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Politico-economic Models in Competition with Alternative Models: Which Predict Better?*

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ABSTRACT

Empirically estimated politico-economic models which study the interdependence between the economy and the polity are confronted with competing models using the hard test of *ex ante* forecasts. The politico-economic models in which the government is taken to act in a political framework (it wants to be reelected and to put its ideology into action) yield superior forecasts compared to the models in which a 'benevolent dictator' government directly reacts to macroeconomic conditions. These results suggest that political influences are indeed important and can be adequately analysed in the framework of politico-economic models.

1. WHAT IS A POLITICO-ECONOMIC MODEL?

A politico-economic model analyses the interdependence between the economy and the polity. The analysis is explicit and based on the economic theory of politics, in the US usually called public choice.¹ It is assumed that both political and economic decision-makers act according to the individualistic (economic) model of behaviour, i.e. the actors consider (primarily) their own advantage subject to the various constraints imposed from the outside. A very important feature of politico-economic models is that they are – at least in principle – empirically testable. Ideally, the models are tested with the help of econometric methods (politometrics).

In the last ten years or so a considerable number of politico-economic models have² been developed, not all of which, however, meet fully the characteristics mentioned above. With respect to the emphasis placed on the various aspects, four different types may be distinguished.²

(a) *Particular economic relationships* are analysed in the context of politico-economic models. The approaches by Nordhaus (1975) and MacRae (1977) discuss

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the political business cycles arising when a vote maximizing government is confronted with an inflation–unemployment trade-off (Phillips curve).

(b) The influence of *economic conditions on the polity* has been empirically analysed in the context of popularity and vote functions.³ With Kramer (1971) and Goodhart and Bhansali (1970) being the forerunners, there are now hundreds of such studies available (see the surveys by Monroe, 1979; Paldam, 1981).

(c) The influence of *political decisions on the economy* has been analysed within the framework of the theory of government behaviour. Downs's (1957) original assumption of vote maximization has been challenged by the more general assumption that governments (politicians) maximize their utility subject to a re-election constraint (Frey and Lau, 1968).⁴

(d) The *two-way interdependence* between the economy and the polity has been analysed with the help of simulations (for example, Schneider, 1974, Frey, 1974) as well as algebraically. Some approaches are quite general (in particular, van Winden, 1981) but do not employ empirical tests, while other models (in particular, Kirchgässner, 1981) inquire into the consequences of a normative model on the background of empirically measured relationships.

For various countries, a set of *econometrically* tested politico-economic models of the mutual interrelationship of the economy and the polity have been developed (Frey and Schneider, 1978a, 1978b, 1979; Schneider and Pommerehne, 1980). They are now being extended to take account of the central bank (Frey and Schneider, 1981a), trade unions (Gärtner, 1981), other economic interest groups (Schneider and Naumann, 1982), and the institutions of direct democracy (referenda) (Schneider *et al.*, 1981). This type of politico-economic model will be considered in the following pages.

There has certainly been a considerable development of politico-economic models with respect to both quantity (which is undisputed) and quality. Quality may be judged according to three criteria:

(a) The *'intrinsic' interest* in explicitly and quantitatively analysing the politico-economic relationships which have been neglected in economics, political science and sociology, despite the fact that almost everyone agrees that they are of great importance. The *'extrinsic' interest* is shown by the 'invisible college' which has evolved internationally among economists, political scientists and sociologists on the subject. Politico-economic modelling is one of the few areas of truly interdisciplinary research existing in the social sciences.

(b) The results of the conventional *statistical tests* of the estimated equations from vote-, popularity- or policy-functions (such as R^2 , Student-t). To meet the standards of these tests is a necessary, but not a sufficient, condition for research to be of high quality. In the age of sophisticated computers with easily handled statistical programmes, it is (in most cases) possible to obtain satisfactory test statistics by adjusting the model specifications and by using the hard- and soft-ware computer facilities more extensively.

(c) The *forecasts* arrived at by *competing models*. Two types of forecasts are possible:

(i) *Ex post forecasts* which test how closely the alternative models fit the data which have been used to estimate empirically the parameters of the model.

(ii) *Ex ante forecasts* where the relationships of the model are estimated with data for a past period (but not up to the most recent data period). Forecasts with the

competing models are then made to predict the value of the variables for the periods *not* used for the estimation.

It is clear that *ex ante* forecasts are a more demanding test for the quality of a model.

In this paper, econometrically tested politico-economic models are confronted with competing models, using – where possible – the ‘hard’ test of *ex ante* forecasts. Such forecasts have been undertaken for two countries. Models for the United Kingdom and for the United States are compared by use of sample predictions. For Germany a confrontation of a ‘pure’ econometric model with a full-scale model of politico-economic interaction is undertaken by comparing their *ex post* forecasting power. It is concluded that the politico-economic models in general yield superior forecasts, which is mainly due to the fact that they have a well-established theoretical basis. The competing models are theoretically deficient and almost neglect the political influences; they assume that economic variables directly influence economic policy actions. The evidence presented suggests that political influences are indeed important and may not be left out of account. The politico-economic models – while certainly improvable in a great many respects – seem to be on the right track.

2. A CONFRONTATION OF MODELS FOR THE UNITED KINGDOM

2.1 The Politico-Economic Model

The basic idea of the politico-economic model considered (Frey and Schneider 1978a, 1981b) is that the voters evaluate the performance of the government to a considerable degree by the state of the economy and its development. The government which wants to survive (that is, to be re-elected) and to pursue its own goals (that is, to put its ideology into reality) in a democracy reacts by influencing the economy accordingly. In a simplified model there are two decision-makers – voters and government; two areas – the economy and the polity; and two links of interdependence – the evaluation function and the policy function (see Figure 1). The two functional links will now be discussed in turn.

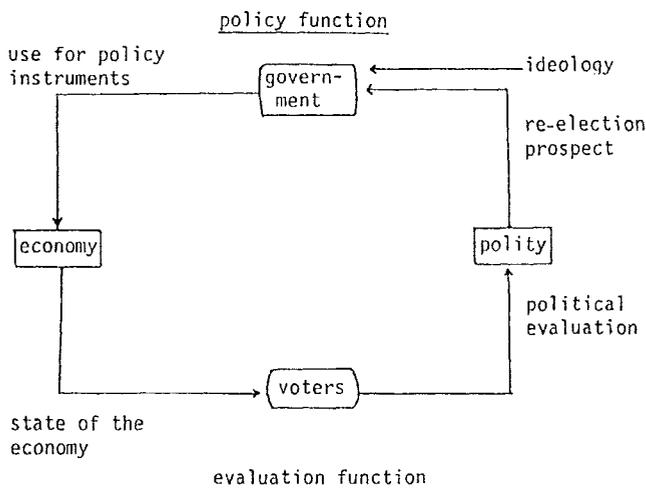


Fig. 1. Basic outline of a politico-economic model.

(a) *Voters: popularity function.* It is assumed that voters tend to turn against the government when they realize that economic conditions worsen, that is when the rate of unemployment and inflation increase, and when the rate of growth of real disposable income falls. The government's position *vis-à-vis* the voters is measured by government popularity, which is the only (reasonably) reliable indicator of its standing with the voters available to the government between elections on a monthly basis in most countries. Besides economic conditions, there are political influences: government popularity wears off during the time in office ('depreciation') and it moreover follows an autonomous 'pure election cycle' (which is unexplained from an economist's view). It has been observed that the voters, after some time, tend to turn away from the government until the middle of the election period; but when the election approaches, they gradually return to support the government. For the United Kingdom, where in the period dealt with there were only two parties effectively contending for office, the difference between the popularity of the government and the main opposition party, the 'lead', is explained. The lead function is estimated with quarterly data for the period 1958.1 to 1976.3:⁵

$$\begin{aligned} \text{LEAD}(t) = & 11.6 + \\ & +0.59 \text{ LEAD}(t-1) \\ & (7.09) \\ & -0.51 \text{ change in the rate of inflation}(t) \\ & (-1.90) \\ & -1.21^* \text{ rate of unemployment}(t) \\ & (-2.56) \\ & +0.22^* \text{ rate of growth of real disposable income}(t) \\ & (2.13) \\ & -0.36^* \text{ popularity depreciation}(t) \\ & (-3.01) \\ & -0.70^* \text{ pure election cycle}(t) \\ & (-2.34) \end{aligned} \left. \begin{array}{l} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} \\ \\ \text{economic} \\ \text{influences} \\ \\ \\ \\ \text{political influences} \end{array}$$

$$\bar{R}^2 = 0.70, h = 1.38, \text{d.f.} = 69.$$

(Figures in parentheses are t-values; * denotes t-values significantly different from zero at the 5% level.)

All the parameters have the theoretically expected signs. In particular, government lead decreases with a rise in the rate of unemployment and increases with a rise in the growth rate of real disposable income (the change in the rate of inflation just misses being statistically significant). 'Popularity depreciation' is captured by a set of (dummy) variables which continually increase over the election period; the corresponding parameter is therefore negative. The 'pure election cycle' is captured by a set of (dummy) variables which continually increase until the middle of the election period, and then continually decrease until the next election; the corresponding parameter is therefore negative. The equation 'explains' (in the statistical sense) 70% of the variance, and the h-test suggests that there is no auto-correlation of residuals. The equation thus performs well, judged according to the conventional statistical tests.

(b) *Government: policy function.* The politicians in power are assumed to pursue

their (ideological) selfish goals; for example, a Conservative government prefers lower public expenditures than a Labour government, measured as a share in GNP. The government's actions are restricted by political and economic constraints. As the government politicians are unable to pursue their ideological goals when they are not in power, they will make a great effort to be re-elected. They endeavour to undertake an economic policy which will make sure that they will receive a sufficient share of the vote. For the period investigated (1957-76) the lead function indicates that – provided inflation does not increase very quickly – an expansionary economic policy will most probably increase the government's lead. Thus, if government fears that its lead is not sufficient for remaining in office and the next election is close, it is assumed to undertake an expansionary policy. If, however, the government is confident of winning the forthcoming election, it is free to undertake an ideologically orientated policy. In both cases, the policies cannot be instantaneously changed, but an adjustment period is needed. Moreover, the government must take into account economic constraints in the form of the balance of current account and of cost factors (real wage level).

The policy function estimated over the period 1958.1 to 1976.3 is shown here for real (exhaustive) government expenditures:

$$\begin{aligned} \text{EXPENDITURES (t)} = & 0.16 \\ & +0.02^* \text{ Lead-deficit (t - 1)} & \left. \begin{array}{l} (2.70) \\ +0.83^* \text{ adjustment to value desired} \\ (28.07) \text{ for re-election (t - 1)} \end{array} \right\} \begin{array}{l} \text{in case of} \\ \text{re-election} \\ \text{effort} \end{array} \\ & +0.01^* \text{ Conservative ideology (t - 1)} & \left. \begin{array}{l} (2.11) \\ +0.03^* \text{ Labour ideology (t - 1)} \\ (3.66) \\ +0.53^* \text{ adjustment to value desired} \\ (25.60) \text{ for ideological reasons (t - 1)} \end{array} \right\} \begin{array}{l} \text{in case of} \\ \text{ideologically} \\ \text{orientated} \\ \text{policy} \end{array} \\ & +0.02^* \text{ balance of current account} & \left. \begin{array}{l} (3.6) \\ +0.02^* \text{ real wage rate (t - 1)} \\ (5.90) \end{array} \right\} \begin{array}{l} \text{economic and} \\ \text{financial} \\ \text{constraints} \end{array} \end{aligned}$$

$$\bar{R}^2 = 0.99, h = 1.19, \text{d.f.} = 68.$$

The equation's test statistics meet the conventional requirements, and the estimated coefficients have the theoretically expected signs. Given a lead-deficit, the government increases its expenditures in order to lower unemployment and to increase growth, so as to improve its re-election likelihood, but it takes time to adjust. On the other hand, when there is a lead-surplus, a Conservative government aims at a lower public expenditure share in GNP than a Labour government, again after a time of adjustment. Similar equations have been estimated for subsidies to households.

2.2 The Crystal-Alt Model

This competing model (Chrystal and Alt, 1981) for the United Kingdom specifies a *policy function* which differs fundamentally from the politico-economic model discussed in the previous section. The two authors assume that economic variables directly influence government policy and that there is no need to model the political sector. The two economic factors taken to influence the use of policy instruments are taken to be the level of national income (in real terms) and the lagged level of government expenditures.

Estimated over the same period (1958.1 to 1976.3) as the politico-economic model, the policy function is

$$\begin{aligned} \text{EXPENDITURES (t)} = & -2.623 \\ & +0.0806* \text{ real GNP(t)} \\ & \quad (3.06) \\ & +0.759* \text{ Expenditures (t - 1)} \\ & \quad (14.01) \end{aligned}$$

$$R^2 = 0.99, h = 1.50, \text{d.f.} = 76.$$

Judging from the test statistics, the Chrystal-Alt version of the policy function looks satisfactory.

2.3 Comparison of Ex Ante Forecasts

In order to allow a comparison of the ex ante predicting power of the two models, the two equations of the politico-economic model and that of the Chrystal-Alt model were estimated with data extending only up to 1976.3. Table I shows the ex ante forecasts for the subsequent period 1976.4 to 1979.3 whose data have *not* been used for the estimation. Two measures of forecasting performance are given:

(i) Theil's inequality coefficient T

$$T = \frac{\sqrt{\frac{1}{n} \sum (PV - AV)^2}}{\sqrt{\frac{1}{n} \sum PV^2 + \frac{1}{n} \sum AV^2}}$$

where n = number of forecasted periods

PV = predicted values

AV = actual values

T is one of the most often used measures for judging the quality of forecasts. If it takes the value 0, one has a 'perfect' (without error) forecast; and if it takes the value 1, one has a 'bad' prediction, such as a naïve trend extrapolation.

(ii) Average absolute percentage deviation between the actual and predicted values. The closer this value is to 0, the better is the forecast.

As may be seen from Table I, the politico-economic model yields superior ex ante forecasts for both exhaustive government expenditures and subsidies: Theil's inequality coefficient and the average mean error of deviation between predicted and

TABLE I. Comparison of ex ante forecasts between the politico-economic model of Frey/Schneider and Chrystal-Alt model for the UK (forecast for 1976.4 to 1979.3, on the basis of model estimates for 1958.1 to 1976.3). Forecasts for exhaustive government expenditures and subsidies.

		Measures of deviation between actual and predicted values		
		Theil's inequality coefficient	Average absolute percentage deviation (per quarter)	Result
Exhaustive government expenditures	1. Politico-economic model (Frey/Schneider)	0.38	1.10	} Politico-economic model superior
	2. Chrystal/Alt	0.78	2.68	
Subsidies	1. Politico-economic model (Frey/Schneider)	0.33	1.24	} Politico-economic model superior
	2. Chrystal/Alt	0.87	2.15	

actual values are considerably smaller in the case of the politico-economic model. This suggests that the political relationships (in our case the standing of the government with the voters in terms of a popularity surplus or deficit) should be *explicitly* modelled in order to give a good forecast of government policy action.

3. A CONFRONTATION OF MODELS FOR THE UNITED STATES

The two models compared in this section both have a 'politico-economic' content, but they differ with respect to the underlying assumptions about government behaviour. In the first model (Frey and Schneider, 1978b; Schneider and Frey, 1982), government does not have a direct interest in the state of the economy but reacts to changes in its re-election prospects. In the second model (Ahmad, 1982), government is taken to be a 'benevolent dictator' concerned about the state of the economy as such. But government is also assumed to react to changes in its re-election prospects. As the popularity functions of the two models are identical, they are not reproduced here. The two models again differ with respect to the policy function.

3.1 The Frey/Schneider Model

The government differentiates between two states of the world. In the case of a popularity deficit just before an election (i.e. when the president fears not to be re-elected), public expenditures are again increased in order to raise popularity, because if unemployment is reduced (and real income growth increased) this has the largest economic impact on the president's popularity during the period 1952 to 1978. This policy will be undertaken the more strongly, the nearer the elections are. In the case of a popularity surplus, the presidents pursue ideological goals, the Democratic ones tending to increase, and the Republican ones tending to decrease, the share of real public expenditure. The government is unable to change its policy quickly due to the reluctance of the public administration, which in the American model is captured

Table II shows that the politico-economic model by Frey/Schneider yields superior forecasts to those of the Ahmad model for both types of policy instruments. This suggests that the Frey/Schneider model is based on a better theory of government behaviour than Ahmad's 'benevolent dictator' model. Policy action seems to be influenced by political considerations, and there is no relevant systematic *direct* influence of macro-economic variables such as inflation, growth of income and unemployment.

4. A CONFRONTATION OF MODELS FOR THE FEDERAL REPUBLIC OF GERMANY

4.1 The Politico-Economic Model

This model (Frey and Schneider, 1979) is based on the same theoretical ideas as the ones for the United Kingdom and the USA presented above. The econometric estimates cover the years 1951–74 (yearly data). Over this period, three ideological types of government may be distinguished: 1951–66, government dominated by the 'right-wing' Christian-Democratic Party, CDU; 1967–9, the so-called 'grand Coalition' between the CDU and the 'left-wing' Social-Democratic Party, SPD; and 1970–4, government dominated by the SPD. It is theoretically expected that in the case of a popularity surplus the CDU aims at restricting, and the SPD at expanding government expenditures compared to the trend. The Grand Coalition is assumed not to have an identifiable ideological orientation. In the case of a popularity deficit, all governments are expected to undertake an expansionary policy in order to raise popularity for the purpose of winning the forthcoming election, because during the estimation period unemployment had the greatest impact on government popularity.

The policy function referring to current (exhaustive) public expenditures is:

$$\text{EXPENDITURES (t)} = 0.85$$

+0.002* popularity deficit (t 2 1)	}	when popularity deficit
(2.48)		
+1.20* nearness of election (t)	}	when popularity surplus
(2.05)		
0.03* Christian-Democratic	}	when popularity surplus
(-2.06) government (t)		
+0.46* Social Democratic government (t)	}	administrative and financial constraints
(2.06)		
+0.66* expenditures (t - 1)	}	administrative and financial constraints
(4.45)		
+0.41* tax income (t - 1)	}	administrative and financial constraints
(3.00)		

$$R^2 = 0.99, h = 1.03, \text{d.f.} = 18.$$

All the parameters are statistically significant and have the theoretically expected sign. Again, the differentiation between periods of popularity deficit and surplus seems to be worth while. (Similar equations have been estimated for transfers to wage earners, the wage rate and the number of public employees.)

4.2 Krelle's Pure Economic Model

In the competing model (Krelle, 1974), the policy variables are directly linked to economic variables without attempting to provide a theoretical rationale. The policy equations for the period 1951-74 are:

$$\begin{aligned} \text{EXPENDITURES (t)} = & -6.74 + 0.39* [\frac{1}{2} \text{TAX (t - 1)} + \frac{1}{2} \text{TAX (t - 2)}] \\ & (-3.21) \quad (2.82) \\ & +42.79* [\text{growth of nominal domestic income in the} \\ & (2.23) \quad \text{private sector (t)}]. \end{aligned}$$

$$R = 0.99; D.W. = 1.78; d.f. = 22.$$

Similar 'economic' equations have been specified and estimated by Krelle for transfers, the government wage rate and government employment.

4.3 Comparison of Ex Post Forecasts

The confrontation of the two models for Germany differs in two respects from the ones undertaken:

- (i) Ex post predictions are made, that is only the quality of fit is compared;
- (ii) The predictions do not refer only to the policy variables, but to *all* variables of the underlying econometric model (which comprises about 140 equations). The econometric model for Germany is used and in the case of the politico-economic model amended by the policy equations of section 4.1, in the other case by the policy equations of section 4.2.

TABLE III. Comparison of ex post forecasts between the politico-economic model of Frey/Schneider and the Krelle model (forecast over the four election periods, 1958-72). Forecasts for two policy instruments and two macro-economic variables.

		Average absolute percentage deviation between predicted and actual values (per year)	Results
Exhaustive government expenditures	1. Politico-economic model (Frey/Schneider)	2.09	} Politico-economic model superior
	2. Krelle model	8.61	
Transfers	1. Politico-economic model (Frey/Schneider)	1.46	} Politico-economic model superior
	2. Krelle model	4.15	
Consumer price index	1. Politico-economic model (Frey/Schneider)	1.86	} Politico-economic model superior
	2. Krelle model	3.66	
Nominal GNP	1. Politico-economic model (Frey/Schneider)	2.51	} Politico-economic model superior
	2. Krelle model	4.36	

Ex post forecasts for the election periods 1958–72 are compared in Table III for two policy variables (exhaustive and transfer expenditures) and two 'output' variables (consumer price index and nominal GNP).

Table III shows that the politico-economic model yields better ex post forecasts than Krelle's pure economic model in both the case of policy instruments and of macro-economic variables. This suggests again that an explicit modelling of politically motivated behaviour is important for the construction of econometric models (even if their purpose is not to model politico-economic interactions).

5. CONCLUSIONS

Comparing the ex ante and ex post forecasting capacities, our analysis reaches the result that the politico-economic model is better able to predict the actual values of the variables than competing models. Our analysis suggests that:

(1) *Macro-economic variables* such as (the growth of) GNP, unemployment and inflation are not well suited to serve as *direct* determinants of government behaviour. In particular, the comparison with the Ahmad model for the United States indicates that it may be preferable not to include them among the determinants, once the political determinants (which also indirectly reflect economic influences) are taken into account.

(2) Government behaviour (also) depends on *politics*. The basic proposition of the politico-economic model that governments are interested in putting their selfish goals into practice in the political contest, i.e. to be re-elected, fares well compared to the competing proposition that governments are interested in the state of the economy (presumably to further the welfare of the population). Our analysis may thus be interpreted as a test of the 'economic model of behaviour' – that actors are primarily pursuing their *own* goals, especially survival – applied to politics compared to the model of a 'benevolent dictator' (see Buchanan, 1977) – that actors pursue the 'good' of society. It should, however, be noted that these behavioural propositions are only indirectly tested, by interpreting revealed behaviour.

(3) Government behaviour is not solely determined by the need to survive but also by *ideological considerations*. The differentiation between the state of a popularity deficit before an election in which the government is forced to undertake a popularity-increasing policy in order to be re-elected, and the state of a popularity surplus, in which the government can allow itself to pursue ideologically motivated objectives, seems preferable to the crude (but still popular) assumption that the government constantly undertakes a vote-maximizing policy.

(4) *Economic variables* do influence government behaviour, but they do so indirectly by determining (part of) the *constraints* within which the government can act. These constraints differ between countries and periods; for example, the balance of payments constraint proved not to be relevant for the United States, but was so for the United Kingdom, 1958–79.

(5) Governments are part of politico-economic interaction in which a *multitude of actors* is participating. In the policy functions of the politico-economic models estimated, the influence of public administration on government can be identified to lie in the incapacity of governments to change their policy instruments quickly to the value desired. The public administration has an interest in a conservative policy which enhances their position.

To summarize: Neither the 'pure' economists' assumptions that economic variables alone explain government behaviour, nor the assumption that governments maximize votes only seems to be adequate. A satisfactory model of government behaviour and politico-economic interdependence requires that a more complex model be considered.

The politico-economic models presented here are certainly only a first step towards an adequate analysis of reality. They may point to the directions in which future research may usefully proceed. Many aspects of the model can be improved upon. In particular, the many facets of government ideology have to be captured. Equally, the decision process of government in the case of popularity deficit has to be modelled more generally, that is it has to be shown explicitly what type of economic policy (including redistribution to specific groups) increases re-election chances.

As was mentioned at the beginning of this paper, work is presently under way in various directions with the goal of improving politico-economic models. What this paper is intended to show is that first, even at the present state of research, *politico-economic models perform well compared to competing models*; and second, that the performance of models can and should be evaluated not simply by considering the conventional test statistics, but rather by comparing (*ex ante*) forecasts of competing models.

NOTES

- 1 See the surveys by Mueller, 1979; van den Doel, 1979; Frey, 1978.
- 2 The various approaches are only mentioned here. For a more comprehensive discussion, see Frey and Schneider, 1975.
- 3 One variant is the median voter model, which assumes that the (median) voter determines fully government policy. See, for example, Pommerhne, 1978; Romer and Rosenthal, 1979.
- 4 Another variant consists of the party competition models based upon Downs (1957) and Hotelling (1929): see, for example, Riker and Ordeshook (1973). They have not proved to be very fruitful, in that they have rarely, if ever, been capable of being rigorously tested empirically.
- 5 For a more exact presentation and definition of variables in the United Kingdom case, see Frey and Schneider, 1978a, 1981b.
- 6 For a more exact presentation and definition of variables in the United States case, see Frey and Schneider, 1978b; Schneider and Frey, 1982.
- 7 To save space, the other policy functions (for example, for transfers) are not reproduced here. The popularity function is not reproduced either, because it has no counterpart in the competing model discussed later.

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