TOWARD A MORE
THEORETICAL FOUNDATION FOR
EMPIRICAL POLICY ANALYSIS

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Comparative policy analysis is without doubt one of the more important areas within modern empirical political science. However, the substantial research effort in this field has not been matched by a corresponding degree of success. Empirical research has been unable to provide a satisfactory answer to the old question “does politics make a difference” insofar as it has failed to indicate whether variations in policy output are determined primarily by the political system or by socioeconomic factors.

Various studies have pointed to a number of reasons for the unsatisfactory results produced by comparative policy analysis. However, the critique and suggestions for improvement outlined refer, in the main, to points which are of only limited use for empirical research.

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Furthermore, they may even be counterproductive insofar as they point toward a relatively unfruitful line of research. Suggestions of this nature include:

(1) how the intervening variables between socioeconomic inputs and the output of the political process may be measured (see for the example of party competition, among others, Zody and Luttb erg, 1968; Riley, 1971);

(2) how one may devise more adequate input and output proxies (Sharkansky, 1967; and more generally, Jacob and Lipsky, 1968);

(3) how new methods of measurement such as factor and principal components analysis) may be applied (see, e.g., Hofferbert, 1968; Pidot, 1969);

(4) how the underlying system-theoretic model may be extended by relationships with more meaningful content.2

In most cases, these suggestions constitute a move in the wrong direction, for the complexity of the empirical analysis is increased with no improvement in the theoretical base. If, instead, a model with clearly specified theoretical foundations had been used, it would have become evident that the question of whether or not "politics make a difference" is wrongly formulated. There is, contrary to the conclusion often derived from system-theoretic models, no contrast to be made between the economy and the polity as determinants of public activity. Both interact simultaneously and must therefore be captured with the aid of an integrated approach. The purpose of this paper is to show, by the use of specific examples, how this procedure enables us to improve both estimation and forecasting.

The second section of this article presents a short summary of the development and current state of comparative policy analysis.3 In the following sections, two policy output models are presented, illustrating how the interaction between the policy and the economy may be theoretically formulated and empirically tested.

In the third section this is achieved with a micro model, which is characterized by the fact that the variables, categories of local public expenditure (e.g., education, health, and social affairs) due to their small size do not feed back on policy output. In the fourth section a macro model of the federal level is discussed which takes account of the feedback of public expenditure on the economy and back to the polity. Section five draws some conclusions for the theoretical and empirical study of public activity and of political phenomena in general.
SURVEY OF THE LITERATURE AND CRITIQUE

Empirical policy analysis has two roots:

(a) case studies of government activity within political science (e.g., Key, 1951: 298 et seqq.; Lockard, 1959: 320 et seqq.);

(b) comparative studies of the influence of socioeconomic variables upon public expenditure by fiscal economists.

Let us begin with the latter. According to Fabricant (1952) the differences in expenditure levels of American states and local communities may be explained by differences in per capita income, degree of urbanization, and population density. Ignoring the theory of collective decision-making and solely on the basis of ad hoc assumptions, he was able to explain over 70% of the variance in per capita expenditures in American states and communities. As his results were also applicable to areas of special political importance, such as education and welfare, it seemed safe to infer that political factors such as party competition, voter participation, and the specific decision rules used were of minor practical importance. Subsequent studies have reached essentially the same conclusion.4

This peculiar result has motivated sociologists and political scientists to analyze the problem for themselves. Using Easton’s (1957, 1965) model of the political system, Casstevens and Press (1963) and Dawson and Robinson (1963) tested whether the inclusion of “political” variables would alter the results achieved by the use of purely socioeconomic models of the Fabricant type.

The empirical estimates achieved gave results which were staggering for political science. If the level of economic performance of states and communities was kept constant, “political” variables, representing the legislative, executive, and administrative systems had no significant influence on public expenditure behavior. This held, even if—taken in isolation—they were significant. Whether party competition was weak or strong, voter participation high or low, whatever the distribution of power between the executive and legislative branches of the political bodies concerned—these factors seemed to have no major effect on public expenditures. Even when areas conventionally considered to be of special political interest, such as welfare payments to the poor and the aged and education expenditure, were included, this was still found to be the case.

The minor role assigned to “political” variables remained invariant, even when a larger set of input, process, and output variables were
included; multiple correlation and regression methods were used in place of simpler approaches; and time series estimates were employed as well as the more usual cross-sectional analysis.\textsuperscript{5}

However, more recent empirical research seems to indicate that the conclusions that "politics does not matter" may be premature. Even if political variables do not (statistically) determine the absolute level of per capita public expenditure, it may still be true that they affect the distribution of output. Indeed, politics has been much more often identified with that particular problem.\textsuperscript{6}

The distributional aspect has been taken up by Fry and Winters (1970).\textsuperscript{7} They asked what part of public expenditure is received by the three lowest income groups, what taxes and other levies they pay, and how far the "indulgence-deprivation" ratio derived therefrom could be explained by either the political system or by socioeconomic variables. They arrived at the conclusion that politics plays a dominant role in public income and expenditure decision-making. Overall, socioeconomic factors explain the total sum available for distribution, while political variables were decisive for the structure of public expenditure and financing.

A repetition of the Fry and Winters study, together with some methodological improvements,\textsuperscript{8} has been undertaken by Booms and Halldorson (1973). However, they arrived at quite a different conclusion—finding that political determinants affect distribution of public income and expenditure only to a minor degree.

The present confused state of the discussion is not, however, accidental as comparative policy analysis is plagued by a number of methodological difficulties and problems of measurement. Above all though, it lacks a coherent theoretical base. The two former problems have been adequately discussed elsewhere (Cnudde and McCrone, 1969; Elliott, 1965; Lineberry and Fowler, 1967; Sharkansky, 1971), and we shall not deal with them here. Rather, in what follows, we shall be concerned with the latter, the problem of theoretical coherence.

The main theoretical shortcomings of the studies mentioned are: (1) an uncritical usage of Easton's system-theoretic model, irrespective of whether the analysis requires a descriptive or an explanatory approach, or even whether a problem of optimal control is the purpose of the study; (2) building the models upon structural magnitudes (such as the degree of party competition) with no explicit theory of the structural relationships underpinning them. Furthermore, these models ignore decision-theoretic elements,\textsuperscript{9} suggesting that all behavior may
be given a convincing role-theoretic interpretation. (3) In addition, hypotheses are often formed and applied in an uncritical fashion. As a rule, they are not deduced from a theoretical model subjected to logical analysis, but are rather formulated on an ad hoc basis, or refer to earlier hypotheses. Such hypotheses may, however, have been advanced with respect to quite different circumstances and may apply only to a restricted problem area. It is necessary to examine carefully the conditions under which a hypothesis is applicable and when it is not. Party competition, for example, has only a minor influence after an election, as in most democratic countries four to six years must usually elapse before the next election. We therefore need to develop a model which enables us to derive the influence of political decisions in the course of a legislative period. This cannot be achieved solely by increasing the complexity of descriptive detail. The main task lies in the development of theoretical models from which hypotheses may be deduced, these in turn being transformable into exactly specifiable estimation equations. This is demonstrated with two specific examples of local and federal expenditure.

The first example presents a cross-section analysis of functional expenditure categories of 48 Swiss local communities. It concentrates upon improving the main shortcomings of two groups of approaches existing: the neglect of political influences in traditional public finance approaches and the untheoretical treatment of political factors in policy output studies. As the model deals with local expenditure of relatively small size the feed-back upon output decisions need not be taken into account (see Figure 1).

The second example is concerned with an analysis of central government policy over election periods in Germany using time series data. Figure 2 sketches how policy output influences the state of the economy.
(e.g., the rates of unemployment and inflation) and how the state of the economy affects the election process which in turn determines government decision-making and policy output. Though there is circular interdependence between the corresponding variables, it need not be simultaneous, i.e., the system may well be recursive. What matters in this context is that at this level of aggregation, the feedback of policy upon the economy may not be neglected.

This closed-ended macro model serves to overcome the main shortcoming of traditional econometric models which completely disregard the political nature of public expenditure decisions, i.e., consider exclusively the impact of policy output upon the economy.

A MICRO MODEL OF PUBLIC EXPENDITURE AT THE LOCAL LEVEL

In this section we present an empirical analysis of public expenditure decisions within various categories, taking explicit account of the collective nature of the decision process. Using the same data-set, the estimates derived are compared with those from the traditional approach. Analysis is restricted to the local level, as the decision process is quite different at the state and federal level. In some American and especially in Swiss communities, direct majority voting is utilized, with no major influence being exerted by the administrative system.
As has been shown by Black (1958: ch. 5) and generalized by Rae and Taylor (1971), the median voter is decisive under simple majority rule. If the tax system remains unchanged, or is determined independently of public expenditures decision, the median voter model enables us to derive income and price elasticities of demand for publicly supplied goods and services using cross-section analysis. It is also necessary to take account of the varying degrees of "publicness" of a publicly supplied good. With a pure public good, there is jointness of consumption and one person's consumption does not exclude the consumption of others. Therefore, the larger a political body, the more people may enjoy consumption of the same good, and the smaller is, ceteris paribus, each individual's cost share. With impure public goods, the quantity of consumption decreases continually with the number of users.

The median voter's demand for individually consumable units of the public good depends on his income ($\hat{Y}_j$) and his cost of acquiring the good, which is in this case the "price" ($\hat{r}_j$):

$$\hat{x}_{ij} = \hat{r}_j \cdot \hat{P}_{x_i} \cdot n_j^\delta,$$  

where $\hat{r}_j$ is his tax share (i.e., his relative contribution to the costs of production of the publicly supplied good); $\hat{P}_{x_i}$, the unit cost of production of public good $i$, assumed to be constant; $n_j$ the number of persons in the political body $j$; $\delta$ the degree of jointness of consumption (see equation (i), note 14).

Using a constant elasticity demand function:

$$\hat{x}_{ij}^{IN} = k \cdot \hat{Y}_j^\alpha \cdot \hat{r}_j^\beta = k \cdot \hat{Y}_j^\alpha \cdot (\hat{r}_j \cdot \hat{P}_{x_i} \cdot n_j^\delta)^\beta$$

The political decision must be taken with respect to the quantity of the public good, $x_{ij}$. The relevant demand function of the median voter is therefore:

$$\hat{x}_{ij} = k \cdot \hat{Y}_j^\alpha \cdot (\hat{r}_j \cdot \hat{P}_{x_i})^\beta \cdot n_j^\delta (1 + \beta)$$

noting that $x_{ij}^{IN} = x_i \cdot n^{-\delta}$.

The demand function used for empirical estimation is:

$$\log X_{ij} = c + \alpha \cdot \log \hat{Y}_j + \beta \cdot \log \hat{r}_j + \gamma \cdot \log n_j + \epsilon_{ij},$$
with $X_n$ as expenditures for public good $i$, $c = \log k$, $\alpha$ and $\beta$ are income and price elasticities of demand, respectively, $\gamma = \delta (1 + \beta)$ is the elasticity of demand with respect to the size of the user group, and $\epsilon_i$ is the error term, assumed to be normally distributed with zero mean and constant finite variance.\(^{16}\)

This approach to the explanation of various categories of public expenditure derived from the *theory of collective choice* may be contrasted with the *traditional regression approach*, using average values of income and tax share:\(^{17}\)

$$\log X_{ij} = c' + \alpha' \cdot \log \bar{Y}_j + \beta' \cdot \log \bar{r}_j + \gamma' \cdot \log n_j + \epsilon_{ij},$$ \[5\]

where $\bar{Y}_j$ is average income and $\bar{r}_j$ the average tax share in community $j$.\(^{18}\)

The relative performance of the two approaches has been tested in a cross-section of 48 Swiss local communities with direct democracy. The largest community is Olten with a population of 21,209, the smallest Arosa with 2,717 inhabitants in 1970.\(^{19}\)

Decisions are taken by simple majority voting after a discussion in which changes may be proposed from the floor. There is therefore a close correspondence with the conditions necessary for the application of both the median voter and the traditional average model—the latter being unconcerned with any aspect of political institutions. The unit costs of production are assumed to be equal in all communities.\(^{20}\)

The estimation technique used is the general-least-square regression in order to avoid problems of heteroscedasticity.\(^{21}\) A comparison of residual variances with the F-test (using a two-tailed significance level of 5\%) indicates that there is no heteroscedasticity. The values of simple correlation coefficients suggest the absence of any grave problems of multicollinearity.

The performance of both models is given for the aggregate of local expenditure (AGG) in the following equations (4a and 5a):

$$\log AGG = -12.91 + 1.29^{**} \log \bar{Y} - 0.73^{**} \log \hat{r} + 0.33^{**} \log n; \quad [4a]$$

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<tr>
<td></td>
<td>(7.40)</td>
<td>(7.35)</td>
<td>(10.65)</td>
<td>(3.33)</td>
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<tr>
<td>$R^2$</td>
<td>0.89</td>
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$$\log AGG = -6.96 + 0.73^{**} \log \bar{Y} - 0.64 \log \bar{r} + 0.42 \log n; \quad [5a]$$

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<td></td>
<td>(4.48)</td>
<td>(4.42)</td>
<td>(1.57)</td>
<td>(1.00)</td>
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<tr>
<td>$R^2$</td>
<td>0.74</td>
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where $\tilde{R}^2$ is the coefficient of determination, adjusted by the number of degrees of freedom; the numbers in parentheses give the absolute values of the t-statistics for the coefficient (an asterisk indicates statistical significance at the 95% level, two asterisks at the 99% level of security).

The results indicate that the median voter model has a much higher degree of explanatory power and yields statistically more significant estimates: the estimation result ($\tilde{R}^2$) is significantly better (using a two-tailed significance level of 5%), applying the chi-square test, and taking the residual variance of the traditional average estimates as null hypothesis.

Before we can make this inference, however, a possible objection must be considered: the possibility of specification error due to the omission of the possible influence of structural differences. Thus, in order to avoid such an error, variables are added showing the influence of the age composition, and density of the population (see equations 4b and 5b):

$$\log \text{AGG} = -9.96 + 1.07^{**} \log \hat{Y} - 0.64^{**} \log \hat{\tau} + 0.48^{**} \log n$$  
(3.17)  (3.88)  (7.12)  (3.92)  
$- 0.02 \text{POPi} - 0.01 \text{POP}_{2} - 0.0 \text{POPD}; \quad [4b]$  
(1.67)  (0.87)  (1.92)  
$$\tilde{R}^2 = 0.90$$

$$\log \text{AGG} = -2.26 + 0.41 \log \hat{Y} - 0.53 \log \hat{\tau} + 0.63 \log n - 0.05^{*} \text{POPi}$$  
(0.79)  (1.66)  (1.37)  (1.57)  (2.36)  
$- 0.03 \text{POP}_{2} - 0.01^{*} \text{POPD}, \quad \tilde{R}^2 = 0.77 \quad [5b]$  
(1.69)  (2.31)

where POP$_1$ is the share of the population aged 0-19 years; POP$_2$ is the share of population aged 65 years and over; and POPD is population density.

As the results show, the inclusion of socioeconomic variables, to allow for structural differences, contributes only little to the explanation of the variance in public expenditure. Moreover, when socioeconomic variables are included, the coefficients of the average income per capita becomes insignificant in equation 5b. The same effect does not hold in equation 4b, suggesting that the average income has to be seen in a socioeconomic context. However, there is a further possible
objection to be considered, the possibility that the aggregate regressions serve no useful purpose because there are theoretically initial conditions for independent variables to be significantly related to the aggregate of local expenditure without being significantly related to any of the components of that aggregate. Thus, Table 1 contrasts the performance of both models for the individual public expenditure categories, excluding the socioeconomic variables.

The median voter equation \((4a_i; i = 1, \ldots, 7)\) has in all cases a higher degree of explanatory power and yields substantially more significant estimates for all seven local expenditure areas. According to theoretical expectation, all price elasticities in equation \(4a_i\) are negative and significant at the level of security of 1%. The estimates with the traditional average model yield no statistically significant price elasticity. The demand elasticities with respect to income are—with one exception each—in both equations statistically significant; however, they are—with one exception—more significant with the median voter than with the traditional average model.

The degree of jointness in consumption \(\delta\) is not presented in the table because the two components from which it is derived, the tax price elasticities \((\hat{\beta})\) and the demand elasticities with respect to the size of the user group \((\hat{\gamma})\) were not always statistically significant.

The general superiority of the median voter over the traditional average approach suggests the usefulness of a carefully specified estimation function based upon the specific nature of the collective choice. The median voter model seems to be appropriate for the problem discussed here, where local public expenditure decisions are taken by direct vote. This study of policy output at higher levels, such as the federal government, requires, however, that the feedback of public expenditure decisions upon the economy and back to the polity is taken into account. The next section presents such a closed-ended macro model using times series analysis.

A MACRO MODEL OF THE TIME PROCESS OF PUBLIC POLICY OUTPUT

The analysis of a closed-ended public expenditure model such as shown in Figure 2 is of particular interest because existing econometric models (see, e.g., Fromm and Klein, 1973; Tsurumi, 1973) study the
### TABLE 1
Comparison of the Performance of the Median Voter Model with the Traditional Average Model (48 Swiss Local Communities with Direct Democracy, 1970)\(^a\)

<table>
<thead>
<tr>
<th>Spending Categories</th>
<th>Eq.</th>
<th>Intercept (\hat{\alpha}, (\hat{\beta}, (\hat{\gamma}))</th>
<th>Demand Elasticities with Respect to Income (\hat{\alpha})</th>
<th>Tax Share (\hat{\beta})</th>
<th>Population (\hat{\gamma})</th>
<th>(R^2)</th>
</tr>
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<tr>
<td>General Administration</td>
<td>((4a_1))</td>
<td>(-20.39 (6.85))</td>
<td>1.89** (6.29)</td>
<td>-0.71** (6.08)</td>
<td>0.05 (0.32)</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>((5a_1))</td>
<td>(-10.70 (5.27))</td>
<td>0.96** (4.45)</td>
<td>-0.63 (1.20)</td>
<td>0.07 (0.13)</td>
<td>0.56</td>
</tr>
<tr>
<td>Police, Fire Protection</td>
<td>((4a_2))</td>
<td>(-17.86 (3.04))</td>
<td>1.42* (2.41)</td>
<td>-0.83** (3.61)</td>
<td>0.26 (0.80)</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td>((5a_2))</td>
<td>(-13.38 (3.84))</td>
<td>1.02* (2.78)</td>
<td>-0.94 (1.03)</td>
<td>0.14 (0.15)</td>
<td>0.43</td>
</tr>
<tr>
<td>Education, Recreation, Sports</td>
<td>((4a_3))</td>
<td>(-8.63 (3.63))</td>
<td>0.69** (2.90)</td>
<td>-0.32** (3.42)</td>
<td>1.00** (7.48)</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>((5a_3))</td>
<td>(-4.10 (2.73))</td>
<td>0.25 (1.56)</td>
<td>-0.29 (0.74)</td>
<td>1.05* (2.56)</td>
<td>0.77</td>
</tr>
<tr>
<td>Health, Hospitals</td>
<td>((4a_4))</td>
<td>(-32.61 (3.71))</td>
<td>2.74** (3.09)</td>
<td>-1.67** (4.84)</td>
<td>-0.004 (0.008)</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>((5a_4))</td>
<td>(-18.02 (3.12))</td>
<td>1.37* (2.17)</td>
<td>-2.36 (1.57)</td>
<td>-0.69 (0.44)</td>
<td>0.33</td>
</tr>
<tr>
<td>Social Assistance</td>
<td>((4a_5))</td>
<td>(-10.76 (1.94))</td>
<td>0.73 (1.51)</td>
<td>-0.73** (3.36)</td>
<td>0.73* (2.33)</td>
<td>0.56</td>
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<td></td>
<td>((5a_5))</td>
<td>(-13.40 (4.20))</td>
<td>1.05** (3.12)</td>
<td>-0.68 (0.81)</td>
<td>0.70 (0.80)</td>
<td>0.51</td>
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<tr>
<td>Local Roads</td>
<td>((4a_6))</td>
<td>(-19.39 (5.23))</td>
<td>1.77** (4.73)</td>
<td>-0.88** (6.05)</td>
<td>-0.02 (0.10)</td>
<td>0.66</td>
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<tr>
<td></td>
<td>((5a_6))</td>
<td>(-11.09 (4.40))</td>
<td>0.98** (3.67)</td>
<td>-0.83 (1.26)</td>
<td>0.05 (0.08)</td>
<td>0.52</td>
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<tr>
<td>Environmental Protection</td>
<td>((4a_7))</td>
<td>(-17.86 (5.18))</td>
<td>1.59** (4.56)</td>
<td>-1.18** (8.75)</td>
<td>-0.002 (0.01)</td>
<td>0.77</td>
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<tr>
<td></td>
<td>((5a_7))</td>
<td>(-11.18 (3.89))</td>
<td>0.96** (3.14)</td>
<td>-1.32 (1.77)</td>
<td>-0.17 (0.22)</td>
<td>0.50</td>
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\(a\). Figures in parentheses indicate the t-values. An asterisk indicates statistical significance at the 95% level, two asterisks at the 99% level of security.

\(b\). Includes local expenditure for civil defense.
influence of policy output variables upon the state of the economy, only, but do not consider the interdependence between the polity and the economy. Government expenditures and transfers are taken either as completely exogeneous variables, or are linked on an ad hoc basis to tax receipts, with no theoretical explanation whatsoever. The conventional procedures is subject to several major drawbacks and errors: (1) existing econometric models cannot be used for forecasting, as the future course of any modern industrial economy depends to a large extent upon governmental actions; (2) government will often not follow policy advice derived from econometric models, as this advice may negatively affect its popularity and reelection chances; (3) the structure of econometric models is misspecified if governmental policy is not exogeneous, but rather, interacts with the economy (see Crotty, 1973; Blinder and Solow, 1974: 71).

The simplest macro politicoeconomic model is composed of two sections: the economy and the polity. It is explicitly concerned with how the state of the economy influences the polity and how the polity influences the economy. With respect to this latter link—which is shown as the upper loop of interdependence in Figure 2—what matters is in what way policy output is determined through government decision-making, as the link between policy output and the state of the economy is taken care of in traditional econometric models.

In a democracy, voters' evaluation of the government's performance is based to a significant extent upon the state of the economy. At election time, they should compare the expected future behavior of the government with that of the opposition, taking into account outside influences. They should judge the government only with respect to those factors which it can control. An evaluation of this nature would be extremely complex and would require both a great deal of information and calculative ability. To minimize decision costs involved, individual voters adopt a "satisficing" strategy (Simon, 1955) or "limited rationality." They consider only the current state of the economy, comparing it with economic performance over the last election period. If the state of the economy improves, voters tend to support the government, if it deteriorates, they tend to support the opposition. The most important macro economic variables characterizing the state of the economy are: the rate of unemployment (U), the rate of inflation (I), and the growth rate of disposable nominal income (GDY).

At election time, this evaluation is reflected in actual votes cast. Any government interested in remaining in power has to prepare itself for
that moment by continually informing itself as to the likely election outcome— influencing it if it appears to be necessary. Regular popularity surveys provided by Gallup and other institutions provide such a current indicator of the government's standing with the voters. Governmental popularity (POP) is influenced not only by the economic variables mentioned, but also by the specific attraction of the party in power—this being reflected in different popularity levels for each government \( \pi_0^1, \pi_0^2, \ldots \) as well as by random influences \( u_r \). The popularity function to be tested empirically is taken to be linear:

\[
POP_{t+1} = \pi_0 G_1 + \pi_0 G_2 + \ldots + \pi_U \cdot U^0(t) + \pi_I \cdot I^0(t) + \pi_{GDY} \cdot GDY^0(t) + u_t.
\]

The economic variables are defined as deviations from their average value over the last election period. It may be theoretically expected that an increase in the rates of unemployment and inflation will lead to a lowering of and an increase in the growth rate of disposable income, a rise in government popularity \( \pi_I < 0, \pi_U < 0, \pi_{GDY} > 0 \). The impact of changes in the state of the economy and its evaluation by the voters affects government popularity after a lag of a quarter of a year only.

If on the basis of current popularity figures, the government expects to lose the forthcoming election, it seeks to increase its popularity with the electorate so as to stay in power. This may be achieved by using policy instruments at its disposal so as to improve economic conditions. For simplicity, it may be assumed that there is a minimal popularity level (POPMIN), below which the government may expect to lose the next election. If, on the other hand, the government is confident of winning the forthcoming election, it may pursue policies in accordance with its own preferences. This behavioral assumption is somewhat different from that used in the theory of party competition (see, e.g., Davis et al., 1970; Riker and Ordeshook, 1973), where parties maximize votes at any point in time and where no place is given to ideology. Government does not, of course, formally solve this constrained dynamic maximization problem, but approximates the solution by differentiating between a situation in which its reelection is likely (there is a popularity "surplus," i.e., \( \text{POP} \geq \text{POPMIN} \)), and one in which it is unlikely (there is a popularity "deficit," i.e., \( \text{POP} < \text{POPMIN} \)).

The policy output function describes the government's use of economic policy instruments, in particular exhaustive and transfer ex-
penditures, after a reaction lag assumed to extend over one quarter of a year. The situation of a *popularity surplus* is indicated by a dummy variable \( Z \) taking the value one; in that case the government is free to pursue its ideology (ID). ID is taken to depend on the size of the squared popularity surplus \((\text{POP}_{t} - \text{POPMIN})^2\) to show that the government’s possibility to act ideologically rises strongly the more current popularity rises above the reelection threshold. Ideology differs according to whether there is a right-wing or left-wing party in power. ID is thus defined to be

\[
\text{ID}_t = [i_R \cdot R + i_L \cdot L] \cdot (\text{POP}_t - \text{POPMIN})^2. ~[7]
\]

\( i_R \) and \( i_L \) are parameters and \( R \) and \( L \) take the value one in those time periods in which the party in power was right-wing and left-wing, respectively \((R = 0, L = 0, \text{otherwise})\). A priori, it may be expected that governments of the right tend to restrict and governments of the left increase public outlays, thus \( i_R < 0, i_L > 0 \).

In a situation of *popularity deficit* the dummy variable \( Z \) is equal to zero. The government’s need to raise its popularity in order to be re-elected is indicated by the size of the squared popularity deficit \((\text{POP}_{t} - \text{POPMIN})^2\) and by a variable which indicates the amount of time the government has still available before the next election takes place. To capture this effect, a variable is defined measuring the number of quarters passed since the last election (QP). The latter serves to indicate the temporal urgency of undertaking popular actions which serve to increase the government’s popularity. Under normal circumstances an expansionary economic policy serves that purpose because it reduces unemployment and increases the growth of income while a possible rise in the inflation rate is lagged (and thus is likely to fall into the subsequent election period).

Government does not, however, directly control actual policy output; the intended use of economic policy instruments is modified by the public bureaucracy which constitutes the second institution considered within the political system. Following Wildavsky (1964) and Davis et al. (1966, 1974), it is assumed that the bureaucracy is committed to incremental behavior. Government may thus only influence the *change* in policy instruments \((\Delta \text{POL}_{t})\), while the level already attained is, in the short run, beyond its reach. There are also various *economic constraints* such as the balance of payments and budget balance, setting limits to the government’s actions. The larger the surplus in the balance of payments
(BP) and in the budget—represented by the difference between government expenditures and tax income (B)—the larger the scope for public expenditures. The policy output equation to be estimated thus reads:

\[
\Delta \text{POL}_{t+1} = p_0 + p_1 \text{BP} + p_2 B + p_3 Z \cdot ID_t + p_4 (1 - Z) (\text{POP}_t - \text{POPMIN})^2 + p_5 (1 - Z) \alpha P_t + \epsilon_t. \tag{8}
\]

The first two arguments relating to economic constraints are always relevant. The third argument refers to situation of popularity surplus \((Z = 1)\), and the last two arguments refer to situations of popularity deficit \((Z = 0)\). \(\epsilon_t\) is a random variable. Restricting the policy instruments \((\text{POL})\) to public expenditures, the theoretically expected sign of all the parameters \(p\) of equation 8 is positive: the government is expected to increase the growth rate of expenditures \((\Delta \text{POL})\) when there is a surplus in the balance of payments and in the budget \((\rho_1, \rho_2 > 0)\), when a left-wing party in power (identified by \(i_t > 0\)) is able to pursue an ideological policy \((\rho_3 > 0)\), the larger the popularity surplus \((\rho_4 > 0)\), and the more time has passed since the last elections \((\rho_5 > 0)\). Consequently, a right-wing party in power (with \(i_R < 0\)) is expected to reduce the growth rate of expenditures.

The politicoeconomic model theoretically derived was empirically tested, with quarterly data, for the Federal Republic of Germany over the period: 1951: 1-1974: IV, giving a total of 95 observations in all.\(^{30}\) Due to the time lags in the voters' and the government's reactions, the system is recursive and may be estimated by the ordinary least squares method. Within the period indicated there were six elections (September 1953, 1957, 1961, 1965, 1969, and November 1972). Governments formed as a result of these elections were as follows: 1951-1966 by the "right-wing" Christian Democratic Union (CDU), together with the small Free Democratic party (FDP); 1967-1969 by the "Grand Coalition" of CDU and the Social Democratic Party (SPD); and in 1969-1974 by the SPD together with the FDP.\(^{31}\) The Grand Coalition is taken to have neither a right-wing nor a left-wing ideology, it is rather assumed that none of the two large parties had a sufficient vote share to form a government of their own. They were both in a state of popularity deficit \((Z = 0)\), strongly interested in pursuing an expansionary economic policy, each one hoping to therewith increase its popularity with the voters.
### TABLE 2

Popularity Function (Federal Republic of Germany, 1951: I-1974: IV Quarterly Data)\(^a\)

<table>
<thead>
<tr>
<th>Eq.</th>
<th>Independent Variable</th>
<th>Popularity Levels</th>
<th>State of the Economy</th>
<th>Test Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CDU/ FDP</td>
<td>CDU/ SPD</td>
<td>SPD/ FDP</td>
</tr>
<tr>
<td>6a</td>
<td>Government Popularity</td>
<td>55.70</td>
<td>87.44</td>
<td>53.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6b</td>
<td></td>
<td>55.81</td>
<td>87.39</td>
<td>53.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(a.\) Figures in parenthesis indicate t-values. The parameter values are significant with the 93 degrees of freedom if they are larger than 1.98 (95% level of security, indicated by one asterisk) and 2.65 (99% level, indicated by two asterisks). \(d\) is the Durbin-Watson coefficient.
Table 2 provides estimates of the popularity function (equation 6). Equation 6a gives the estimation results if all three economic variables are included. For policy output variables, in particular public expenditures and taxes, no direct effect could be found upon governmental popularity. It should be noted, however, that disposable income includes government transfers to private households. Equation 6a is able to account for 98% of the variance, and there is no serial correlation according to the Durbin-Watson test after the Cockrane-Orcutt iteration procedure has been applied.

The parameters of the economic variables are all statistically significant (particularly in the case of unemployment and inflation) and conform to theoretical expectations. The estimate indicates that a 1% increase in the rate of unemployment and of the rate of inflation reduce government popularity by about 1.7 percentage points. A 1% increase in the growth rate of nominal disposable income increases government popularity by about 0.6 percentage points.

It is, of course, hardly surprising that the popularity level of a government formed by the two major parties (CDU and SPD) is much larger than that which holds where one of the larger parties forms a coalition with the smaller FDP. Where this is the case, the popularity level of a government dominated by the CDU is somewhat larger than that of one dominated by the SPD.

Equation 6b in Table 2 tests whether the possible multicollinearity between the economic variables (the rate of inflation and the growth rate of disposable income have a coefficient of correlation of 0.82) affects the size of the parameter estimates. The exclusion of the growth rate of disposable income has very little effect upon the parameter values of the remaining variables, as a comparison of equations 6a and 6b confirms. The stability of parameter estimates suggests that the underlying theoretical relationship is well specified. Table 3 shows the empirical estimates of the policy output function (equation 8), equation 8a referring to government expenditures on goods and services (exhaustive expenditure), and equation 8b to government transfers. It should be kept in mind that for the reasons explained, the change in, and not the level of, the expenditure components are taken as dependent variables. In the Federal Republic over the period considered, there was no balance of payments problem, the corresponding parameter $p_1$ is therefore a priori set equal to zero.

The two equations are able to account for over three-quarters of the variance and there is no serial correlation. All parameters have the
Table 3: Policy Output Function (Federal Republic of Germany, 1951: I-1974: IV, Quarterly Data)

<table>
<thead>
<tr>
<th>Economic Constraints</th>
<th>Ideological Influences (z = c)</th>
<th>Test Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq. and Transfers</td>
<td>Economic Constraints</td>
<td>Change in Budget Surplus (t-1)</td>
</tr>
<tr>
<td>(β)</td>
<td>(β)</td>
<td>(φ)</td>
</tr>
<tr>
<td>2.40</td>
<td>0.14**</td>
<td>-0.004**</td>
</tr>
<tr>
<td>1.06</td>
<td></td>
<td>(-2.85)</td>
</tr>
</tbody>
</table>

See Table 2. The t-values indicating statistical significance are for the 91 degrees of freedom (practically) the same as in Table 2.
theoretically expected sign and are statistically significant, at least at the 95% level of security. The budget constraint is a relevant constraint on the government ($\hat{\rho}_2 > 0$). If the government is free to act according to its ideological preferences (i.e., if $Z = 1$), the estimates show us that—as was theoretically expected—"right-wing" governments dominated by the CDU tend to spend less (negative sign of $\hat{i}_R$), and "left-wing" governments dominated by the SPD tend to spend more (positive sign $\hat{i}_L$).

When the government feels that it is likely to lose a forthcoming election (i.e., if it is constrained in its actions by the reelection requirements, $Z = 0$), the estimates indicate that it undertakes an expansionary policy ($\hat{\rho}_4 > 0$). The popularity function estimated in Table 2 confirms that a policy of this kind, which leads to a decrease in the rate of unemployment and an increase in the growth of disposable income, will raise government popularity, provided that the rate of inflation is not simultaneously pushed to too high a level. The more time that has already passed since the last election the more rigorously is this expansionary policy pursued ($\hat{\rho}_5 > 0$).

It has not been the purpose of this section to present a complete model of the interdependence between the economy and the polity. Many important links are missing. In particular, interest groups, the central bank, and federal and international relationships need to be included. The objective has been, rather, to demonstrate that existing macro-econometric models should be extended to explicitly allow for the political nature of public policy decision-making. Our empirical analysis suggests that even a simple model such as that used here is able to account in a statistically significant fashion for the development over time of government exhaustive and transfer outlays in a major Western democracy.

**CONCLUDING REMARKS**

This article has discussed the explicit formulation of the political character of public expenditure on the basis of theoretical reasoning in contrast to traditional approaches which have been unconnected with the theory of political decision-making. Of the traditional approaches, one has been mainly developed by fiscal economists and political scientists, the other by econometricians. The superiority of explicit politicoeconomic models for the explanation of policy output is not
maintained solely on theoretical grounds; it has also been demonstrated with the use of empirical examples.

In the course of the article, discussion has been concerned with open-ended and closed-ended models of policy output. It is possible to integrate the open-ended micro model, concerned with direct voting, and the closed-ended macro model, concerned with the behavior of the central government, where the political unit under consideration is still subject to direct voter influence (via a representative system), but where there exists an executive with room for discretionary behavior.

Finally, we may revert to the question which we considered at the beginning of this article: "does politics matter?" To this we have tried to offer a clear answer suggesting that the question is formulated incorrectly. In the sphere of public expenditure, economics and politics are both important, and always interact. Where an interdependent relationship such as this exists, it is of little interest to ask what determines what. Rather, the social scientist's task is to discover appropriate theoretical and empirical formulations so as to be able to grasp the basic elements of this politicoeconomic interaction:

NOTES

2. This is, for example, the intention of Clark (1969) and Rakoff and Schaefer (1970).
4. As, e.g., that by Fisher (1961), Sacks and Harris (1964), Bahl and Saunders (1965). For a survey of more recent studies see Pryor (1968: 446-451), and Wiensky (1970).
5. For details see Hofferbert (1966), Dye (1966), Sharkansky (1967a), and more recently Morgan and Lyons (1975).
6. See, e.g., Lasswell's famous question relating to the core of politics: who gets what, when, how?
7. For further work in this direction see Uslaner and Weber (1975).
8. The major shortcoming of the Fry and Winters study is that the national distribution of families and unattached individuals is taken per income class, rather than the distribution within each state.
9. This has been criticized particularly by Uslaner and Weber (1975), and Clark (1974: 22 and following).
10. An example is Key's hypothesis about the effect of party competition on the level of old-age assistance and similar expenditures of American states. See, e.g., Dawson and Robinson (1963: 270), Hofferbert (1966: 77), and Dye (1966: 143 and following).
11. Two different countries are consided due to a lack of data (especially for Switzerland), but more importantly due to the institutional differences: direct voting upon
which the local expenditure model is based is used especially in Swiss communities but not so in Germany. On the other hand it is reasonable to take Germany in the case of federal policy output which is there decided by representative democracy, while Switzerland has the institutions of half-direct democracy (obligatory referenda) at this level, too.

12. As Sharkansky (1968: 4) puts it: "the fusion of state and local government activities confuses the efforts of politically-distinct units. The state-plus-local aggregate is artificial, and not the arena in which policy-makers decide about the size of their budgets or the allocation of funds."


14. If \( x_{i}^{\text{IN}} \) is the individually consumable quantity and \( x_i \) the physical quantity of the public good \( i \),

\[
x_{i}^{\text{IN}} = x_{i} \cdot n_{i}^{\text{A}}
\]

with \( n \) as the number of persons in political body, (community) \( i \), and \( \delta \) a parameter indicating the "degree of jointness of consumption." \( \delta = 0 \) for a pure public good (i.e., \( x_{i}^{\text{IN}} = x_{i} \)); \( \delta = 1 \) for a pure private good in which each consumer receives the \( n \)th share of the physical quantity \( x_i \), only.

15. The median voter’s budget constraint is

\[
\sum p_{m} \cdot x_{m} + r_{i} \cdot p_{x} \cdot x_{n} = Y_{i}
\]

where \( \sum p_{m} \cdot x_{m} \) is the value (equal price times quantity) of the goods traded in the market. Substituting equation i from the previous note into equation ii gives

\[
\sum p_{m} \cdot x_{m} + r_{i} \cdot p_{x} \cdot x_{i}^{\text{IN}} \cdot n_{i}^{\text{A}} = Y_{i}
\]

The second term on the left hand side, \( r_{i} \cdot p_{x} \cdot x_{i}^{\text{IN}} \cdot n_{i}^{\text{A}} \) is the amount of income taxed away in order to finance the costs of producing the publicly supplied good. Thus, the "price" is \( \bar{r}_{i} = r_{i} \cdot p_{x} \cdot n_{i}^{\text{A}} \).

16. It should be noted that equation 4 and the following equation 5 do not measure physical quantities, but price times quantity. As \( p_{x} \) is assumed to be constant over units, this is of no effect here.

17. As is employed by almost all fiscal economists and empirical political scientists -- compare, e.g., the evidence presented in the surveys of Wilensky (1970) and Hofferbert (1972).

18. Most traditional average regression approaches do not consider the influence of the "tax price" on demand which leads to a considerable specification error (see, e.g., Wilde, 1972). The traditional model has estimated in equation 5 is therefore in an improved form.

19. For a description of the structure and functioning of Swiss political communities, see Rees (1969) and Meylan et al. (1972).

20. The public expenditures of Swiss local communities according to functions are taken from official statistics of the League of Swiss cities (Schweizerischer Stadetverband, various years) and consist of the average cash values of current and investment expenditures for 1968-1972 (in order to exclude a possible bias due to bulky investment projects). Personal income (median and average) in 1970 has been computed from the Federal Income Tax statistics (Eidgenössische Steuerverwaltung, 1976a, 1976b) and
from Census figures (Eidgenoessisches Statistisches Amt, 1972a) using a method developed by Noth (1975: 45-51). The corresponding local tax price has been derived with the aid of the tax statistics (Eidgenoessisches Statistisches Amt, 1971, 1972b) and from unpublished data of the Federal Bureau of Taxation. All other data are taken from official statistics (Schweizerischer Staatsterverband, various years) and refer to 1970.

21. Whereby it is assumed that the variance of the error terms is proportional to the number of users of the publicly supplied goods.

22. As shown by Weicher and Emerine (1973), the statistical significance of the aggregate coefficient for any independent variable depends on the signs, magnitudes, and variances of the coefficients for that variable in the individual regressions, and on the covariance between each pair of individual regressions.

23. Applying the sign-test for comparison of the $R^2$, there are statistically better results in the case of median voter estimates at the 1% level of security.

24. Those values of $\delta$ which can be calculated from statistically significant parameters $\hat{\beta}$ and $\hat{\gamma}$ indicate that the degree of jointness of consumption is one or above one, i.e., the corresponding goods and services are considered to be rather "private" than "public."

25. The relationship between election outcomes and economic conditions has for the United States been studied recently with modern statistical techniques by Kramer (1971), Lepper (1971), Stigler (1973), Tuftes (1975), Arcelus and Meltzer (1975), Bloom and Price (1975), and Gordenan and Kramer (1975).

26. See the empirical study by Mueller (1970). This study has been criticized for statistical reasons by Hibbs (1974); for the United Kingdom compare Goodhart and Bhansali (1970).

27. I.e., $U'' = U(1) - AU$, where AU is the average rate of unemployment over the last election period. $1''$ and GDY $^0$ are calculated accordingly.

28. POPMIN is determined by elements of the institutional structure such as the number of competing parties and the coalition possibilities. In the estimates presented, POPMIN has been set at 52%, thus giving the government (which may be composed of various parties) a margin of security above the strict majority of votes. As Schattschneider (1942: 95) argues: "Fifty-one percent of the vote will give any party all there is of the power to govern. A larger number of votes will add nothing to the victory except certain embarrassments." Similarly, Luce and Rogow (1956: 93): "Other things being equal, the President's power as a legislator appears to be be great when his own party controls between 51% and 66% of Congressional seats. . . . Tactically, this means that his party should have only about 55% of the seats."

29. For a similar approach see Lau and Frey (1971).

30. We are grateful to Friedrich Schneider for collecting the data and undertaking the computer work.

31. A description of the structure and functioning of the German political system is given in Füllwein (1973).

32. The popularity indices have been kindly provided by the Institut fuer Demoskopie (Allensbach, Germany); they give the percent $\%$e share of persons naming the party in government when asked the question (in translation): "If there were elections tomorrow—which party would you vote for?" For the present study, the average of the index of the three months of each quarter is used. The unemployment data (seasonally adjusted) are taken from Bundesanstalt fuer Arbeit (various years); the disposal income data (seasonally adjusted) are taken from Deutsches Institut fuer Wirtschaftsforschung (1975); the rate of inflation data are taken from Statistisches Bundesamt (various years).
33. The quarterly data of exhaustive expenditures, transfers, and budget deficit surplus are taken from Deutsches Institut für Wirtschaftsforschung (1975).

34. If the expansionary policy reduces employment by 1% and increases the growth rate of disposable income by 2%, popularity rises if the rate of inflation does not simultaneously rise by more than 1.7 percentage points.

REFERENCES


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