'POLITICO-ECONOMETRICS'—ON ESTIMATION IN POLITICAL ECONOMY

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1. In recent years the study of the relationships between the economic and political systems has received increasing attention at the theoretical level.[1]

However there has been relatively little study of the empirical side, particularly with somewhat more than the most simple statistical techniques.

The recent article by Goodhart and Bhansali in this journal[2] concentrating on measurement therefore commands much attention. It is the most important contribution yet published in this new field which may be called 'politico-econometrics'.

2. The two authors seek to examine empirically the impact of economic conditions on party popularity. The economic variables entering the estimation are the well-known 'general goals of an economy', given by such indices as unemployment rate, growth rate of prices, and real growth rate of income. Party popularity is measured by indices derived from regular monthly sample surveys by Gallup and National Opinion Poll. The statistical methods used by Goodhart and Bhansali are

(a) spectral analysis, and
(b) multiple regression analysis.[3]

The authors apply both spectral and regression analysis to the same time series data. It is important to note that when using the first method the time series are considered to be the realization of weekly stationary processes.[4] When applying regression analysis, however, this can be so only if all parameters at least of their economic variables are equal to zero. Hence in all relevant cases only one of the two models can be correct, a fact overlooked by the two authors. It is not surprising then that they discuss without noticing two contradictory results in their study. In our view, Goodhart and Bhansali neglect an important relationship in their multiple regression analysis whose consideration leads to overcoming the contradictory results mentioned and supports the correctness of the approach based on spectral analysis. It seems then that economic variables did not permanently influence the popularity lead of the British Government.

[1] For surveys see Brian M. Barry, *Sociologists, Economists and Democracy* (Macmillan, London, 1970) and William C. Mitchell, 'The Shape of Political Theory to Come: From Political Sociology to Political Economy'. Reprinted in S. M. Lipset, (ed.), *Politics and the Social Sciences* (Oxford University Press, London, 1969).

[2] C. A. E. Goodhart and R. J. Bhansali, 'Political Economy', *Political Studies*, Vol. 18 (March, 1970).

[3] According to a footnote on p. 44, Goodhart is primarily responsible for the regressions, Bhansali for the spectral analysis.

[4] See the basic textbook by Phoebus Dhrymes, *Econometrics* (Harper and Row, Evanston and London, 1970), p. 385.

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3. At this point, only one result of the spectral analysis needs mentioning: the popularity series $X_i(t)$ of the two parties (Labour and Tory) can be adequately described by an autoregressive process[1] of the first order:

$$X_i(t) = \alpha_i X_i(t-1) + \epsilon_i(t) \qquad i = 1,2$$

With respect to the regressions, the authors arrive e.g. for the period November 1951–October 1964 with Gallup data at the following estimate (p. 73)[2]

$$G = \underset{(2\cdot30)}{12\cdot02} - \underset{(0\cdot002)}{0\cdot004}\, U_G - \underset{(0\cdot23)}{1\cdot32}\, \Delta P - \underset{(0\cdot34)}{0\cdot52}\, EU - \underset{(0\cdot04)}{0\cdot28}\, TR - \underset{(0\cdot35)}{2\cdot51}\, BA$$

$R^2 = 0\cdot47$; Durbin Watson-stat. $= 0\cdot57$, 144 Degrees of freedom. The numbers in parentheses indicate standard errors. With G = percentage lead of the government popularity over the main opposition, and $U_G(t) = U(t-6) + U(t-5) + U(t-4)$, where $U(t)$ = Unemployment in 1000 at time t (in months); ΔP = percentage change of prices over last year; EU, TR, and BA are 'dummy variables'.

The popularity lead of the Conservative Party then in power thus tended *cet. par.* to fall by 0·004 percentage points if the number of unemployed six, five, and four month before rose by 1000. It tended *cet. par.* to fall by 1·37 percentage points if the rate of inflation rose by 1 percentage point. (The dummy variables are of no concern here and in the following.)

From such a statement it is straightforward to derive a relationship between inflation and unemployment which just keeps the percentage lead of government popularity constant. This 'iso-popularity curve' has, of course, a negative slope: in order to keep up its popularity, the government must compensate an increase in inflation by a decrease in unemployment (and the reverse). The 'iso-popularity curve' is then confronted with the trade-off between inflation and unemployment as given by actual economic conditions (known as 'Phillips Curve'). It turns out that under certain conditions the government is not viable at all because it cannot reach a sufficiently high 'iso-popularity curve', while under other conditions it has some leeway for its decisions. By adding an assumption concerning the generation of expectations about inflation, the authors reach the conclusion that a pure democracy with vote maximizing parties 'is doomed to increasing inflation and political disintegration' (p. 83).

4. The brief discussion of the paper shows that the authors proceed in a stepwise fashion in their regression analysis. They *first* estimate the reaction of voters to economic conditions.

In the *second* step only they make a behavioural assumption with respect to the government (and parties), namely that they maximize the vote percentage received at the next election. There is some shift of argument, as what is measured are results of opinion polls and what is spoken of with respect to behaviour are elections. To be logically correct, it must further be assumed that opinion polls give at *every moment of time* correct forecasts of election outcomes. This is quite doubtful. What the approach used really amounts to is that the government (and parties) are *continuously* maximizing popularity. However, there are again good reasons speaking against this.[3]

[1] Ibid., pp. 394–5.

[2] It should be mentioned, however, that the graphs of the estimated spectral densities on p. 98 do not strongly support the above interpretation advanced by the authors.

[3] They are discussed in Bruno S. Frey and Lawrence J. Lau, 'Towards a Mathematical Theory of Government Behaviour', *Zeitschrift für Nationalökonomie*, Vol. 28 (1968).

The stepwise procedure employed has an important implication: there is a complete separation in time between the reaction of voters upon economic conditions and of the government upon political conditions (i.e. popularity). Time is divided into slices within which there is never any simultaneous reaction of voters and the government. This assumption is important for the measurement undertaken. If there is within any period *exclusively* a reaction of popularity due to economic conditions, the single-stage least square technique as employed by the authors yields correct results (assuming that all the other conditions for this estimation method are fulfilled). If there is any reaction of the government within the same period, the estimation is subject to the 'simultaneous equation bias'. A regression of popularity on economic conditions may in that case describe either

(a) the effect of economic conditions on popularity (as assumed by the authors) or
(b) The effect of government actions on the economy due to changes in popularity or
(c) any conceivable combination (mongrel) between effects (a) and (b).

The crucial question of the existence of simultaneous reactions is not payed much attention to by Goodhart and Bhansali. They relegate it to a footnote (1) (p. 70) and seem to argue that the equation is part of a simple recursive system. It is a well known theorem in econometrics that in this case the Ordinary Least Square estimator is indeed consistent and in a certain sense best linear unbiased; there exists no simultaneous equation bias and no problem of identification.[1]

5. Against this rather quick dismissal of the model of simultaneous interdependent behaviour of voters and the government the theoretical argument can be raised that the government is likely not to rely on current popularity ratings only, but will also forecast them. It reacts on expected future popularity in advance, such that the effects of its reactions coincide with the expected future. If the government is reasonably successful in prediction, there is in effect a 'causal' relationship from popularity to economic conditions within the *same* period.

On the practical side it seems that the negation of interdepency is reflected in the low values of the Durbin-Watson d-Statistic. In all equations which do not contain a lagged endogenous variable and which are estimated from the Gallup data this statistic is lower than 0·8 thus indicating strong serial correlation. But it is necessary that the disturbance vector term $\epsilon(t)$ of a simple recursive system fulfills the condition

$$\text{Cov}\,(\epsilon(t_1), \epsilon(t_2)) = \delta_{t_1,t_2} D$$

where $\delta_{t_1t_2}$ is the Kronecker symbol and the matrix D is diagonal.[2]

The question is how strongly the results are affected by the violation of this condition. The authors seem to argue that this is of no crucial importance for their results, because the Durbin Watson d-statistic looks much better after the introduction of a lagged endogenous variable into the equations and the estimated parameters of the economic variables are on the whole still significantly different from zero. In this case relation (1) is transformed into:

[1] See for instance Dhrymes, *Econometrics*, pp. 305–8.
[2] Dhrymes, *Econometrics*, pp. 305–6.

$$G = 2{\cdot}74 - 0{\cdot}001\ U_G - 0{\cdot}34\ \Delta P - 0{\cdot}27\ EU - 0{\cdot}07\ TR + 0{\cdot}87\ BA + 0{\cdot}75\ G_{-1},$$
$$(1{\cdot}73)\quad (0{\cdot}001)\quad (0{\cdot}17)\quad (0{\cdot}23)\quad (0{\cdot}03)\quad (0{\cdot}27)\quad (0{\cdot}06)$$
$$R^2 = 0{\cdot}75;\ \text{Durbin Watson d-statistic} = 2{\cdot}26$$
$$143\ \text{degrees of freedom.}$$

It is known, however, that the Durbin Watson d-statistic when applied to an autoregressive model is strongly biased upward[1] therefore serial correlation may be present although the values of the d-statistic are higher than 2. However in the case of an autoregressive model with serial correlation the actual variances of the least square estimates of the parameters 'appear on the average as near the values given by the formula' (Malinvaud) for non-autoregressive models with serially correlated errors treating the lagged endogenous as exogenous variables. But this means that the estimated standard errors are generally biased downward.[2] Now this downward bias may be as little as 1·5 per cent and yet—demonstrating it with an unjustified t-test—no parameter of an economic variable of (2) will be significantly different from zero any longer at the 5 per cent level. Things are only slightly better in the equations for the periods January 1947–June 1968 and July 1956–June 1968. Restricting to the estimations based on Gallup data it thus follows that one should not put too much reliance on the results reached by the two authors.

6. This is different when N.O.P. data are used, in which case the equation presented above exhibits the following parameter estimates[3]

$$G = 46{\cdot}05 - 0{\cdot}077\ U_{-6} - 3{\cdot}42\ \Delta P + 0{\cdot}67\ EU - 0{\cdot}24\ TR + 2{\cdot}38\ BA$$
$$(3{\cdot}78)\quad (0{\cdot}007)\quad (0{\cdot}50)\quad (0{\cdot}20)\quad (0{\cdot}04)\quad (0{\cdot}38)$$
$$R^2 = 0{\cdot}81;\ \text{Durbin-Watson d-statistic} = 1{\cdot}52$$
$$82\ \text{degrees of freedom.}$$

Contrary to the former case (with Gallup data) this indicates that at least no strong serial correlation is present.[4] There is still no reason, however, to put much reliance on this equation. The reason lies in the low quality of the basic data material employed. N.O.P. collects its series not by quota sampling as does Gallup but rather by random sampling.

But this method tends to strongly overestimate the popularity share of conservative parties because on the one hand the interviewers do not always meet the persons selected and do not always make a real effort at doing so, and on the other hand the supporters of conservative parties appear to be somewhat more 'homely' than the supporters of Labour. The random sampling method has indeed given biased estimates.

This can be demonstrated with examples from the Federal Republic of Germany: The *Institut für Domoskopie in Allensbach* prepared for example forecasts for the 1965 election for the *Bundestag* using both quota and random sampling. According to the former method the share of the Christian-Democrats (CDU/CSU) was 49·5 per cent and that of the Social-Democrats (SPD) 38·5 per cent. (Sample size 2,634). Using the random sampling technique, the forecasts

[1] See for instance Edmund Malinvaud, *Statistical Methods of Econometrics*, (North Holland Pub. Co., 1966), Chap. 14.5.

[2] See Malinvaud, op. cit., Chaps. 13.5 and 14.5.

[3] In the following $U_G(t) = U_{t-6} + U_{t-5} + U_{t-4}$ is substituted for by U_{t-6}.

[4] For 5 independent variables, 80 degrees of freedom and at the 0·05 level of significance, $d_L = 1{\cdot}51$, $d_u = 1{\cdot}77$.

were 53·4 and 36·4 per cent respectively (sample size 1,121). The official results were 47·6 and 39·3 per cent.[1]

7. As there is some evidence then that the parameter of the economic variables do not significantly differ from zero the multiple regression analysis supports the hypothesis that the weekly stationary stochastic process model is the correct one and that, with α in the vicinity of 0·8,

$$X_i(t) = \alpha_i X_i(t-1) + \epsilon_i(t) \qquad i = 1,2$$

$$= \sum_{j=0}^{\infty} \alpha_i^j \, \epsilon_i(t-j)$$

with uncorrelated $\epsilon(t-i_1)$, $\epsilon(t-i_2)$ and the expectation value $E\epsilon(.) \equiv 0$, $E\epsilon^2(.) \equiv \sigma^2 < \infty$.

CONCLUSIONS

8. The foregoing argument leads to the conclusion that economic variables do not have any permanent effect on the popularity lead of the government in Britain for the period studied. Economic conditions affect political popularity only together with other factors in the form of unconnected 'random shocks'. The analysis and theoretical speculation about government stability in the context of the 'Phillips Curve'—though most interesting in itself—are therefore not applicable to the empirical material used. Their conclusions about the inherent inflationary and politically destabilizing nature of pure vote maximizing democracy must be questioned.

This does not, of course, mean that economic variables may never have any permanent influence upon government popularity. If there are *wider* variations in economic factors, especially in unemployment, there are indeed some studies showing that political popularity is continuously affected by economic variables.[2] Nor is it implied that economic conditions might not permanently affect government popularity in other countries. The study of Gerald Kramer[3] shows indeed that election results in the United States of America may be statistically explained by the growth rate in prices and of income (whereas the rate of unemployment proves to be statistically insignificant). In another recent study[4] it turns out that unemployment is a significant determinant of election results, but only in one direction, namely when it is increasing. A decreasing rate of unemployment does not improve the popularity of the party (or president) in power.

Though not all the results can withstand critical analysis, the study of Goodhart and Bhansali is a major step forward in the empirical analysis of economico-political interaction.

[1] *Institut für Demoskopie Allensbach*, private communication.

[2] For the case e.g. of the Weimar-Republic in Germany see Walter Kaltefleiter, *Wirtschaft und Politik in Deutschland. Konjunktur als Bestimmungsfaktor des Parteiensystems* (Westdeutscher Verlag, 1966).

[3] Gerald H. Kramer, 'Short-Term Fluctuations in U.S. Voting Behavior 1896–1964', Forthcoming in the *American Political Science Review*.

[4] John E. Mueller, 'Presidential popularity from Truman to Johnson'. *American Political Science Review*, Vol. 64 (March 1970).