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## Recent research on empirical politico-economic models

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### 1. Introduction

Politico-economic models analyze the interrelationship between the economy and the polity. They are quantitatively formulated and may generally be empirically tested with econometric methods (polito-metrics).

This paper is a report on and first evaluation of the work being done on empirical politico-economic models by a group of economists (among them the authors) formerly at the University of Konstanz, most of whom are now at the University of Zürich. While the earliest work was published in 1968, empirical analyses have been done only in the last three or four years, and some of it is still at a preliminary stage and unpublished. The work as a whole has, however, been carried far enough so that it may be useful for others to have a summary of the main results obtained so far.

No general survey of the state of politico-economic models is intended here since this has been done elsewhere (Frey, 1978a, 1978b; Frey and Schneider, 1975). The valuable work done by other researchers in this area has been utilized only indirectly for the work reported on here though there are many similarities between it and research being done elsewhere.

### 2. Purpose of politico-economic models

The purposes of the politico-economic models can be summarized as follows.

(a) Better specification of the government sector in macroeconomic

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models. The fact that government has assumed a major role in economic affairs must be acknowledged and introduced into formal model-building, particularly for macroeconomic models. The estimates may be seriously misspecified if an endogenous variable (such as public expenditure) is treated as if it were exogenous (Crotty, 1973; Blinder and Solow, 1974).

(b) To help improve forecasting by better predicting future government activity. Existing economic and econometric models do not, for example, take into account the well-known fact that representative governments (in the postwar period) tend to undertake expansionary policies before elections.

(c) Improved policy advising resulting from our taking the political consequences of government actions into account. Moreover, the models suggest a new approach to the theory of economic policy that considers which policies are feasible for a government in the face of a more or less closed system of politico-economic interdependence (Gaefgen, 1976; Frey, 1979). Decisions at the constitutional level will certainly gain in importance.<sup>1</sup>

### 3. The main lines of research

The research to be reported on has been carried out in three main phases.

#### 3.1. Phase one: Analytical formulations

The basic model of government behavior that we are elaborating on here has been analytically developed and deviates significantly from the classical model of party competition developed by Downs and which has been widely used in subsequent theoretical work in public choice (Frey and Lau, 1968; Lau and Frey, 1971). Government is given a prominent role and is viewed as having considerable discretionary power since elections take place rather infrequently (once every three to five years). Under normal conditions, government stays in power once elected unless it cannot muster sufficient support among the electorate at election time. Democratic competition for votes is relegated to a re-election constraint which, however, may be important enough to seriously decrease the government's discretionary leeway.

The government is seen as being confronted with the following maximization problem:

<sup>1</sup> This approach has been pioneered by Buchanan and Tullock (1962), and has been applied in an interesting way to taxation problems by Brennan and Buchanan (1977).

$$\begin{aligned}
& \max \int_{t=0}^{t=\infty} U(.) dt, \\
& \text{s.t. } V(T) \geq V^*, \\
& \text{and } V = V(x_1, x_2, \dots, x_n), \\
& \quad F(x_1, x_2, \dots, x_n) = 0.
\end{aligned} \tag{2.1}$$

The government maximizes its *own* utility ( $U$ ), but at election time ( $T$ ) its share of the vote ( $V$ ) must reach at least a certain level ( $V^*$ ).  $V^*$  will vary according to such factors as the number of parties competing, coalition prospects, and particular election laws in effect. The share of the vote received by the government depends on economic variables ( $x_1, \dots, x_n$ ) (among others) which are interrelated among themselves in the economic model, given by the set of equations  $F(x_1, \dots, x_n) = 0$ .

During the legislative period, government appraises its re-election chances by studying its current popularity with the voters. The popularity level is regularly surveyed (usually monthly) by such organization as Gallup, National Polls (U.S., U.K.) and the Demoskopisches Institut Allensbach (F.R. Germany). Popularity is the only indicator of election prospects available to the government, and it is a reasonably good predictor of vote outcome. The government thus uses current popularity figures to modify policy instruments according to its objectives.

### 3.2. Phase two: Simulation studies

The optimization problem faced by the government as set up above is so complex that it is in general impossible to derive an analytical solution. The problem is, of course, still more difficult to solve in the real world. The government politicians therefore resort to a satisfying strategy, concentrating their attention on the crucial re-election constraint. When current popularity is greater than what they consider necessary to win the forthcoming election, they can allow themselves to undertake policies which raise their own utility. If, on the other hand, their popularity level is so low that they are afraid of losing the next election, they are forced to undertake policies which increase their re-election chances. As they are well aware that both popularity and votes depend heavily on the state of the economy, they will try to bring about what will be perceived by the voters as improved economic conditions. But government must always take into account the constraints imposed on its behavior by the structure of the economic system, both when popularity is high and when it is low.

We have modelled these hypotheses about government's actions and the voters' evaluation of the government's performance for simple cases.

The politico-economic system's ensuing behavior has been analyzed with the help of computer simulation, with special attention being paid to the "political business cycles" that are created (Frey, 1974; Schneider, 1974; Frey, 1977). These simulation exercises have helped us begin to attack the problem of interdependence between the economic and political sectors.

### *3.3. Phase three: Politico-metric estimates*

Though the simulation models provide valuable insights into the functioning of politico-economic systems, the relationships should also be tested empirically. The quantitative analyses use modern econometric techniques and extend in various directions, in each case stressing different aspects of politico-economic modelling. Five main directions may be distinguished.

(1) Macro models directly based on the simulation approaches sketched above and stressing the active role of government in representative democracies. Such politico-economic models using time series data have been constructed and tested for the United States, the United Kingdom, the Federal Republic of Germany, and Australia (Frey and Schneider, 1978a, 1978c, 1979; Schneider and Pommerehne, 1980).

(2) The basic assumptions about the behavior of governments and voters are the same in each case, but the special political institutions and economic conditions of each country have been taken into account. Thus, for example, a theory has been developed for the United Kingdom of how the government fixes the election date (within the constitutional limit of five years) taking into account what popularity level (variable over time) is sufficient to guarantee re-election. The balance of payments is included as a relevant economic constraint though it was found to be unimportant for Germany and the U.S. The specification of the individual equations also differs in the three studies: the adjustment process necessary for reaching the desired policy goal is, for example, explicitly modelled for the United Kingdom.<sup>2</sup>

(3) Popularity functions providing an in-depth analysis of the influence of economic conditions on government and party popularity. Theoretical and empirical analyses have been done for Australia, Germany, U.K., U.S., and Sweden; for the relationship between government and the opposition and among the various parties; for actual economic conditions

<sup>2</sup> It turns out that the government in the United Kingdom adjusts more quickly in the case of support deficit than in the case of support surplus, indicating greater pressure for action when re-election is in danger.

and the citizen's assessment of them (his/her own and general); and the differential impact of economic conditions on government popularity according to various income groups (Kirchgaessner, 1974, 1977; Frey and Garbers, 1971, 1972; Ronning and Schneider, 1976; Schneider, 1978; Frey and Schneider, 1978b).

(4) Micro analyses in the context of the median voter model which assume that the voters' wishes are passively followed by the government. The institutional differences in different types of direct voter participation (obligatory, optional, and nonexisting referendum), the role of the bureaucracy, and the difference between the median voter model and policy models of political science have been analyzed for Swiss communes and cities (Pommerehne, 1974, 1978a, 1978b; Pommerehne and Frey, 1976, 1978; Frey and Pommerehne, 1978).

(5) Additional decision-makers have been introduced into models of the type discussed in section 3.1, such as the central bank (Bundesbank) (Frey and Schneider, 1981) and the trade unions in Germany (Gaertner, 1977). The combination of direct democracy and an active government with some amount of discretionary power has been analyzed for Switzerland (Schneider, Pommerehne and Frey, 1981). In this context, a referendum function analogous to the popularity functions (see section 3.2) has been developed and estimated showing the influence of economic conditions on vote outcome in Swiss referenda.

#### 4. The main results

This section presents some of the main hypotheses derived and empirically tested in the studies mentioned above.

##### 4.1. *Influence of economic conditions on the political sector*

Government popularity is influenced by both economic and noneconomic factors. Both of these must be introduced into the popularity and referendum functions to specify them correctly. Both sets of factors independently account for a large share of the variance in popularity. Taking the United States as an example, this is shown in table 2.1. The economic factor alone explains (in the statistical sense) 70 percent of the variance; the noneconomic factors, 82 percent; and both factors together, 87 percent. The popularity function is misspecified if only economic variables are included.

Table 2.1  
 Presidential popularity, U.S., 1953:II–1976:III: The influence of economic and noneconomic variables.

Eq.	Economic variables			Con- stant term	Noneconomic variables									Test statistics			
	Infla- tion (%)	Unem- ploy- ment (%)	Growth rate of real dispos- able income (%)		Popularity level					Popularity depreciations			Water- gate	$\bar{R}^2$	D.W.	d.f.	
					Eisen- hower I	Eisen- hower II	Kennedy	Johnson	Nixon	Ford	Eisen- hower	Kennedy/ Johnson					Nixon
(1)	-2.19* (-2.87)	-0.91 (-0.68)	0.08 (0.51)	71.56 (10.19)	--	--	--	--	--	--	--	--	--	0.70	1.19	90	
(2)	--	--	--	--	66.3* (32.9)	57.0* (24.9)	81.5* (44.8)	76.2* (35.4)	66.3* (24.7)	48.6* (19.4)	0.43* (2.13)	-1.81* (-9.84)	-1.29* (-3.73)	-7.64* (-9.70)	0.82	1.26	84
(3)	-1.58* (-2.89)	-4.07* (-6.44)	0.09 (0.64)	--	86.1* (24.6)	82.9* (19.0)	108.6* (23.7)	99.7* (23.9)	86.2* (21.3)	97.5* (11.1)	0.46* (2.97)	-2.06* (-9.91)	-0.26 (-0.86)	-5.24* (-6.31)	0.87	1.61	81

D.W. is the Durbin–Watson coefficient.

d.f. is the degrees of freedom.

An asterisk indicates that the respective coefficient is statistically significant at 95% level.



There are a great many noneconomic factors to be considered, and they, of course, differ from country to country. The most important are as follows.

(1) Initial popularity level, which varies according to which party forms the government and who is the government leader.

(2) Popularity depreciation, which takes place over time but which proceeds at different rates for different governments.

(3) An autonomous election cycle in which government popularity decreases after the election until about the middle of the legislative period and then increases before elections. This cycle is most apparent in the United Kingdom.

(4) Internal events of great importance, such as the introduction of women's voting rights in Switzerland or the Watergate issue in the United States (see table 2.1). These may be captured by a special dummy variable to account for the structural discontinuity.

(5) External events of importance must also be taken into account. It should, however, be noted that the impact of events in foreign affairs often have such a short-term effect that they do not show up in the data in yearly (or even quarterly) models. An example is the building of the Berlin Wall in August 1963, which affected only one or two monthly popularity figures. It would be helpful to introduce foreign events and the voters' evaluation of them in the form of continuous time series, but little progress has been made in this direction. Up to now political factors have largely been accounted for with dummy variables, such as in the case of the Vietnam War in the United States presidential popularity function.

Three macroeconomic variables have a statistically significant effect on government popularity:

- (a) the rate of unemployment (negative effect),
- (b) the rate of inflation (negative effect), and
- (c) the rate of growth in real disposable income (positive effect).

Since these variables are highly intercorrelated, all that can be shown is that the variables taken two at a time have a statistically significant effect. Where the percentage rates of these variables show a clear trend over time (as, for example, unemployment in Germany in the 1950s and 1960s) it is advisable to subdivide the time period or, even better, to take the percentage rate prevailing at the beginning of the legislative period as the reference point and deviations therefrom as indicators of the state of the economy. In a simple way this allows for the tendency of voters to become accustomed to persistently high (or low) rates of inflation, unemployment, and growth.

Actual data on economic conditions as collected and published by statistical offices perform very well in popularity functions. This is also

true for data on economic conditions as *perceived* by the voters, collected by survey research institutes. Among the perceived economic indicators, those referring to general economic conditions (GPEC) perform better than those referring to the respondent's own economic conditions (OPEC). This is shown in table 2.2, with monthly data for Germany.

This result suggests that each voter looks at the general conditions of the economy as providing an indicator about her/his own likely future situation. In the discussion following the original presentation of this paper, James Alt suggested as a preliminary hypothesis that the government is held responsible for the general state of economic conditions while economic conditions affecting personal well-being are considered to be outside the control of *any* government.

The popularity and referendum functions' explanatory power is consistently high, but the size of the coefficients differs over time. This reflects differences in the electorate's evaluations over time. An example is given for the United States and Germany in tables 2.3 and 2.4, respectively, with only the economic coefficients of the popularity functions being shown.

In the United States as time passes the coefficients showing the influence of inflation and unemployment increase. This impact is particularly strong for the first variable: a one percentage point increase in inflation decreased President Eisenhower's popularity by only a statistically insignificant  $-0.19$  percent, while it reduced Presidents Nixon's and Ford's popularity by the statistically significant amount of  $-2.73$  percent. The growth of real income, on the other hand, seems to have had the greatest

Table 2.2  
The influence of general and/or own perceived economic conditions on government popularity in West Germany; March 1971–September 1976, monthly dates, OLS estimates

Constant term	Perceived economic conditions		Test statistics		
	General (GPEC)	Own (OPEC)	$\bar{R}^2$	D.W.	d.f.
44.97* (33.23)	0.11* (3.82)	–	0.39	1.91	65
36.71* ( 5.89)	–	0.18* (2.11)	0.19	1.89	65
40.45* ( 6.41)	0.10* (2.97)	0.069* (0.73)	0.41	1.89	64

impact on presidential popularity in the 1960s, when Kennedy and Johnson were presidents.

For Germany (table 2.4), the coefficients of the three variables considered changed in different directions from the first to the second period. The impact on government popularity of a rise in inflation decreased (from  $-0.86$  to  $-0.67$  percent); the impact of an increase in unemployment was  $-0.99$  percent in the first period and rose to  $-1.43$  percent in the second period, 1969–76; and that of real income growth decreased from  $0.12$  to  $0.04$  percent.

Table 2.3

The influence of economic variables on presidential popularity, U.S., various periods.

Periods	Economic variables		
	Rate of inflation (%)	Rate of unemployment (%)	Growth rate of real disposable income (%)
1952–1960 (Eisenhower)	$-0.19$	$-3.31^*$	$0.04$
1961–1968 (Kennedy/Johnson)	$-2.66^*$	$-5.40^*$	$0.32$
1969–1976 (Nixon/Ford)	$-2.73^*$	$-3.81^*$	$0.11$

Table 2.4

The influence of economic variables on government popularity in West Germany, various periods.

Periods	Economic variables		
	Rate of inflation (%)	Rate of unemployment (%)	Growth rate of real disposable income (%)
1950–1966 (governments dominated by Christian Democrats)	$-0.86^*$	$-0.99^*$	$0.12$
1969–1976 (governments dominated by Social Democrats)	$-0.67^*$	$-1.43^*$	$0.04$

In all countries and all periods studied by us, a one percentage point change in the rate of unemployment has a larger marginal effect than a one percentage point change in inflation. A change in the growth of real disposable income of one percentage point always has the smallest effect. This is, for example, shown in tables 2.3 (for the U.S.) and 2.4 (for Germany). In the most recent period (1969–76), a one percentage point increase in the rate of unemployment in the United States *ceteris paribus* reduced presidential popularity by –3.81 percent, whereas the effect of a one percentage point increase in inflation was –2.73 percent and that of growth of income +0.11 percent. In Germany, a one percentage point increase in unemployment reduced government popularity by –1.43 percent, compared to –0.67 percent in the case of inflation and +0.04 percent in the case of real income growth.

The fact that the rate of unemployment has the largest marginal impact on governmental popularity is of great importance for governmental behavior. It suggests that in the periods considered so far an expansionary policy lowering unemployment (and raising income growth) is an effective policy for raising popularity and thus increasing re-election chances. The positive effect of this will not only be greater, but also be much more immediate than the negative effect resulting from any subsequent inflation. As is well known, an expansionary government policy raises the rate of inflation only after a considerable time lag and it may therefore not show up until the next election period.<sup>3</sup>

Switzerland is the only country that we have considered so far for which this pattern does not apply. There has been virtually no unemployment there since the Second World War. Inflation, on the other hand, did go up towards the mid-1970s and the voters have generally reacted negatively to increases in the rate of inflation when casting their vote in referenda. Accordingly, the Swiss federal government (the Bundesrat) has undertaken restrictive economic policies to combat inflation and thereby raise its level of support in referenda.

The impact of changes in unemployment and inflation is different for different income classes. As fig. 2.1 shows, high-income recipients react more negatively to inflation, and low-income recipients to unemployment. This obviously corresponds to their private interests. Fig. 2.1 shows the difference in the estimated coefficients of inflation and unemployment for various income groups in the United States.

<sup>3</sup> An empirical analysis (done by the authors) for the United States and Germany has shown that when the economy expands (according to some accepted criteria), government popularity tends to rise, not fall.

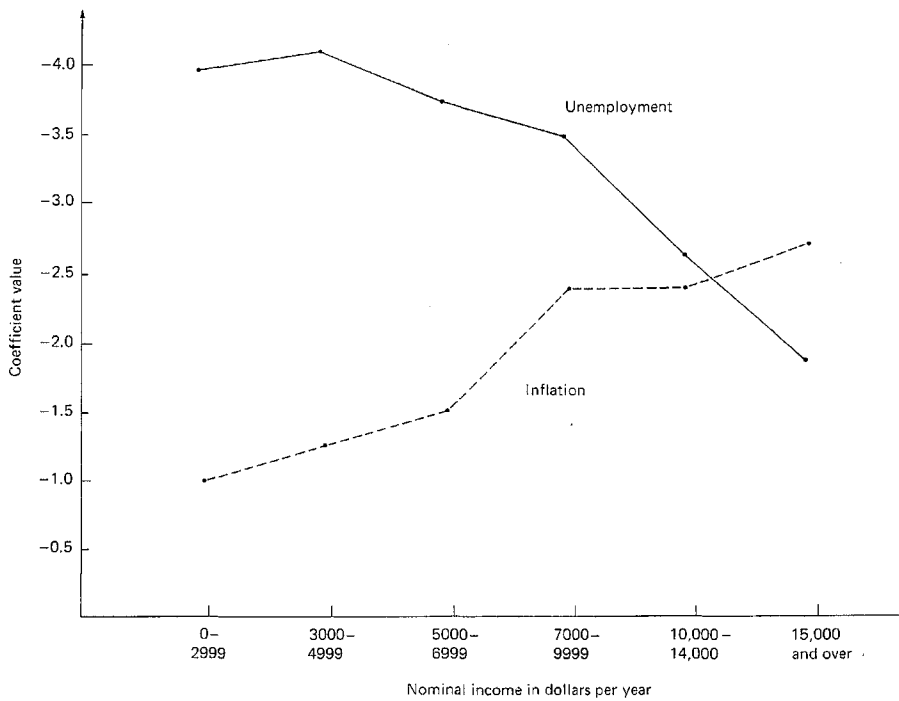


Figure 2.1. Coefficients of the rate of inflation and of the rate of unemployment. U.S. presidential popularity, 1969-76 (monthly estimates).

#### 4.2. Government behavior

The basic model developed — that government maximizes its utility subject to political (re-election), economic (budget, balance of payments), and administrative/legal constraints, and that it uses a satisfying strategy to solve this maximization problem by differentiating between a state of support surplus and a state of support deficit — performs well in empirical tests. It is able to explain aggregate public expenditure as well as its components (exhaustive and transfer expenditures, construction and investment outlays, etc.), taxes, and the use of at least some other instruments such as the wage rate and employment in the public sector.

The politico-economic models empirically tested by us seem to be better able to trace past developments. A comparison for Germany of ex-

*post* forecasts using yearly estimates of the politico-economic model with the yearly "pure" econometric model of Krelle (Krelle, 1974) gives the results shown in table 2.5. This table shows that the politico-economic model has a consistently and clearly lower percentage deviation of predicted from observed values for both policy instruments (exhaustive and transfer expenditures) and macroeconomic "goal" variables (GNP, price level).

Left-wing governments (Labor in the U.K., SPD in Germany) have a tendency to increase government expenditures and taxes when they are free to follow their own ideological ideas, i.e. when they enjoy a popularity surplus. Right-wing governments on the other hand (Tories in the U.K., CDU in Germany, Republican presidents in the U.S.) tend to decrease public expenditures and taxes when they enjoy a state of popularity surplus.

All types of representative governments in the countries studied (U.S., U.K., Germany) undertake expansionary policies when they are afraid that they will not be re-elected in the forthcoming elections (i.e. are in a state of popularity deficit). They tend to increase exhaustive and transfer expenditures, decrease taxes, and increase public employment before elections. This is evidence of a political business cycle. In the semidirect democracy of Switzerland, the federal government tends to undertake a restrictive policy when it suffers a support deficit, mainly because the electorate is most concerned with inflation. Also, the budget and administrative/legal constraints are important determinants of government behavior when re-election expectations are high and low.

Table 2.5

*Ex-post* forecasts of a politico-economic and a "pure" economic model for West Germany, 1958–72, yearly data. (Average percentage deviation per year.)

Economic variables explained	Type of model	
	Politico-economic	Pure economic
Government expenditures for goods and services (exhaustive)	1.80	8.34
Transfer payments to private households	1.41	4.04
Nominal GNP	2.62	4.55
General price level	1.80	3.66

#### 4.3. Central bank

The model used for the government (utility maximization subject to constraints) is also appropriate for explaining central bank behavior. The decisive constraint on the central bank is the possibility of conflict with the government. It is hypothesized that in the case of conflict, government is, for a variety of reasons, in a more powerful position and the central bank must yield to its demands.

In the case of conflict with the government, the central bank follows government policy (with a time lag). Specifically, it undertakes an expansionary monetary policy in accordance with the government's expansionary fiscal policy. In the case of no conflict with the government, the central bank pursues the policies it favors by undertaking a restrictive policy (increase in interest rates, decrease in credits) to combat inflation.

These propositions have been tested for Germany with good results.

#### 4.4. Trade unions

Before elections, trade unions increase their wage demands to create difficulties for governments of the right and, *ceteris paribus*, reduce demands with governments of the left.

#### 4.5. Institutional influences on politico-economic interaction

The stronger the institutions of direct political participation (referenda, initiative) are, the less scope there is for discretionary behavior by the government and the weaker is the public bureaucracy's influence. Moreover, direct political participation on the part of the voters makes them more aware of the costs of government activity. This results in less fiscal illusion in the form of systematic underestimation of the fiscal burden, which in turn puts pressure on the government to spend less (Pommerhne and Schneider, 1978).

The median voter model is only adequate when the institutions of direct democracy are well developed. It performs best when an obligatory referendum exists. (This has, however, only been investigated for Swiss cities.) It is not adequate in pure representative democracies, though it has been applied there too (Borcherding and Deacon, 1972); in this case, it is necessary to allow for the more active role of government and the public bureaucracy.

## 5. Evaluation

### 5.1. Shortcomings

First, important decision-makers are not adequately introduced into the politico-economic models. It is especially necessary to integrate public bureaucracy, interest groups (business, trade unions), and parliament (the relationships between the President and Congress in the U.S., for example).

Secondly, the politico-economic models are closed and do not allow for international relationships.

Thirdly, the interaction of federal units is not taken into account. Subfederal units not only spend a large part of total public expenditure, but they also influence the central government's policy.

Fourthly, great emphasis has been placed on time-series analysis, but structural characteristics of public activity are equally important (for example, which business sectors are most strongly supported or exploited by government and bureaucracy).

Fifthly, informational aspects should receive increased attention with respect to both voters and actors (government and public bureaucracy) in the political sector.

Sixthly, in the present models, government activity is reflected only through the budget. There are, however, a great many other policy areas available to the government and which it can substitute for each other (consider, for example, the popular idea that governments undertake active foreign policies when they have internal economic problems). If the substitution possibilities are intensively used by the government, the policy function as discussed above may be misspecified.

Finally, it may be worthwhile formally to solve the government's dynamic maximization problem subject to the set of constraints for empirical cases. To do this, an exact specification of the model is needed, including the informational aspects mentioned above.<sup>4</sup>

### 5.2. Strengths

First, the economic approach to studying the macro interrelationship between the economy and polity compares favorably with interdisciplinary attempts undertaken in the other social sciences. In particular, it is an

<sup>4</sup> So far, only one attempt in this direction has been made (Fair, 1975). Fair, however, reduced the vote function to one element (growth of real total income) and is himself not certain whether his algorithm really found the optimal solution.



advance over systems approaches (such as that of Easton (Easton, 1965)) which are quite elaborate, but which cannot be quantified with empirical data.

Secondly, the closed model of interdependence between the economy and polity introduces an important feedback loop into economists' modelling with considerable consequences for the theory of economic policy. The econometrically estimated politico-economic models with an endogenous government compare well with traditional econometric models (see table 2.5 for a comparison of *ex-post* forecasting ability).

Thirdly, the emphasis on the dominant role of government (subject to constraints) seems to be more useful than that of models of party competition, which have become increasingly sterile and which (for good reasons) are rarely tested empirically.

Finally, the politico-economic model easily allows for extensions in various directions (as has been done, for example, with the introduction of the central bank and referendum institutions). It is considerably more flexible than the formal party competition model.

## References

- Blinder, Alan and Robert Solow, 1974, *The Economics of Public Finance* (Brookings, Washington, D.C.).
- Borcherding, Thomas E. and R.T. Deacon, 1972, The demand for the services of non-federal government, *American Economic Review* 62, 891–906.
- Brennan, Geoffrey and J.M. Buchanan, 1977, Towards a tax constitution for levithan, *Journal of Public Economics* 8, 255–273.
- Buchanan, J.M. and Gordon Tullock, 1962, *The Calculus of Consent* (University of Michigan Press, Ann Arbor).
- Crotty, R.J., 1973, Specification error in macro-econometric models: The influence of policy goals, *American Economic Review* 63, 1025–1030.
- Easton, David, 1965, *A System Analysis of Political Life* (Wiley, New York).
- Fair, Ray C., 1975, *On controlling the economy to win elections* (Cowles Foundation Discussion Paper, New Haven).
- Frey, Bruno S., 1974, Politico-economic cycles: A simulation model, *Kyklos* 27, 227–254.
- Frey, Bruno S., 1977, On the political economy of public service, in: Martin S. Feldstein and Robert P. Inman, eds., *The Economics of Public Services* (Macmillan, London) 415–434.
- Frey, Bruno S., 1978a, Politico-economic models and cycles, *Journal of Public Economics* 9, 203–220.
- Frey, Bruno S., 1978b, *Modern Political Economy* (Martin Robertson, Oxford).
- Frey, Bruno S., 1979, Economic policy by constitutional contract, *Kyklos* 32, 307–319.
- Frey, Bruno S. and Hermann Garbers, 1971, Politometrics – on measurement in political economy, *Political Studies* 19, 316–320.
- Frey, Bruno S. and Hermann Garbers, 1972, Der Einfluss wirtschaftlicher Variablen auf die Popularität der Regierung – eine empirische Analyse, *Jahrbücher für Nationalökonomie und Statistik* 186, 381–360.

- Frey, Bruno S. and Lawrence J. Lau, 1968, Towards a mathematical model of government behavior, *Zeitschrift für Nationalökonomie* 186, 355–380.
- Frey, Bruno S. and Friedrich Schneider, 1975, On the modelling of politico-economic interdependence, *European Journal of Political Research* 3, 339–360.
- Frey, Bruno S. and Friedrich Schneider, 1978a, An empirical study of politico-economic interaction in the U.S., *Review of Economics and Statistics* 60, 174–183.
- Frey, Bruno S. and Friedrich Schneider, 1978b, Economic and personality determinants of presidential popularity, *Empirical Economics* 3, 79–89.
- Frey, Bruno S. and Friedrich Schneider, 1978c, A politico-economic model of the United Kingdom, *Economic Journal* 88, 243–253.
- Frey, Bruno S. and Friedrich Schneider, 1979, An econometric model with an endogenous government sector, *Public Choice* 23, 29–43.
- Frey, Bruno S. and Friedrich Schneider, 1981, Central bank behavior: A positive empirical analysis, *Journal of Monetary Economics* 7, forthcoming.
- Frey, Bruno S. and Werner W. Pommerehne, 1978, Toward a more theoretical foundation for empirical policy analysis, *Political Studies* 11, 311–336.
- Gaefgen, Gerard, 1976, *Praktische Ökonomie und Lehre von der Wirtschaftspolitik: Zur Realisierbarkeit wirtschaftspolitischer Vorschläge*, in: H. Körner et al., eds., *Wirtschaftspolitik-Wissenschaft und politische Aufgabe*, Festschrift für Karl Schiller (Haupt Verlag, Bern) 123–143.
- Gaertner, Manfred, 1977, *Politisch-ökonomische Determinanten der Lohnentwicklung in Deutschland*, Dissertation, Konstanz, F.R. Germany: University of Konstanz, mimeo.
- Kirchgässner, Gebhard, 1974, Ökonometrische Untersuchungen des Einflusses der Wirtschaftslage auf die Popularität der Parteien, *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* 110, 409–445.
- Kirchgässner, Gebhard, 1977, *Wirtschaftslage und Wählerverhalten*, *Politische Vierteljahresschrift* 18, 510–536.
- Krelle, Wilhelm, 1974, *Erfahrungen mit einem ökonometrischen Prognosesystem für die BRD* (Verlag Anton Hain, Meisenheim, F.R. Germany).
- Lau, Lawrence J. and Bruno S. Frey, 1971, Ideology, public approval and government behavior, *Public Choice* 10, 20–40.
- Pommerehne, Werner W., 1974, Determinanten öffentlicher Ausgaben – Ein einfaches politisch-ökonomisches Modell, *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* 110, 455–491.
- Pommerehne, Werner W., 1978a, Institutional approaches to public expenditure: Empirical evidence from Swiss municipalities, *Journal of Public Economics* 9, 255–280.
- Pommerehne, Werner W., 1978b, Politisch-ökonomisches Modell der direkten und repräsentativen Demokratie, in: E. Helmstädter, ed., *Neuere Entwicklungen in den Wirtschaftswissenschaften* (Duncker and Humblot Verlag, Berlin) 569–589.
- Pommerehne, Werner W. and Bruno S. Frey, 1976, Two approaches to estimating public expenditure, *Public Finance Quarterly* 4, 395–407.
- Pommerehne, Werner W. and Bruno S. Frey, 1978, Bureaucratic behavior in democracy: A case study, *Public Finance* 33, 98–112.
- Pommerehne, Werner W. and Friedrich Schneider, 1978, Fiscal illusion, political institutions and local public spending, *Kyklos* 31, 381–408.
- Ronning, Gerd and Friedrich Schneider, 1976, Popularitätsfunktionen: eine empirische Zwei-Länder-Studie, *Jahrbuch für Sozialwissenschaft* 27, 370–390.
- Schneider, Friedrich, 1974, Politisch-ökonomische Konjunkturzyklen: Ein Simulationsmodell, *Schweizerische Zeitschrift für Volkswirtschaft und Statistik* 110, 519–550.

- Schneider, Friedrich, 1977, Different (income) classes and presidential popularity: An empirical analysis, *Munich Social Science Review* 1, 53–69.
- Schneider, Friedrich and Werner W. Pommerehne, 1980, Politico-economic interactions in Australia: Some empirical evidence, *Economic Record* 56, 113–131.
- Schneider, Friedrich, Werner W. Pommerehne and Bruno S. Frey, 1981, Politico-economic interdependence in a direct democracy: The case of Switzerland, this volume, Chapter 13.

