£mn	i(555)	11.3(S19)
NJCR	Employees contracted out rebate rate		x(337)	
NLAJ	Persons' holdings of net liquid assets (end-quarter)	£mn	b(318)	10.6(S18)
NLEL	Lower Earnings limit		t(292)	10.4(S2)
NLES	Lower Earnings limit self employed		t(308)	10.4(S2)
NOLD	Demand for petroleum products	85£mn	b(143)	5.2(S8)
NPSE	Self employed contributions		i(270)	10.5(S18)
NRCE	Employers contracted out rebate		i(271)	10.5(S18)
NRCJ	Employees contracted out rebate		i(275)	10.5(S18)
NRSE	Self employed contribution rate		x(338)	
NRST	Number of restart interviews (flow)	000s	x(528)	
NSG	North Sea Gas production (excluding public sector)	tonnes mn	x(287)	
NSGR	Gross revenue of North Sea Companies (excluding public sector)	£mn	i(261)	12.3(S25)
NSO	North Sea oil production	tonnes mn	x(557)	

NSTC	North Sea total costs	£mn	t(262)	12.3(S25)
NTIF	Rent and non-trading income of financial companies	£mn	i(771)	11.4(S19)
NTRI	Industrial and commercial companies non-trading income	£mn	t(26)	11.1(S19)
NUEL	Upper Earnings limit	£/wk	t(305)	10.4(S2)
NURE	Rate paid by those earning above upper earnings limit		x(317)	
NURJ	Rate paid by employees earning above upper limit		x(327)	
NWJ	Personal sector net wealth	£mn	i(279)	10.7(S18)
ODII	Outward investment (including outward unremitted profits)	£mn	b(411)	15.1(S5)
ONSO	North Sea net output	85£mn	t(641)	12.4(S25)
OOTH	Output of 'other' sectors (nationalised ind and private serv)	85£mn	i(425)	6.2(S10)
PAHM	Price deflator for all houses mix adjusted	1985=1	b(16)	9.6(S15)
PAT	Price of alcohol and tobacco	1985=1	b(693)	9.4(S15)
PC	Price deflator for total consumption	1985=1	i(82)	9.5(S0)
PCD	Price deflator for consumption of durable goods	1985=1	b(81)	9.5(S15)
PCE	Expected price level	1985=1	b(183)	9.7(S12)
PCND	Price deflator for consumption of non-durable items	1985=1	i(80)	9.4(S15)
PCON	Price of other non-durable consumption	1985=1	b(708)	9.4(S15)
PCUS	US consumer price index	1985=100	x(526)	
PEF	Price deflator for total final expenditure	1985=1	i(123)	9.7(S15)
PF	Price deflator for the consumption of food	1985=1	b(313)	9.4(S15)
PFCA	Implicit deflator for the factor cost adjustment	1985=1	i(201)	6.2(S9)
PFOS	World dollar price of oil	1985=1US$	x(656)	
PG	Price deflator for public authorities' current expenditure	1985=1	b(91)	9.5(S15)
PGAS	Price of gas	£/tonne	b(288)	12.3(S25)
PGDP	Price deflator for GDP (expenditure estimate)	1985=1	i(126)	9.7(S15)
PIF	Price deflator for total fixed investment	1985=1	i(90)	9.7(S15)
PIFG	Price deflator for Public Sector fixed investment	1985=1	t(676)	9.7(S15)
PIFO	Price deflator for fixed investment other than residential	1985=1	b(675)	9.6(S15)
PIHP	Price deflator for private residential fixed investment	1985=1	b(86)	9.6(S15)
PILG	Price of transfers of land and existing buildings	1985=1	t(187)	9.7(S15)
PINS	Price deflator for fixed investment in North Sea	1985=1	b(13)	9.7(S15)
PM	Price deflator for imports of goods and services	1985=1	i(125)	9.2(S8)
PMBM	AVI for imports of basic materials and miscellaneous	1985=1	b(11)	9.1(S14)
PMFD	AVI for imports of food, drink and tobacco	1985=1	b(92)	9.1(S14)
PMG	AVI for total visible imports	1985=1	i(95)	9.2(S8)
PMGM	AVI for imports of manufactures, inc erratics	1985=1	b(186)	9.1(S14)
PMGN	AVI for total non-oil visible imports	1985=1	i(117)	9.2(S14)
PMGO	AVI imports of crude oil and oil products	1985=1	t(111)	9.2(S14)
PMOS	AVI imports of crude oil and oil products (dollars)	1985=1US$	t(61)	9.2(S14)
PMOF	AVI imports of other fuel	1985=1	t(101)	9.2(S14)
PMS	Price deflator for imports of services	1985=1	b(96)	9.2(S8)
POIL	Price of North Sea Oil	£/tonne	t(685)	12.3(S25)
POWA	Population of working age excluding those in full-time education	000s	x(73)	
PPOX	Producer price of manuf output (excl food, drink tobacco)	1985=1	b(599)	9.3(S15)
PROM	Index of manufacturing production	1985=100	i(159)	6.2(S10)
PRRX	Real non-North Sea pre-tax rate of return	£mn	i(481)	11.4(S19)
PRUE	Prop of total earnings earned by those above upper limit		x(276)	
PS	Price deflator for stock levels	1985=1	b(127)	9.7(S15)
PSBR	Public sector borrowing requirement	£mn	i(233)	16.1(S20)
PVIC	Present value of investment allowances	%	x(344)	
PX	Price deflator for exports of goods and services	1985=1	i(124)	9.9(S16)
PXG	AVI for total visible exports	1985=1	i(99)	9.9(S16)
PXGM	AVI for exports of manufactures, inc erratics	1985=1	b(363)	9.8(S16)
PXGN	AVI for total non-oil visible exports	1985=1	i(58)	9.8(S16)
PXGO	AVI exports of crude oil and oil products	1985=1	t(315)	9.8(S16)
PXNM	AVI for exports of non-fuel, non-manufactures	1985=1	b(459)	9.8(S16)
PXOS	AVI exports of crude oil and oil products (dollars)	1985=1US$	t(57)	9.8(S16)
PXOF	AVI for exports of other fuel	1985=1	t(314)	9.9(S16)
PXS	Price deflator for exports of services	1985=1	b(100)	9.9(S16)
Q1	Seasonal dummy for quarter 1		x(501)	
Q2	Seasonal dummy for quarter 2		x(502)	
Q3	Seasonal dummy for quarter 3		x(503)	
Q4	Seasonal dummy for quarter 4		x(504)	
RCBR	Clearing banks' base rate	%	t(140)	8.3(S17)
RCCM	Real cost of capital		i(451)	7.5(S11)
RCCX	Non-North Sea ICCs capital consumption at replacement cost	£mn	b(536)	11.4(S19)
RCI2	Real cost of stockholding (lagged 2 quarters)		i(43)	3.1(S6)
RDT	Rate of customs and excise duty on tobacco	%	x(572)	
RESB	Unidentified financial transactions: banks	£mn	i(748)	16.2(S2)
RESE	Residual error in national income accounts	£mn	x(567)	
RESG	Unidentified financial transactions: public	£mn	x(469)	

RESJ	Unidentified financial transactions: persons	£mn	x(732)	
RESO	Unidentified financial transactions: overseas	£mn	t(485)	15.2(S5)
RESS	Net non-deposit liabilities	£mn	x(610)	
RESV	Unidentified financial transactions: OFIs	£mn	x(749)	
REUS	Three-month euro-dollar rate (quarterly average)	%	x(616)	
RHT	Implicit average tax rate on households' inc(excl grants)	%	i(430)	10.3(S18)
RIBA	Rate of return on banks & MFIs liabilities	%	b(348)	13.3(S22)
RIDI	Rate of return on inward non-bank, non-oil direct investment	%	i(349)	13.2(S22)
RIOL	Rate of return on inward oil direct investment	%	i(350)	13.3(S22)
RIPO	Rate of return on portfolio & miscellaneous liabilities	%	b(352)	13.3(S22)
RJGO	Ratio of the rate of other current grants to the initial estimate		t(303)	10.1(S2)
RLA	Local authority three month rate (quarterly average)	%	i(234)	8.3(S17)
RMD	Effective minimum deposit rate for durables	%	x(568)	
RNSR	Rate of North Sea oil and gas royalties	%	x(687)	
ROBA	Rate of return on banks & MFIs assets	%	i(353)	13.1(S22)
RODI	Rate of return on outward non-bank direct investment	%	b(356)	13.1(S22)
ROPO	Rate of return portfolio & miscellaneous assets	%	b(357)	13.2(S22)
RPAL	Average rate of personal allowance		t(54)	10.3(S2)
RPDI	Real personal disposable income	85£mn	i(293)	10.6(S18)
RPI	Retail Price Index (all items)	Jan 1987=1	t(158)	9.5(S17)
RPIA	Initial estimate for Retail Price Index	Jan 1987=1	x(517)	
RPIX	Retail Price Index (all items excl. mortgage interest)	Jan 1987=1	b(139)	9.5(S6)
RTPR	Rate of petroleum revenue tax	%	x(619)	
RUB	Estimated average rate of unemployment benefit	£/wk	t(611)	10.1(S2)
RUKG	Rate on long-term (20 years) UK government stock	%	b(311)	8.3(S17)
RULC	Relative unit labour costs	1985=100	i(670)	9.9(S16)
RUSG	US bond yield (secondary market, 10 years or more)	%	x(447)	
RWG	Constructed world long bond yield (10 yr)	%	b(359)	13.5(S24)
RZMG	Interest rate on building society mortgages	%	b(238)	8.3(S17)
RZSG	Gross rate of interest on building society shares	%	b(236)	8.3(S17)
RZSN	Net rate of interest on building society shares	%	i(237)	8.3(S17)
SCF	Financial companies saving	£mn	i(421)	11.5(S19)
SCI	Industrial and commercial companies saving	£mn	i(267)	11.3(S19)
SDBA	Spread on euro currency lending	£mn	x(340)	
SG	Public sector current surplus	£mn	i(208)	12.1(S20)
SHMB	Bank's share of private mortgage lending		x(203)	
SHMV	OFI's share of mortgage lending		x(59)	
SJ	Person's saving	£mn	i(172)	10.6(S18)
SNS	Saving by North Sea companies	£mn	i(253)	12.3(S25)
SPUK	UK share prices index	1985=100	x(297)	
SPW	Constructed world share price		b(336)	13.4(S24)
SR	Saving ratio	%	i(260)	10.6(S18)
SWI	Banks' net foreign currency position (assets +)	£mn	x(72)	
TARR	Reduction in income tax due to the existence of reduced rates	£mn	x(721)	
TAT	Taxes on alcohol and tobacco	£mn	t(694)	12.2(S2)
TCAT	Tax rate on consumption of alcohol and tobacco		t(703)	9.3(S21)
TCD	Tax rate on consumer durables		t(702)	9.3(S21)
TCF	Tax rate on consumption of food		t(704)	9.4(S21)
TCNS	North sea corporation tax payments	£mn	b(272)	12.4(S25)
TCCN	Tax rate on consumption of other non-durables		t(705)	9.3(S21)
TCR	Building societies' composite tax rate	%	t(634)	14.4(S2)
TE	Receipts by government of taxes on expenditure	£mn	i(195)	12.3(S21)
TFMA	Initial estimate of Fincos mainstream corporation tax payments	£mn	x(402)	
TGG	Taxes on current grants to persons	£mn	t(290)	10.4(S18)
TGR	Effective tax rate on current grants from public sector		x(655)	
THCO	Taxes on hydrocarbon oil	£mn	i(202)	12.2(S21)
TIMA	Initial estimates of non-North Sea mainstream corp tax payments	£mn	x(171)	
TIME	Time trend starting in 1955 Q1		x(505)	
TPAL	Aggregate married, single and child tax allowance	£mn/qtr	t(442)	10.3(S18)
TPG	Tax rate for government consumption		t(136)	9.3(S21)
TPIF	Tax rate for fixed investment		t(157)	9.3(S21)
TPR	Petroleum revenue tax	£mn	t(686)	12.4(S25)
TRAT	Local authority receipts of rates	£mn	b(205)	12.2(S21)
TRES	Residual expenditure taxes (including motor vehicle duty)	£mn	t(701)	12.3(S21)
TRY	Standard rate of income tax	%	x(564)	
TRYC	Annual tax rate on corporate income	%	x(596)	
TRYU	Implicit average higher tax rate	%	t(657)	10.3(S2)
TSET	Selective employment tax receipts	£mn	x(556)	
TWJ	Personal sector tangible wealth	£mn	b(210)	10.7(S18)
TYF	Financial companies payments of UK taxes on income	£mn	i(420)	11.5(S19)
TYFM	Financial companies payments of mainstream corporation tax	£mn	t(406)	11.4(S19)

TYI	ICCs payments of UK taxes on income	£mn	i(168)	11.2(S19)
TYIM	Non-North Sea ICCs payments of mainstream corporation tax	£mn	i(185)	11.2(S19)
TYJ	Personal sector payments of UK income tax	£mn	b(169)	10.4(S18)
TYJI	Proxy for the revenue from the investment income surcharge	£mn	x(444)	
TYJU	Proxy for payments of surtax/higher rate tax	£mn	t(441)	10.4(S18)
TYV	Tax payments by life assurance companies and pension funds	£mn	x(661)	
ULC	Unit labour costs whole economy	£/85£	i(77)	7.5(S15)
UMGM	UVI for imports of manufactures, including erratics	1985=100	b(189)	9.1(S14)
UPLT	Uplift allowance for North Sea investment	%	x(620)	
UR	Rate of unemployment	%	i(76)	7.2(S11)
UULC	US normalised unit labour costs	1985=1	x(510)	
UXGM	UVI of exports of manufactures, including erratics	1985=100	b(282)	9.8(S16)
VATS	Standard rate of VAT	%	x(662)	
VOHS	Value of owner occupier housing stock	£mn	i(212)	10.6(S6)
WER	World/dollar exchange rate: foreign currency per US$ (MERM wts)	fc/$	x(604)	
WGDP	Major six GDP	1985=100	x(696)	
WLCL	World actual unit labour costs	1985=1	x(435)	
WODY	Constructed world dividend yield	%	b(310)	13.5(S24)
WPC	Major six consumer prices	1985=100 lc	x(697)	
WPFD	World dollar price of food	1985=100	x(167)	
WPIC	World dollar price of industrial commodities	1985=100	x(166)	
WPP	World producer price	1985=100	x(45)	
WPX	World export prices	1985=100	x(87)	
WS	Actual average quarterly wages and salaries (CSO measure)	£/qtr	b(269)	7.3(S12)
WSE	Self-employment income per man	£mn	b(358)	7.3(S12)
WIMU	World import volumes (UK weighted)	1985=100	x(178)	
X	Exports of goods and services	85£mn	i(41)	4.2(S7)
XE	Exports of goods and services	£mn	i(110)	4.2(S7)
XCME	UK effective export competitiveness		i(671)	9.9(S16)
XG	Total visible exports	85£mn	i(36)	4.1(S7)
XGE	Total visible exports	£mn	i(108)	4.2(S7)
XGMA	Exports of manufactures, inc erratics	85£mn	b(34)	4.1(S7)
XGNM	Exports of non-fuel, non-manufactures	85£mn	b(468)	4.1(S7)
XGNO	Total non-oil visible exports	85£mn	i(474)	4.1(S7)
XGO	Exports of crude oil and oil products	85£mn	b(278)	4.1(S7)
XGOF	Exports of other fuels	85£mn	t(277)	4.1(S7)
XOGO	Other external finance:overseas	£mn	x(472)	
XS	Exports of services	85£mn	b(40)	4.2(S7)
XSE	Exports of services	£mn	i(109)	4.2(S7)
XSOT	Exports of services excluding shipping	85£mn	b(46)	4.2(S7)
XSSH	Exports of services shipping	85£mn	x(89)	
YD	Personal disposable income	£mn	i(170)	10.6(S18)
YDIJ	Personal income from dividends and net interest	£mn	i(146)	10.2(S18)
YDLH	Adjusted proxy for household real disposable income	£mn	t(590)	10.6(S18)
YEC	Employers' contributions	£mn	i(149)	10.3(S18)
YECN	Employers' national insurance contributions	£mn	b(151)	10.5(S18)
YECO	Employers' other contributions (ie to LAPF's)	£mn	b(150)	10.2(S18)
YECS	Accruals of the national insurance surcharge	£mn	i(141)	12.3(S18)
YFAB	Financial companies income from abroad	£mn	t(391)	11.4(S19)
YFT	Financial companies proxy for taxable profits	£mn	i(400)	11.4(S19)
YFTA	Financial companies initial estimate of proxy for taxable profits	£mn	x(401)	
YGC	Public sector total current receipts	£mn	i(196)	12.1(S20)
YGDI	Central government receipts of debenture interest	£mn	x(246)	
YGRA	Pub sec inc from rent, non-trading cap,divs & interest	£mn	t(192)	12.1(S20)
YGTA	Public sector gross trading surplus	£mn	t(190)	12.1(S20)
YHOL	Proxy for households' receipts of dividends and gross interest upon which tax is paid in the current qtr	£mn	i(437)	10.3(S2)
YHOO	Households' receipts of dividends and gross interest other than that from building societies (households)	£mn	b(142)	10.1(S18)
YIAB	Industrial and commercial companies income from abroad	£mn	t(39)	11.1(S19)
YIBA	Banks & MFIs IPD debits	£mn	i(360)	13.3(S22)
YIDI	IPD debits: direct investment	£mn	i(361)	13.2(S22)
YIOL	IPD debits: oil direct investment	£mn	i(375)	13.2(S22)
YIPO	IPD debits: portfolio & miscellaneous	£mn	i(398)	13.3(S22)
YIT	Proxy for non-North Sea taxable profits	£mn	t(161)	11.1(S19)
YITA	Initial estimate of proxy for non-North Sea taxable profits	£mn	x(163)	
YITP	Industrial and commercial companies gross trading profits	£mn	i(19)	11.1(S19)
YJ	Personal pre-tax income	£mn	i(155)	10.3(S18)
YJCN	National insurance contributions paid by employees and self-empl	£mn	b(351)	10.5(S18)
YJG	Current grants to persons from public sector	£mn	t(319)	10.3(S18)
YJGA	Initial estimate of current grants to persons from public sector	£mn	x(591)	

YJO	Other personal income	£mn	i(148)	10.2(S18)
YJT	Computed taxable personal income	£mn	i(304)	10.4(S18)
YJTW	Income from wages, salaries and private pension scheme	£mn	i(432)	10.3(S18)
YOBA	IPD credits: banks & MFIs	£mn	i(413)	13.1(S22)
YODI	IPD credits: direct investment	£mn	i(414)	13.1(S22)
YOPO	IPD credits: portfolio & miscellaneous	£mn	i(429)	13.2(S22)
YR	Income from rent and non-trading capital	£mn	b(134)	6.2(S18)
YRI	Industrial and commercial companies income from rent	£mn	b(25)	11.1(S19)
YRJ	Personal sector income from rent and non-trading capital	£mn	i(147)	10.2(S18)
YSA	Stock appreciation (total)	£mn	t(138)	3.2(S6)
YSAG	Public sector stock appreciation	£mn	t(215)	3.2(S6)
YSAI	Industrial and commercial companies stock appreciation	£mn	t(21)	3.2(S6)
YSAJ	Personal sector stock appreciation	£mn	i(214)	3.2(S6)
YSE	Income from self-employment	£mn	i(135)	10.1(S18)
YSEL	Proxy for the taxable self-employment income on which tax is paid	£mn	i(433)	10.3(S2)
YVO	Life assurance companies' and pension funds' receipts of rent and non-trading capital, dividends and net interest	£mn	t(539)	10.2(S18)
YWS	Income from wages and salaries	£mn	i(145)	10.1(S18)
ZDOW	Percentage share of endowment mortgages	%	x(225)	
ZLIQ	Proxy for building societies' liquidity position	%	i(241)	14.6(S1)
ZLVF	Loan to value ratio for 1st time buyers	%	x(12)	

(a) Unless otherwise stated, seasonally-adjusted series are used in all cases where the appropriate statistics are available or can be derived.
(b) b = behavioural equation, i = identity, t = technical, x = exogenous.

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