

## A POLITICO-ECONOMIC MODEL OF THE UNITED KINGDOM<sup>1</sup>

### I

Over the past few years economists have become increasingly concerned with theoretical and empirical analysis of the interdependence between economy and polity. Various approaches have been used, each differing in emphasis:

(a) *Reaction functions* are based on the quantitative theory of economic policy (Tinbergen, 1956; Theil, 1964). These derive the revealed preference of decision-makers from an analysis of their actions. The weights in the preference function are inferred by assuming that a quadratic loss function is *minimised* subject to the constraint of a macro-econometric model.<sup>2</sup> Considerable methodological problems are involved in this approach, it is very difficult to separate the parameters of the preference function from those of the economic structure or of the reaction function (see Wood, 1967; Makin, 1976).

(b) *Median Voter Models* serve to derive the demand for publicly supplied goods under simple majority rule, given single peaked preferences (Black, 1958).<sup>3</sup>

(c) *Behavioural models of bureaucracy* are intuitively appealing but lack a well-established theoretical base. It is assumed that the bureaucracy is interested in a continuous expansion of outlays – and that bargaining between it and parliament results in a mark-up of expenditures over the previous year's base.<sup>4</sup>

(d) *Politico-economic models* study how the state of the economy affects the polity, and how political behaviour affects the economy (see Frey, 1978). One of the earliest *partial* models was developed by Goodhart and Bhansali (1970). They estimated a popularity function for the United Kingdom with monthly data for 1947-68, showing the influence of the rate of inflation and unemployment upon government popularity as measured by Gallup or National Opinion Polls. They also related it to the options given by the Phillips Curve.

<sup>1</sup> The research on this paper was undertaken during the first author's stay as a visitor at Nuffield College, Oxford, in spring 1976. He had the chance to present preliminary versions at research seminars at St Catherine's and Nuffield Colleges, Oxford, at an inflation workshop of the US Treasury and of the International Institute for Economic Research in Los Angeles (March 1976), as well as at seminars at the Cowles Foundation of Yale University, the Woodrow Wilson School of Princeton, The University of North Carolina, and the Center of Public Choice, Virginia Polytechnic Institute and State University. The authors are particularly grateful to A. S. Blinder, S. Brittan, J. M. Buchanan, D. Butler, M. A. H. Dempster, J. S. Flemming, C. Goodrich, G. M. Heal, D. F. Hendry, G. H. Kramer, and W. D. Nordhaus.

<sup>2</sup> Studies of this kind have been undertaken for the UK's monetary policy (Fisher, 1968, 1970; Nobay, 1974) and general economic policy (Pissarides, 1972), and for other countries (for the United States, e.g. by Friedlaender, 1973; for Australia by Jonson, 1974).

<sup>3</sup> There are many studies of this kind, especially for local issues and referenda in the United States (e.g. Barlow, 1970; Borcharding and Deacon, 1972; Deacon and Shapiro, 1975). With Swiss data it has been empirically shown that untheoretical demand estimates using average income and tax shares (i.e. relying on the mistaken analogy with the demand for private goods, e.g. Fabricant, 1952; Dye, 1966) yield inferior results to the median voter model (Pommerehne and Frey, 1976).

<sup>4</sup> See Wildavsky (1964); Davis, Dempster, Wildavsky (1966).

A well-known politico-economic model is that developed by Nordhaus (1975). Assuming the existence of a Phillips trade-off between inflation and unemployment, he concludes that a vote maximising government will behave in an infinitely myopic way in a steady state. However, if vote maximisation at the next election is replaced by an equally reasonable assumption (that the government wants to stay in power for as long as possible), this conclusion no longer holds and socially optimal behaviour is no longer excluded (Frey and Ramser, 1976). If government policy is variable over time, it may be profitable for a vote maximising government to create political business cycles (Nordhaus, 1975; see the similar models by MacRae, 1977; Lindbeck, 1976).

An economy-wide econometric model of politico-economic interaction has been developed for the United States (Fair, 1975). Other studies come to different conclusions about the vote function (see Kramer, 1971; Stigler, 1973; Arcelus and Meltzer, 1975).

## II

This paper seeks to present a *positive* model of politico-economic interaction in the United Kingdom and to estimate it empirically with recent data.

The basic hypothesis advanced is that the governing party aims to stay in power and therefore seeks to increase its popularity with the electorate when its (perceived) re-election chances are low. For this purpose it undertakes an expansionary policy expected to lead to a popularity increase and an improvement in its election prospects. On the other hand, when it is confident of winning the forthcoming general election, it can afford to undertake a policy in accordance with its ideology.<sup>1</sup> A left-wing government is expected to increase, and a right-wing government to decrease the budget, i.e. both public expenditures and taxes, relative to national income.<sup>2</sup> These hypotheses imply that *the voters* respond in a predictable way to changes in overall economic conditions influenced by government policy. We therefore assume that government takes the result of popularity surveys as the best *current* indicator of its future re-election chances, these in turn being influenced by the government with precisely that end in mind. All governments operate within a given institutional framework.

The British political system (see, for example, Leonard, 1968; Butler and Stokes, 1974; and the Nuffield election studies, the latest being Butler and Kavanaugh, 1974) is characterised by two main parties, Conservative and Labour. The larger of the two parties, in terms of parliamentary seats, forms the government, i.e. the *lead* (relative to the main opposition party) is decisive. A lead in seats (in the House of Commons) usually corresponds to a lead in votes, but exceptions are the general elections of 1951 and February 1974.

<sup>1</sup> It may be argued that the constraint on ideological action does not hold in all cases, e.g. where the governments perceive re-election prospects are so bad that they abandon the goal of retaining power and seek to establish ideological policies before losing power.

<sup>2</sup> These hypotheses may be formulated in the Public Choice tradition: the government maximises its utility (consisting in putting its ideology into practice) subject to a re-election (and other) constraint(s). Not being able to solve this complex dynamic optimisation problem formally due to high transactions costs, it resorts in a satisficing way to the behaviour suggested.

A notable feature of the British (and some Commonwealth) systems is the variable election date. The Prime Minister is able to call a general election at his own discretion, provided it is within five years of the last one. This gives the government an additional policy instrument. For our purposes we need only distinguish two situations which may obtain after a general election:

(i) The government has a majority of ten or more seats, providing a safe parliamentary base from which to pursue its policy goals. As it is unwise to wait until the last possible moment, the next general election will be called after (about) *four years*.

(ii) The government has a parliamentary majority of *less than 10 seats*, in which case it takes the first opportunity to call a new general election (as in 1966 and 1974). Here the government acts as if the next election was imminent. This simple theory of election fixing will be used in what follows.

Our discussion will take the following form. Section III develops and tests the assumption about voters' behaviour (lead function). Section IV examines the corresponding hypotheses concerning government behaviour (policy functions).

### III

Following earlier voting and popularity function estimates it is assumed that voters' behaviour is related to the *current* (or only slightly lagged) state of economy. If it is satisfactory, there is a tendency to vote for the government, if not, for the opposition.

A striking feature of the United Kingdom is that the government's lead *always* falls quite strongly between elections and is very often negative (see, for example, Hodder-Williams, 1970; Oakeshott, 1973), this being reflected in by-election losses (see Cook and Ramsden, 1973). It has been argued that this popularity loss is *solely* due to non-economic factors (Miller and Mackie, 1973). This (pure) "election cycle" is accounted for by two variables:<sup>1</sup>

(i) The number of quarters to what is expected to be the *nearest election*, past or future (*NE*) following Miller and Mackie. This seeks to capture both the fall and the revival of the government lead over the election term.

(ii) The lead of the government "depreciates" continually over the term of office, this being indicated by a variable which increases over time (*DEP*) as measured from the previous election.

Both election-cycle variables are so constructed that the corresponding parameters are *a priori* expected to be negative.

Besides the "election cycle" variables, *economic variables* enter into the *lead function*; in particular the annual rate of inflation (in per cent, *I*), the rate of unemployment (in per cent, *U*), and the rate of growth (over the previous year) of disposable real income (in per cent, *GDY*).<sup>2</sup> It is expected that the rates of inflation and of unemployment have a negative, and the growth of income a positive effect on the government lead.

<sup>1</sup> Exact specification of the variables is given in the Appendix, together with data.

<sup>2</sup> In the United Kingdom the balance of payments may be thought to have an influence on government popularity. Empirical estimates have, however, shown no statistically significant influence.

The lead function was estimated with OLS in a linear form with quarterly data from 1959:IV to 1974:IV (61 observations). It covers the period from the October 1959 general election to the most recent one (October 1974); with the governments of Macmillan, Douglas-Home (Conservative, C.), Wilson (Labour, L.), Heath (C.) and again Wilson. The lead is measured as the percentage difference between the popularity of the government and that of the main opposition party, as surveyed by Gallup Polls Ltd.<sup>1</sup>

Assuming that past lead has an influence upon the current value, the empirical estimate is

$$\begin{aligned} LEAD_t = & 4.59 + 0.37 LEAD_{t-1} - 0.35 I_t - 1.98 U_t \\ & (3.11) \quad (-2.23) \quad (-2.09) \\ & + 0.39 GDY_t - 0.92 NE_t - 0.31 DEP_t \\ & (2.34) \quad (-2.07) \quad (-3.09) \end{aligned} \quad (1)$$

$(\bar{R}^2 = 0.77; \text{D.W.} = 1.97; \text{D.F.} = 54).$

The figures in parentheses are the  $t$  values. D.W. indicates the Durbin-Watson coefficient, D.F. the degrees of freedom. All the parameter estimates of the lead function are statistically significant at the 5% level using a two-tailed test, and have the expected signs. The equation accounts for almost 80% of the variance ( $\bar{R}^2$ ) and there is no serial correlation according to the Durbin-Watson test. (But note that the test statistic may be biased due to the lagged endogenous variable.)

These encouraging results are not due to the inclusion of the lagged lead variable in equation (1). Dropping  $LEAD_{t-1}$  gives

$$\begin{aligned} LEAD_t = & 10.24 - 0.61 I_t - 6.01 U_t + 0.81 GDY_t \\ & (-2.65) \quad (-3.89) \quad (2.88) \\ & - 0.69 NE_t - 0.57 DEP_t \\ & (-2.36) \quad (-4.53) \end{aligned} \quad (2)$$

$(\bar{R}^2 = 0.69; \text{D.W.} = 1.71; \text{D.F.} = 55).$

All the variables remain statistically significant and almost 70% of the variance is accounted for.

The equations suggest that a government's lead over the opposition is determined by both the *state of economy* and the *election cycle*. According to the second equation an increase in the rate of inflation by 1 percentage point reduces the government lead by about 0.6%, an increase in unemployment by 1 percentage point reduces the government lead by about 6%, and a rise in the real growth rate of 1% increases the government lead by about 0.8%.

The estimate also indicates that in addition to a symmetric rise and fall in the government lead (captured by  $NE$ ) there is a gradual deterioration in popularity (compared to the opposition) over the course of the election term (captured by  $DEP$ ).

There is some correlation between the economic variables ( $r_{IU} = 0.5$ ,  $r_{IGDY} = -0.21$ ,  $r_{UGDY} = 0.13$ ), the parameter estimates are, however, stable if one of the variables is omitted. It was also tested whether the lead levels or their depreciation are significantly different for individual governments. For both, this was found not to be the case.

<sup>1</sup> We are grateful to David Butler for the data and advice given for their interpretation.

## IV

It was suggested in section II that a government will differentiate between two states of the world:

(a) if the current popularity of government is so low that its lead ( $LEAD$ ) is below some critical level  $LEAD^*$  – a situation which is indicated by the dummy variable  $D$  taking the value one – it tries to increase its lead so as to be re-elected. A low popularity at the beginning of the term is taken to be less serious by government than towards the end of the term when little time is available to improve this situation. It is therefore assumed that the critical lead level  $LEAD_t^*$  continually rises over the election period, starting from  $-8\%$  and ending at  $+8\%$ .<sup>1</sup> The larger the deficit  $LEAD_t^* - LEAD_{t-1}$ , the more strongly it must do this. A time lag of one quarter is introduced to allow for the decision lag.

The *change* of government's policy instruments ( $PI$ ) for re-election purposes ( $PI^{REEL}$ ) depends on the size of the lead deficit, i.e. the past level of policy instruments has an effect on its current use and there is only gradual adjustment to a new level:

$$PI_t^{REEL} = [\alpha'_0 + \alpha_1(LEAD_t^* - LEAD_{t-1}) + \alpha_2 PI_{t-1}] D_{t-1}. \quad (3)$$

According to our hypothesis, the government undertakes an *expansionary* policy in an effort to raise its popularity. This it will do by decreasing (short-run) unemployment and increasing the growth of disposable income, provided that the induced increase in inflation is not very large. A comparison of the parameter sizes of the lead function given above shows that this expectation is empirically sound.<sup>2</sup> It is therefore expected that  $\alpha_1 > 0$  for expenditures, and  $\alpha_1 < 0$  for taxes, and that  $\alpha_2 \geq 0$ .

(b) The government is confident of winning a forthcoming election if its lead over the main opposition party is equal to, or greater than, the critical level  $LEAD_t^*$ .

Provided that  $LEAD_t^* < LEAD_{t-1}$ , i.e. if  $D = 0$ , the government is free to pursue its ideological goals. To test whether the two major parties have different goals, two variables ( $IDEOL^C$ ,  $IDEOL^L$ ) are introduced to reflect Conservative and Labour ideology, respectively.  $IDEOL^C$  is taken to be equal to  $(LEAD_t^* - LEAD_{t-1})(1 - D_{t-1})$  if the Conservative party is in power. The difference between the target lead level  $LEAD_t^*$  and actual lead  $LEAD_{t-1}$  indicates what scope the government has available to undertake an ideological policy, the time lag of one quarter reflecting inevitable lags in perception. Accordingly,  $D$  also enters one quarter lagged. Correspondingly,  $IDEOL^L$  is equal to  $(LEAD_t^* - LEAD_{t-1})(1 - D_{t-1})$  if the Labour party is in power. An ideological policy consists of an effort to achieve certain *goals*. The ideological goal is taken to be a target share

<sup>1</sup> Estimations with different sequences of  $LEAD_t^*$  have not changed the qualitative outcome. For an exact definition of  $LEAD_t^*$  used here see the Appendix.

<sup>2</sup> Using the estimated lead function and assuming that the expansionary policy reduces unemployment by 1% and increases income growth by 1%, inflation would have to rise by more than 10% to induce an overall fall in the government lead.

of public expenditure and taxes in gross domestic product (*GDP*). Thus

$$PI_t^* = (\alpha_3^C IDEOL^C + \alpha_3^L IDEOL^L) GDP_{t-1}. \quad (4)$$

It is expected that  $0 < \alpha_3^C < \alpha_3^L$ .

Within any period only part of the ideological use of policy instruments is achieved. The path of ideological policy ( $PI^{IDEOL}$ ) is given by the adjustment function

$$PI_t^{IDEOL} = [\alpha_0'' + (\alpha_3^C IDEOL^C + \alpha_3^L IDEOL^L) GDP_{t-1} + \alpha_4 PI_{t-1}] (1 - D_{t-1}), \quad (5)$$

where  $\alpha_4 \geq 0$ .

Government behaviour is subject to various constraints, in particular, it has to take account of the state of the *balance of payments*, reflected by the balance of current account (*BCA*). The importance of this outside restriction for British economic policy has, of course, been noted by many observers (see, for example, Brittan, 1969).

Public expenditures (in real terms) are also expected to increase due to the rise in relative *cost* of government activity when the general wage level in the economy increases coupled with below average productivity increases in the public sector compared to the rest of the economy (see Baumol, 1967, and for an empirical analysis, Dempster and Davis, 1976). This effect is accounted for by adding the (lagged) level of real wage rates ( $W$ ) to the explanatory variables.<sup>1</sup> The influence of constraints on the use of policy instruments ( $PI^{CONST}$ ) is therefore given as

$$PI_t^{CONST} = \alpha_0''' + \alpha_5 BCA_{t-1} + \alpha_6 W_{t-1}, \quad (6)$$

and the expected signs are  $\alpha_5 > 0$  for public expenditures and  $\alpha_5 < 0$  for taxes;  $\alpha_6 > 0$ .

Adding the various determinants of policy instruments,

$$PI = PI^{REEL} + PI^{IDEOL} + PI^{CONST} \quad (7)$$

gives

$$\begin{aligned} PI_t = & \alpha_0 + [\alpha_1 (LEAD_t^* - LEAD_{t-1})] D_{t-1} \\ & + [(\alpha_3^C IDEOL^C + \alpha_3^L IDEOL^L) GDP_{t-1}] (1 - D_{t-1}) \\ & + [\alpha_2 D_{t-1} + \alpha_4 (1 - D_{t-1})] PI_{t-1} + \alpha_5 BCA_{t-1} + \alpha_6 W_{t-1}, \end{aligned} \quad (8)$$

where  $\alpha_0 = \alpha_0' D_{t-1} + \alpha_0'' (1 - D_{t-1}) + \alpha_0'''$ .

Statistical estimates of the policy functions have been undertaken for the period 1962:II–1974:IV, covering the governments of Macmillan (the last one and a half years), Douglas-Home, Wilson (1964–70), Heath, and again Wilson. Of these 51 quarters the Conservatives were in power for 24, and Labour for 27. The Tories were free to act ideologically in 10 quarters (i.e. periods in which  $LEAD^* < LEAD$ ), Labour in 13 quarters.

The following economic policy instruments are considered: government expenditure in real terms (various components divided into consumption *CON*,

<sup>1</sup> In the equation explaining current grants to the personal sector (*CGR*), the rate of unemployment is included among the determining variables (with coefficient  $\alpha_{UR}$ ) to account for the concomitant change in unemployment benefits paid out.

Table I  
*Policy Function for the United Kingdom, 1962: II-1974: IV*  
 (OLS-estimates)

	Ideological goals			Adjustment		Economic constraints			Test statistics		
	Re-election effort Government lead deficit Constant ( $\alpha_1$ ) ( $\alpha_0$ )	Con-servative government ( $\alpha_2^C$ )	Labour government ( $\alpha_2^L$ )	With respect to ideological goals ( $\alpha_3$ )	With respect to re-election effort ( $\alpha_4$ )	Balance of current account ( $\alpha_5$ )	Real wage rate ( $\alpha_6$ )	Unem-employment ( $\alpha_{UR}$ )	$\bar{R}^2$	D.W.	D.F.
CON	0.194 (6.07)	0.00027 (2.11)	0.00039 (2.62)	0.629 (27.99)	0.771 (34.51)	0.00017 (3.56)	0.0094 (6.78)	—	0.98	2.04	43
INV	0.465 (1.51)	0.00012 (1.69)	0.00031 (2.15)	0.607 (12.09)	0.717 (16.41)	0.00010 (2.48)	0.0069 (4.11)	—	0.92	2.20	43
SUB	0.432 (1.81)	0.00009 (1.53)	0.00037 (2.31)	0.621 (13.99)	0.792 (20.03)	0.00013 (2.21)	0.0025 (3.61)	—	0.90	2.23	43
CGR	-0.231 (-1.77)	0.00067 (1.75)	0.00082 (3.17)	0.734 (18.58)	0.853 (23.51)	0.00012 (2.36)	0.0015 (9.80)	0.121 (2.57)	0.97	1.91	42
TR	-0.906 (-3.47)	0.00014 (0.94)	0.00031 (1.94)	0.695 (15.40)	0.769 (20.41)	-0.00098 (-3.47)	0.0053 (5.07)	—	0.98	1.87	43

The figures in parentheses are *t* values. D.W. indicates the Durbin-Watson statistic and D.F. the degrees of freedom.

investment *INV*, subsidies to enterprises *SUB*, current grants to the personal sector *CGR*) and tax policy reflected by total government receipts *TR* in real terms.

Table 1 gives the set of estimates for the various policy instruments using ordinary least-squares estimates. The equations are (in the statistical sense) able to explain a very high share of the variance and the Durbin–Watson statistics indicate absence of serial correlation. It should be noted that due to the lagged endogenous variables the D.W.- and the *t*-coefficients may be biased.<sup>1</sup> All the parameters have the expected sign. From this we may conclude that the need for re-election exerts a significant influence upon the use of government policy instruments. All governments undertake an expansionary policy, i.e. increase public expenditures the higher the popularity (lead) deficit ( $\hat{\alpha}_1 > 0$ ). The reverse holds for taxes ( $\hat{\alpha}_1 < 0$ ).

The ideological determinants of government policy are significant at the 5% level in half the cases examined, and the Conservatives seem to have a lower target share of expenditures and taxes than Labour ( $\hat{\alpha}_3^C < \hat{\alpha}_3^L$ ). The ideology parameters of the two parties, however, do not differ significantly from each other<sup>2</sup> which may be due to the small number of observations. The estimated coefficients for the adjustment are highly significant.  $\hat{\alpha}_2$  is moreover significantly smaller than  $\hat{\alpha}_4$ ,<sup>3</sup> the *past* instrument level has a smaller weight when the government is concerned with re-election than with ideology. There are thus good grounds for assuming that governments perceive the re-election requirement to be more pressing than the pursuit of ideological goals and therefore adjust their policy instruments more quickly in the former than in the latter case.

The constraints identified exert a statistically highly significant effect upon the government's use of policy instruments. An improvement in the balance of payments (*ceteris paribus*) allows a more expansionary economic policy, and conversely ( $\hat{\alpha}_5 > 0$  for expenditures, and  $\hat{\alpha}_5 < 0$  for taxes); and a rise in the real wage rate tends to increase real public outlays and taxes ( $\hat{\alpha}_6 > 0$ ). An increase in the rate of unemployment significantly increases current grants to the personal sector ( $\hat{\alpha}_{UR} > 0$ ).

## V

It may be concluded that the model of mutual interdependence between the economy and the polity of the United Kingdom has been successfully tested with recent data. The government's lead in popularity (as regularly surveyed by Gallup) compared with the main opposition party is significantly affected by the state of the economy. A rise in the rate of inflation by 1% reduces the government's lead by about 0.6% and an increase in unemployment by 1% reduces the government's lead by about 6%, and an increase in the growth

<sup>1</sup> Estimates without the lagged endogenous variable among explanatory variables also give statistically satisfactory results.

<sup>2</sup> The *t* values for the equations *CON*, *INV*, *SUB*, *CGR*, and *TR* are 0.61, 1.17, 1.61, 0.76 and 1.76, respectively.

<sup>3</sup> The *t* values for the equations *CON*, *INV*, *SUB*, *CGR*, and *TR* are 5.94, 2.36, 3.81, 3.46 and 2.09, respectively.



rate of disposable real income by 1% increases the lead by about 0.8%. In addition, the lead is significantly affected by an autonomous "election cycle" bringing about a decrease in relative government popularity in between elections as well as a continuous popularity depreciation relative to the opposition.

The analysis also suggests that the use of policy instruments is determined by ideological factors, where government is free to act according to its preferences. If the government's lead falls below a critical level, policy instruments are used in an expansionary fashion, i.e. expenditures are raised while taxes are reduced. The balance-of-payments constraint also has a significant effect upon government policy.

The model developed may be useful for purposes other than providing new insights into the working of a modern economy and society: economic forecasting may be improved due to the improved knowledge of prospective government action. Better policy advice may also be offered because one may take into account the interests of the government in adopting it. Finally, specification of macro-econometric models may be improved due to endogenisation of government behaviour.

*University of Zurich and Basel  
University of Zurich*

BRUNO S. FREY  
FRIEDRICH SCHNEIDER

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#### APPENDIX: THE DATA

The policy instruments *CGR*, *CON*, *INV*, *SUB*, and *TR* are all deflated with the GDP index. The average earnings are deflated with the retail-price index.

*BCA*. Current balance of payments, current account, million £, seasonally adjusted, source: Databank of the Bank of England, group 03, table 08.

*CGR*. Government transfer payments and loans: current grants (= grants to the personal sector, principally national insurance benefits, and grants paid abroad by central government and local authorities), million £, source: Central Statistical Office, *Economic Trends*, annual supplement, HMSO, London 1975, table 113.

*CON*. Government goods and services: consumption (= current expenditure on goods and services at market prices by central government and local authorities, including the pay of employees), million £, source: *Economic Trends*, *op. cit.*, table 113.

*DEP*. Depreciation of the government's popularity: 1, 2, 3, ..., 20 for the period 1959:IV-1964:III; 1, 2, 3, 4, 5 for 1964:IV-1965:IV; 1, 2, 3, ..., 18 for 1966:I-1970:II; 1, 2, 3, ..., 14 for the time 1970:III-1973:IV; and 1, 2, 3, 1 for 1974:I-IV.

*GDP*. Gross domestic product at factor cost, million £, source: *Economic Trends*, *op. cit.*, table 113.

*GDY*. Rate of growth of real personal disposable income, seasonally adjusted 1970 prices, yearly percentage, source: *Economic Trends*, *op. cit.*, table 19.

*I*. General index of retail prices (all items), average 1970 = 100, source: *Economic Trends*, *op. cit.*, table 94, seasonally adjusted by the authors.

*INV*. Government goods and services: investment (= expenditure on fixed assets (land and buildings, vehicles, plant and machinery, etc.) by central government, local authorities and public corporations), million £, source: *Economic Trends*, *op. cit.*, table 113.

*LEAD*. Lead of government popularity over the popularity of the main opposition party (i.e. Conservative or Labour), percentage points, source: Gallup (1975) and Butler and Sloman (1975).

*LEAD\**. Critical lead level. Over the 16 periods of a "normal" election period it takes the values (in per cent) -8, -8, -7, -7, -6, -5, -4, -3, -2, -1, 0, 2, 4, 6, 8, 8. When elections are taken to be imminent, *LEAD\** takes the value +8%.

*NE*. Number of quarters to the expected date of the nearest elections, past or present. For actual election periods of more than the expected 4 years, the variable is set equal to one. 1, 2, 3, ..., 8, 8, 7, ..., 1, 1, 1, 1, 1 for the period 1959:IV-1964:III; 1, 1, 1, 1, 1 for 1964:IV-1965:IV; 1, 2, 3, ..., 8, 8, 7, ..., 1, 1, 1 for 1966:I-1970:II, 1, 2, 3, ..., 8, 8, 7, ..., 3 for 1970:III-1973:IV; and 1, 1, 1, 1 for 1974:I-IV.

*PGDP*. Price index of gross national product, average 1963 = 100, source: *Economic Trends, op. cit.*, table 94; used for calculating *CGR*, *CON*, *INV*, and *SUB* in real terms.

*SUB*. Government transfer payments and loans: subsidies (= unrequited payments on current account by central government and local authorities to enterprises both in the private and public sectors), million £, source: *Economic Trends, op. cit.*, table 113.

*TR*. Total receipts in the public sector, million £, source: *Economic Trends, op. cit.*, table 111.

*U*. Unemployment rate, seasonally adjusted, percent, source: *Economic Trends, op. cit.*, table 89.

*W*. Average earnings (wages and salaries combined), all industries and services, seasonally adjusted, Jan. 1970 = 100, source: *Economic Trends, op. cit.*, table 91.

## REFERENCES

- Arcelus, F. and Meltzer, A. H. (1975). "The Effect of Aggregate Economic Variables on Congressional Elections." *American Political Science Review*, vol. 69 (December), pp. 1232-9.
- Barlow, R. (1970). "Efficiency Aspects of Local School Finance." *Journal of Political Economy*, vol. 78 (September/October), pp. 1028-40.
- Baumol, W. J. (1967). "Macroeconomics of Unbalanced Growth." *American Economic Review*, vol. 57, pp. 415-26.
- Black, D. (1958). *The Theory of Committees and Elections*. Cambridge: The University Press.
- Borcherding, Th. and Deacon, R. (1972). "The Demand for Services of Non-Federal Governments." *American Economic Review*, vol. 62 (December), pp. 891-901.
- Brittan, S. (1969). *Steering the Economy*. London: Secker and Warburg.
- Butler, D. and Kavanagh, D. (1974). *The British General Election of February 1974*. London: Macmillan.
- and Sloman, A. (1975). *British Political Facts, 1900-1975*. London: Macmillan.
- and Stokes, D. (1974). *Political Change in Britain: The Evolution of Electoral Choice*. London: Macmillan.
- Cook, Ch. and Ramsden, J. (1973). *By-Elections in British Politics*. London: Macmillan.
- Davis, O. A., Dempster, M. A. H. and Wildavsky, A. (1966). "A Theory of the Budgeting Process." *American Political Science Review*, vol. 60 (September), pp. 529-47.
- Deacon, A. and Shapiro, P. (1975). "Private Preference for Collective Goods Revealed Through Voting on Referenda." *American Economic Review*, vol. 65 (December), pp. 943-55.
- Dempster, M. A. H. and Davis, O. A. (1976). "On Macroeconomics: Comparative Statics." *Center for Advanced Study in the Behavioral Sciences*. Stanford.
- Dye, T. R. (1966). *Politics, Economics and the Public: Policy Outcomes in the American States*. Chicago: Rand McNally.
- Fabricant, S. (1952). *The Trend of Government Activity in the United States since 1900*. National Bureau of Economic Research, New York.
- Fair, R. C. (1975). "On Controlling the Economy to Win Elections." *Cowles Foundation Discussion Paper*, no. 397 (December).
- Fisher, D. (1968). "The Objectives of British Monetary Policy, 1951-64." *Journal of Finance*, vol. 23 (December), pp. 821-31.
- (1970). "The Instruments of Monetary Policy and the generalized Trade-Off Function for Britain, 1955-1968." *Manchester School of Economic and Social Studies*, vol. 38 (September), pp. 209-22.

- Frey, B. S. (1978). "Politico-Economic Models and Cycles." *Journal of Public Economics* (forthcoming).
- and Ramser, H.-J. (1976). "The Political Business Cycle: Comment." *Review of Economic Studies*, vol. 43 (October), pp. 553-5.
- Friedlaender, A. F. (1973). "Macro-Policy Goals and Revealed Preference." *Quarterly Journal of Economics*, vol. 87 (February), pp. 25-43.
- Gallup (1975). *The Gallup Election Handbook*. London: Gallup Polls Ltd.
- Goodhart, C. A. E. and Bhansali, R. J. (1970). "Political Economy." *Political Studies*, vol. 18 (March), pp. 43-106.
- Hodder-Williams, R. (1970). *Public Opinion Polls and British Politics*. London: Routledge and Kegan Paul.
- Jonson, P. D. (1974). "Stabilization Policy in Australia: An Objective Analysis." *The Manchester School of Economic and Social Studies*, vol. 42 (September), pp. 259-76.
- Kramer, G. H. (1971). "Short Run Fluctuations in U.S. Voting Behavior, 1896-1964." *American Political Science Review*, vol. 65 (March), pp. 131-43.
- Leonard, R. L. (1968). *Elections in Britain*. London: Van Nostrand.
- Lindbeck, A. (1976). "Stabilization Policy in Open Economies with Endogenous Politicians." *American Economic Review*, vol. 66 (May), pp. 1-19.
- MacRae, D. C. (1977). "A Political Model of the Business Cycle." *Journal of Political Economy*, vol. 85 (April), pp. 239-63.
- Makin, J. H. (1976). "Constraints on Formulation of Models for Measuring Revealed Preferences of Policy Makers." *Kyklos*, vol. 29, pp. 709-32.
- Miller, W. L. and Mackie, M. (1973). "The Electoral Cycle and the Asymmetry of Government and Opposition Popularity: An Alternative Model of the Relationship between Economic Conditions and Political Popularity." *Political Studies*, vol. 21, pp. 263-79.
- Nobay, A. R. (1974). "A Model of the United Kingdom Monetary Authorities' Behaviour 1959-1969." In H. G. Johnson and A. R. Nobay (eds.), *Issues in Monetary Economics*. Oxford University Press.
- Nordhaus, W. D. (1975). "The Political Business Cycle." *Review of Economic Studies*, vol. 42 (April), pp. 169-90.
- Oakeshott, M. (1973). "Towards an Economic Theory of By-Elections since the War." In C. Cook and J. Ramsden (eds.), *By-Elections in British Politics*, pp. 316-56. London: Macmillan.
- Pissarides, C. A. (1972). "A Model of British Macroeconomic Policy: 1955-1969." *Manchester School of Economic and Social Studies*, vol. 40 (September), pp. 245-59.
- Pommerehne, W. W. and Frey, B. S. (1976). "Two Approaches to Estimating Public Expenditures." *Public Finance Quarterly*, vol. 4 (October), pp. 395-408.
- Stigler, G. J. (1973). "General Economic Conditions and National Elections." *American Economic Review, Papers and Proceedings*, vol. 63 (May), pp. 160-7.
- Theil, H. (1964). *Optimal Decision Rules for Government and Industry*. Amsterdam: North Holland Publishing Company.
- Tinbergen, J. (1956). *Economic Policy: Principles and Design*. Amsterdam: North Holland Publishing Company.
- Wildavsky, A. (1964). *The Politics of the Budgetary Process*. Boston: Little, Brown.
- Wood, J. H. (1967). "A Model of Federal Reserve Behavior." *Monetary Process and Policy. A Symposium* (ed. G. Horwich), pp. 135-66. Homewood, Ill.: Irwin.

## MONOPOLISTIC INDUSTRIES AND MONOPOLY PROFITS OR, ARE KELLOGG'S CORNFLAKES OVERPRICED?\*

### I. INTRODUCTION

Over the last twenty years there have been a large number of studies which have investigated the relationship between various measures of the performance of the firm, in particular its profitability, and the structure of the product market in which the firm operates. There are two excuses for adding to this large body of literature. First, this study uses a measure of profit which is closer to the theoretically desirable measure than is normally the case. Typically performance is measured by the so-called price-“cost” margin where “cost” in this case differs from the text book definition in the sense that it omits any element of the costs attributable to the capital input. This necessitates correcting for inter-firm or industry variations in capital costs, a notoriously unreliable procedure, it being hard enough to measure the capital input itself let alone its imputed cost.<sup>1</sup> In this study all such problems are avoided by making use of a measure which bears a systematic relationship to the true price-cost margin and may be directly observed by the simple expedient of looking at the price tags in supermarkets. The specific prices required are those relating to proprietary brand products and to the similar products marketed under the name of the supermarket itself. In the body of the paper it will be argued that these two prices bear a direct relationship to prices and costs and may be utilised to provide a sensible measure of the gains to a firm which can be attributed to market structure.<sup>2</sup>

Second, although there is a considerable literature on this topic the bulk of it uses US data; less than half a dozen studies refer to the United Kingdom. Further, recent studies which systematically analyse the relationship between price-cost margins and market structure using UK data disagree in their conclusions. Holtermann (1973) and Khalilzadeh-Shirazi (1974) find that concentration is not significantly associated with higher profits while both Cowling and Waterson (1976) and Hart and Morgan (1975) state that increased concentration is significantly related to increased profit margins.

We proceed as follows. In section 2 we present a theoretical model explaining how prices are related to costs in an oligopolistic industry. Most of the analytical work in this field is difficult to apply in an empirical context and consequently most applied work has not been based on any very well defined model. Honour-

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<sup>1</sup> Phillips (1976) and Ornstein (1975) have recently listed the deficiencies of the traditional approach to measuring the price-cost margin.

<sup>2</sup> Morris (1975) uses a similar argument in a slightly different context.