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ON THE POLITICAL ECONOMY
OF PUBLIC SERVICES

Bruno S. Frey

46

DISKUSSIONSBEITRÄGE

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I. INTRODUCTION *)

Public expenditures and the supply of public services show considerable variation over time; in particular there is a close connection with the legislative term. Such variations in public expenditures (and other government actions) may lead to "political business cycles" though a more appropriate name would be "politico-economic cycles"¹⁾. It has recently received attention by theoreticians, especially in Europe²⁾.

The approach taken in the present paper can be characterized by three main aspects:

- 1) The study is positive, i.e. intends to be explicative and concerns itself with intertemporal variations of public services;
- 2) The analysis is in an explicit macro-economic framework, which seems appropriate because of the quantitative importance of public services in a modern society;
- 3) The theoretical background is given by the New Political Economy or Public Choice. However, the restrictive set up of e.g. DOWNS (1957) is left: the government is assumed to maximize its own utility³⁾, elections are discontinuous, and the emphasis lies on the disequilibrium dynamics.

Besides the government, public bureaucracy is another politically relevant decision-maker taken account of.

Section II presents the basic model; in section III it is assumed that the government maximizes its utility, in section IV that it maximizes the length of being in power. In section V bureaucratic behaviour is added. Some concluding remarks are made in section VI.

*) I am grateful to Friedrich Schneider for performing the computations and for helpful comments.

- 1) For empirical evidence see e.g. LINDBECK 1970, SNYDER 1970; and in particular for England DOW 1964 (esp. p.384), PREST 1968.
- 2) The forerunner is KALECKI (1943); GOODHART and BHANSALI (1970) and NORDHAUS (1972) analyze the phenomenon in the Phillips-curve context; special emphasis on the time perspective is put by FREY and LAU (1968) and LIEFMANN-KEIL (1970). A simple simulation model of the politico-economic system without public services and bureaucracy, and no explicit optimizing behaviour of the government is presented in FREY (1974).
- 3) Note that only under four very strong conditions utility-maximization non-trivially boils down to vote-maximization of the government: (i) a two-party system, (ii) perfect political competition, (iii) continuous elections, (iv) full equilibrium

II. THE BASIC MODEL

The model developed is kept as simple as possible. It is composed of four parts, namely three sectors :

- (a) the economy,
- (b) the public services,
- (c) the polity,

and the interaction equations connecting these sectors, of which there are two kinds:

- (i) the popularity function transmitting economic impulses into the political sector;
- (ii) the reaction functions, ^{showing} ~~which shows~~ how the government uses the various instruments to reach its goals.

The economy is pictured as a real one-good model. The emphasis lies on intertemporal aspects introduced through investment equations and various time lags. Full employment of capital and labour is assumed. The time periods can be interpreted as covering half a year, elections take place each fourth year, i.e. at $t = 8, 16, 24, 32, \dots$

The basic model consists of the following equations:

I. The Economy

Real national income Y depends on the real capital stock K by means of a linear-limitational production function

$$(1) \quad Y(t) = k(t) \cdot K(t).$$

Capital productivity ^{k} rises the more public services PS are offered (as a share of national income) and falls the larger the share of current public expenditures (PEC) in national income. This last effect is due to the anti-productive effect of much current public expenditures¹⁾.

$$(2) \quad k(t) = k_0 + k_{PS} \left[\frac{PS(t)}{Y(t)} \right] - k_{PEC} \left[\frac{PEC(t)}{Y(t)} \right],$$

where $k_0 = \text{const.}$

Real capital stock is increased by "private" investment I and "political" investment PI , and decreased by depreciation D

$$(3) \quad K(t+1) = K(t) + I(t) + PI(t) - D(t).$$

1) Current public expenditures often impede growth by subsidizing inefficient sectors such as agriculture. For a theoretical discussion see BERNHOLZ (1966).

The terms "private" and "political" investment refer to the controlling entity. A considerable part of investment undertaken for private profit reasons can be controlled by government intervention. "Political" investment thus covers not only infrastructural investments in the widest sense but also part of investment in the private sector. It is undertaken by government for political reasons. To minimize the fluctuations originating from privately controlled investment, it is simply taken to be a constant fraction of income

$$(4) \quad I(t) = v \cdot Y(t).$$

Capital depreciation is proportional to capital stock

$$(5) \quad D(t) = d \cdot K(t).$$

Private consumption goods are simply assumed to be a constant fraction of income.

$$(6) \quad C(t) = c \cdot Y(t).$$

The government politicians receive an "income" in the form of consumption goods. This "political" consumption PC is residually determined by

$$(7) \quad PC(t) = Y(t) - I(t) - D(t) - C(t) - PT(t),$$

where PT are government expenditures for investment and public services.

2. Public Services

Government expenditures can be used for investment into real capital ("political investment" PI) or for the production of public services. The latter expenditures must be split up into those immediately increasing public services output (PEC = public expenditure current), those increasing public services output only after a time lag of two periods (PEM = public expenditure medium run), and those increasing it only after a lag of four periods (PEL = public expenditure long run).

Total government expenditures PT are

$$(8) \quad PT(t) = PI(t) + PEC(t) + PEM(t) + PEL(t).$$

The production function for the output of public services is

$$(9) \quad PS(t) = PEC(t) + \beta_{PEM} \cdot PEM(t-2) + \beta_{PEL} \cdot PEL(t-4).$$

It is reasonable to assume $1 < \beta_{PEM} < \beta_{PEL}$: expenditures with a lagged effect have a higher productivity.

3. The Polity

In analogy to real capital, the concept of a political capital stock is introduced which reflects the long-run or basic evaluation of the government's performance from the voters' view. A similar concept is used by some empirically oriented political scientists (e.g. CAMPBELL, CONVERSE, MILLER, STOKES 1960) and corresponds to the stock of "good will" as estimated in econometric studies of advertising (e.g. PELES 1971, TSURUMI 1973).

Political Capital stock PK is increased by popularity POP and decreased by political depreciation PD

$$(10) \quad PK(t+1) = PK(t) + POP(t) - PD(t).$$

The depreciation of political capital is due to voters forgetting past government achievements. It is assumed to be proportional to the stock

$$(11) \quad PD(t) = \delta \cdot PK(t).$$

Popularity, on the other hand, refers to the consumer-voters' short run or current evaluation of the government's behaviour.

The politicians in power estimate in each time period t their likely vote share $S(t)$ at the next election. They base this estimate upon the stock of political capital accumulated. They know that the (reasonably rational) voters base their judgment of the government's expected performance over the next electoral period not upon short-lived impressions reflected in popularity ratings but rather upon their more basic evaluation reflected in political capital. The government politicians thus expect their electoral vote share to rise if political capital is increased.

$$(12) \quad S(t) = S(t-1) + \gamma [PK(t) - PK(t-1)].$$

The vote share received by the government is measured in percentage

points, such that $0 \leq S(t) \leq 100$. Before the elections it indicates the vote share expected by the government if it does not undertake any action to influence popularity ratings. At election time, S indicates the actual vote share received by the government. If S is lower than a given minimum share $SMIN$, the government changes and is taken over by the former opposition party (or by a coalition of former opposition parties). The size of $SMIN$ depends on a great many factors such as the number of competing parties and their coalition possibilities, on institutional factors (e.g. the number of seats received in parliament on the basis of S) etc. In the present model $SMIN$ is taken to be exogenously determined and is fixed at 50 %; the opposition is composed of only one party and does not strategically compete with the party in power. (This would involve the construction of a differential game).

The opposition party builds up a stock of political capital PKO in the same way as the government

$$(13) \quad PKO(t+1) = PKO(t) + POPO(t) - PDO(t),$$

$$(14) \quad PD(t) = \delta_0 \cdot PKO(t).$$

where the opposition's popularity and depreciation are $POPO$ and PDO , respectively.

The consumer-voters have expectations concerning the provision of private consumption and public services. They are formed on the basis of discounted past experience. The consumption expectation EC is

$$EC(t) = (1 - \lambda_c) \sum_{i=0}^{\infty} \lambda_c^i C(t-i),$$

and the expectation about public services EPS

$$EPS(t) = (1 - \lambda_{PS}) \sum_{i=0}^{\infty} \lambda_{PS}^i C(t-i).$$

Using Koyck-transformations, this simplifies to

$$(15) \quad EC(t) = (1 - \lambda_c) C(t) + \lambda_c EC(t-1),$$

$$(16) \quad EPS(t) = (1 - \lambda_{PS}) \cdot PS(t) + \lambda_{PS} EPS(t-1)^1$$

1) The parameter values used in the following simulation runs are chosen with a view to realism: $\kappa_0 = 0.125$, $\kappa_{PS} = 0.18$, $\kappa_{PEC} = 0.07$, $\nu = 0.08$, $d = 0.05$, $c = 0.50$, $\beta_{PEM} = 1.15$, $\beta_{PEL} = 1.40$, $\delta = 0.20$, $\delta_0 = 0.10$, $\delta = 0.50$, $\lambda_c = 0.68$, $\lambda_{PS} = 0.70$

For reasons of capacity, PI can be changed only to the extent of 5 units per period.

4. Interaction Equations

Government popularity POP is in this simple model only influenced by the level of private consumption and the supply of public services, in both cases compared to voters' expectations

$$(17) \quad POP(t) = POP(t-1) + \pi_c \cdot [C(t) - EC(t)] + \pi_{ps} \cdot [PS(t) - EPS(t)].$$

Popularity is also measured in percentage points, hence $0 \leq POP(t) \leq 100$.

Popularity functions have recently received much attention by mathematical political scientists and economists. A connection between economic conditions (mainly inflation, unemployment and growth of income) and party popularity has been conjectured for a long time, e.g. by AKERMAN (1947) for various European countries and BEAN (1940) for the United States. The taking over of the Nazi has been shown to be closely related to ^{the} failing economic situation in the Weimar Republic (KALTEFLEITER 1966).

These studies have, however, been undertaken with inadequate statistical methods. Of great interest are the recent studies by GOODHART and BHANSALI (1970) using regression and spectral analysis for Great Britain, and KRAMER (1971) for the US.

There is a corresponding study for Germany (FREY and GARBERS 1972). Though there is some criticism about these approaches¹⁾ it seems reasonable to assume that (i) popularity functions reflect a relationship existing in reality, and that (ii) public services are a significant determinant (a proposition untested so far).

The second type of interaction equations, the action and reaction functions of political decision_makers are discussed in the next sections.

1) See in particular the discussion between STIGLER (1973) and OKUN (1973).

III. A UTILITY MAXIMIZING GOVERNMENT

1. The Maximization Problem in the Politico-Economic System as perceived by the Government

For most governments the relevant time horizon seems to extend over one term and the first upcoming election, only. Such a government is not concerned with any election farther in the future. It seeks to maximize the utility of being in power (PU) over the election term $T_{i+1} - T_i$ (where T_i indicates election dates occurring at $t = 8, 16, 24 \dots$) subject to the condition of re-election at the end of the term. The maximization problem is

$$\max_{\text{(policy instruments)}} \sum_{t = T_i}^{t = T_{i+1}} \text{PU}(t)$$

$$\text{subject to } S(T_{i+1}) \geq \text{SMIN}$$

(the Lagrangean multiplier corresponding to this constraint will be denoted by Λ , with $\Lambda = 0$ indicating that it is non-binding, $\Lambda > 0$ that it is binding).

Government utility depends on its ideological views about the levels of consumption and public services available to the population and on its own consumption

$$(18) \quad \text{PU}(t) = i_c \cdot C(t) + i_{PS} \cdot \text{PS}(t) + \varepsilon \cdot \text{PC}(t).$$

The government does not have full information about the politico-economic system in which it is acting. It is forced to perform the above maximization problem within the system as it perceives it which is certainly simplified compared to the "true" structure as developed in section II. Thus the (small) effect of public expenditures on capacity output is disregarded ($k'_{PS}=0, k'_{PEC}=0$).¹⁾ Due to incomplete information, the government finds it parti-

1) Dashed parameters indicate the values as perceived by the government.

cularly difficult to make an estimate of the popularity function (17). It has only a vague notion of how consumption and public services affect its popularity and feels unable to separate the direct effect of $C(t)$ and $PS(t)$ from the indirect effect through the induced change in voters' expectations²⁾. To reduce complexity, the government takes the popularity function to be

$$(17)' \quad POP(t) = \pi'_c C(t) + \pi'_{PS} PS(t),$$

but makes a conservative estimate of π'_c and π'_{PS} to take account of the changes in voters' expectations (π'_c and π'_{PS} will be taken to be much smaller than π_c and π_{PS} , respectively).

2) Note from (15), (16), (17) that the total effect is

$$\partial POP(t) / \partial C(t) = \pi_c - \pi_c(1 - \lambda_c) = \pi_c \lambda_c, \quad \text{and}$$

$$\partial POP(t) / \partial PS(t) = \pi_{PS} - \pi_{PS}(1 - \lambda_{PS}) = \pi_{PS} \lambda_{PS}.$$

The maximization problem the government perceives is solved here by dynamic programming. However, it can also be found or at least suitably approximated by intuitive reasoning of ^{a sort} ~~which~~ government politicians may well be capable of.

The optimal ^(stated) values for the policy instruments available to the government have the following properties:

- (i) Long-run public expenditures PEL^* are always reduced to zero the four last periods before an election, because due to the four-period lag they afterwards have no effect on the current election term;
- (ii) Political investment PI^* is for the same reason always reduced to zero the last period before an election.

Particularly interesting results can be presented for the case of governments with special ideological views. For the purpose of exposition, three "ideal" types (in the sense of MAX WEBER) of government ideologies are assumed:

- (a) "Extreme Left-wing Government" which puts no value at all on private consumption and on its own political consumption. It is only interested in providing the population with public services

$$(18a) \quad \begin{aligned} PU_{LW}(t) &= i_{PS} \cdot PS(t); \\ i_c &= \varepsilon = 0. \end{aligned}$$

- (b) "Extreme Right-wing Government" which is only interested in the population's consumption level

$$(18b) \quad \begin{aligned} PU_{RW}(t) &= i_c \cdot C(t); \\ i_{PS} &= \varepsilon = 0. \end{aligned}$$

- (c) "Extreme Exploitative Government" which only wants to consume itself as much as possible during the period in power

$$(18c) \quad \begin{aligned} PU_{EX}(t) &= \varepsilon \cdot PC(t); \\ i_c &= i_{PS} = 0. \end{aligned}$$

A complete set of optimal policies can only be specified, moreover, if the many degrees of freedom due to the linearity of the conceived (and "true") politico-economic model are removed. It is realistic to assume that the government solves the problem by a rule of thumb, i.e. by allocating equal amounts to each "free" instrument within

the total limit set to public expenditures and "political" consumption given by

$$(19) \quad PT(t) + PC(t) = Y(t) - C(t) - I(t) = m \cdot Y(t),$$

with $m = 1 - c - u$.

Table 1 gives the optimal policy set for the maximization problem in which the reelection constraint is non-binding ($\lambda = 0$).

Table 1: Optimal Policy for non-binding reelection constraint ($\lambda = 0$)

Type of government	instruments	time periods (between elections)													
		1	2	3	4	5	6	7	election 8						
"Left-wing"	PEC*	} $1/2 \cdot mY(t) \rightarrow$ }				← $mY(t)$ →									
	PEL*									0	0	0	0	0	0
	PI*									0	0	0	0	0	0
"Right-wing"	PEC*	0	0	0	0	0	0	0	0						
	PEL*	0	0	0	0	0	0	0	0						
	PI*	← $mY(t)$ →							0						
"Exploitative"	PEC*	0	0	0	0	0	0	0	0						
	PEL*	0	0	0	0	0	0	0	0						
	PI*	← $mY(t)$ →							0						

The "right-wing" and the "exploitative" governments have the same optimal policy as both are interested in increasing capital accumulation as much as possible in order to have the highest private and political consumption level attainable in the last period ("consumption orgy").

Table 2a shows the optimal policy for governments having to use their instruments in order to guarantee reelection ($\lambda > 0$). It is thus assumed that the government politicians are able to trace thought the consequences of a certain policy, *in the structure of perceived* i.e. they realize when the reelection constraint is going to be violated.

Table 2a: Optimal Policy for binding reelection constraint ($\lambda > 0$)

Type of government	Instrument	time periods (between elections)							
		1	2	3	4	5	6	7	elect. 8
"Left-wing"	PEC*					← 1/2 mY(t) → ← mY(t) →			
	PEL*	← 1/3 mY(t) → →				0 0 0 0			
	PI*					← 1/2 mY(t) → 0 0			
"Right-wing"	PEC*					← 1/2 mY(t) → 0			
	PEL*	← 1/3 mY(t) → →				0 0 0 0			
	PI*					← 1/2 mY(t) → 0			

Not surprisingly, the policies of ideologically "left" and "right" governments are much more similar when a compromise is needed in order to be reelected. Both are now compelled to take account of the voters' opinions as reflected by the parameters of the popularity function.

The optimal policy for an "exploitative government" depends on how binding the reelection constraint is, i.e. on the level of the shadow-price λ . If reelection is a serious problem for such a government (if $\lambda > \varepsilon / \delta \cdot \pi'_{p_s}$) the optimal policy set is given in table 2b.

Table 2b: Optimal policy for the "exploitative government" with binding reelection constraint (case: $\lambda > \varepsilon / \delta \cdot \pi'_{p_s}$).

Instruments		time periods							
		1	2	3	4	5	6	7	elect. 8
PEC*	}					← 1/2 mY(t) → →			
PEL*		1/3 mY(t)				0 0 0 0			
PI*						← 1/2 mY(t) → →			

For other values of λ , the optimal policy is in-between the values shown in table 1 and 2a (for simplicity not shown here).

In order to receive more definitive results, it is interesting to see how the three types of government fare with their optimal strategies under alternative ^(perceived) "environments". These environments are characterized by the voters' preferences with respect to public services and private consumption as they materialize in the popularity function. Two basic environmental conditions are shown here, one in which the voters have a bias for public services ($\pi'_c = 0.05$, $\pi'_{ps} = 0.1364$; the population is "left"), the second in which the voters have a bias for private consumption ($\pi'_c = 0.1$, $\pi'_{ps} = 0.0454$; the population is "right").

Table 3 shows the expected election results for the three types of government and the two environments according to the government's perceived view of the politico-economic system. Only a "right-wing" or "exploitative" party in power in a "right-wing" environment can simply maximize its own utility without regard to elections. In all other cases the government must make a compromise in order to stay in power ($\lambda > 0$). Under this proviso, the "extreme right" and "exploitative" governments expect to stay indefinitely in power. This is due to the fact that their own goals - the maximization of private or "political" consumption - involves building up the real capital stock, which is at the same time a prerequisite for political survival in the long run. Under the simplified politico-economic structure assumed, the "left-wing" government is in a much more difficult situation. Even when environmental conditions are favourable i.e. if the voters are also "left" it can expect to survive only over three legislative periods. At $t = 24$ it is defeated, even if in the respective electoral period it takes voters' wishes as much into account as possible. With a "right-wing" population, the "left-wing" government expects to hold power over two periods only: a defeat at $t = 16$ is unavoidable.

Table 3: The Government's Vote Shares at election time under two basic "environmental" conditions (voters' preferences) under the perceived view of the politico-economic system

type of government	election dates	Perceived "Environment"	
		bias for public services $\pi'_c = 0.05$ $\pi'_{ps} = 0.1364$	bias for private consumption $\pi'_c = 0.100$ $\pi'_{ps} = 0.0454$
		reelection constraint non-operative ($A = 0$)	reelection constraint operative ($A > 0$)
"extreme left" $i_c = 0$ $\epsilon = 0$	8	67.21	53.29
	16	56.82	(44.81) 49.02
	24	(45.06)	46.72
	32		
	40		
48			
"extreme right" $i_{pr} = 0$ $\epsilon = 0$	8	(41.90)	59.31
	16	(45.65)	67.89
	24	57.00	65.07
	32	89.87	93.73
	40	98.30	98.95
48	99.71	99.82	
"exploitative" $i_c = 0$ $i_{ps} = 0$	8	(41.90)	52.42
	16	64.65	65.07
	24	93.86	93.73
	32	98.97	98.95
	40	99.83	99.82
48	99.97	99.97	
			100.00

2. Application of the "optimal policy" as pursued by the government

The government having no knowledge about the "true" structure of the politico-economic system, ~~is forced to nomic system~~, is forced to apply that policy which is optimal in the politico-economic system as the government perceives it. It thus sets the instruments available (PI, PEL and PEC) as shown in table 3. An "extreme left" government confronted with a favourable environment (voters have a bias for public services) e.g. ~~thus~~ plans not to take account of the reelection constraint in the first two terms (i.e. $\lambda = 0$), but intends to make an effort in the third term to fulfill the reelection constraint (i.e. $\lambda > 0$). Table 4 shows how the government fares with such a policy in the "actual world" as represented by the model developed in part II. In the case just mentioned of a government of the "left-wing" in a friendly environment, the government is reelected at $t = 8$ with a vote share of 100 %, but incurs a heavy defeat at the next elections with a vote share of 13.17 %, only.

A comparison of table 4 with table 3 indicates that, quite generally, the choice of that policy set is not very advantageous for the government as it is at best reelected for one further term. The difference is especially marked for "right-wing" and "exploitative" governments which according to their perceived view of the politico-economic system expect to always be reelected. This result is, of course, not surprising as the structure of the two systems is different. In particular, the government is assumed to be unable to ^{correctly} perceive the influence of ~~voters' expectations~~ ^{economic variables and voters' expectations} on popularity . This lack of knowledge is, indeed, one of the major reason why the government's policy is not very successful in the "true" politico-economic system. It is interesting to note the importance of expectations in quite different fields of disequilibrium economics (see e.g. STIGLITZ 1973).

The utility maximizing model is not further pursued here as the usefulness of simulations seems to have reached its limits.

- 1) It is easy to show that there are better policies available. If, e.g. the government knew in advance whether it needs to use the restricted policy ($\lambda > 0$), the "exploitative" government could easily survive in both environments, the "right-wing" government at least in a favourable environment. (Results not shown here).

Table 4: The Government's Vote Share S at election dates when the policy derived from the perceived politico-economic system (see Table 3) is applied in the "true" structure.

		"Environment" Voters' Preferences			
		bias for public services $\pi_c = 0.25$ $\pi_{ps} = 0.35$		bias for private consumption $\pi_c = 0.35$ $\pi_{ps} = 0.25$	
election dates		Perceived optimal policy*	Vote Share	Perceived optimal policy*	Vote Share
extreme "elit" $\lambda_c = 0$ $\lambda_{ps} = 0$	8	$\Lambda = 0$	100	$\Lambda = 0$	93.49
	16	$\Lambda = 0$	13.17	$\Lambda > 0$	3.12
	24	$\Lambda > 0$			
	32				
	48				
extreme "light" $\lambda_{ps} = 0$ $\lambda_c = 0$	8	$\Lambda > 0$	64.34	$\Lambda = 0$	9.76
	16	$\Lambda > 0$	38.72	$\Lambda = 0$	
	24	$\Lambda = 0$		$\Lambda = 0$	
	32	$\Lambda = 0$		$\Lambda = 0$	
	48	$\Lambda = 0$		$\Lambda = 0$	
exploitive" $\lambda_c = 0$ $\lambda_{ps} = 0$	8	$\Lambda > 0$	55.93	$\Lambda = 0$	9.76
	16	$\Lambda = 0$	0.00	$\Lambda = 0$	
	24	$\Lambda = 0$		$\Lambda = 0$	
	32	$\Lambda = 0$		$\Lambda = 0$	
	48	$\Lambda = 0$		$\Lambda = 0$	

$\Lambda = 0$ indicates that the policy is pursued without regard to the re-election constraint; $\Lambda > 0$ means that the policy is used which takes account of this constraint

Realistically assuming that the government is never absolutely sure of being reelected ($0 \leq p_n < 1$), this reduces to

Putting $\prod_{\tau=1}^t p_{\tau} = Z_t$ it follows

$$Z_t = p_t \cdot Z_{t-1},$$

from which it is easy to see that $p_t = 1 + \rho_t$, with ρ_t the rate of time discount of period t ¹⁾.

2. The Simulation Runs

The politico-economic system as developed in section II (eq. 1 through 17)²⁾ combined with the government's behavioural equations (19a) through (19d)³⁾ is in stationary equilibrium if all expectations are fulfilled ($EC = C$, $EPS = PS$) and if the government has been elected with the minimum share of votes ($S = SMIN$). This stationary equilibrium serves as a starting point for the exogenous shocks upon the popularity function. These exogenous shifts may be due to external developments (e.g. international crises) or to internal non-economic shocks (e.g. political scandals).

Table 5 shows the effects of positive popularity shocks of +20, +10 and +5 percentage points, and negative popularity shocks of -5, -10 and -20 percentage points. For simplicity, the table only shows the two variables entering the popularity function [consumption $C(t)$ and public services $PS(t)$] and the government's vote share in the election periods. The figures show the development for every time period and moreover for long run ($PI(t)$, $PEL(t)$) and short run ($PEC(t)$) instruments. The development of all the variables for every time period is reproduced for the case of the -5%-shock in the appendix.

Because of the simultaneous interdependence of variables in the politico-economic system it is not easy to give a verbal account of the

1) See FREY and RAMSER (1974), Compare the present approach to INAGAKI (1970), who quite untheoretically just stipulates an "instantaneous government".

2) Consumption is assumed to have a somewhat larger weight than public services in the popularity function: $\pi_c = 0.30$, $\pi_{ps} = 0.20$.

3) The parameter values assumed are:

$$\rho_{PI} = 0.95, \quad \rho_{PEL} = 0.10, \quad \rho_{PEM} = 0.10, \quad \rho_{PEC} = 0.35.$$

developments. However, an attempt is made to nevertheless give an intuitive, ~~account for the developments.~~

Run 1 (fig. 1a, b, c)

The high exogenous popularity increase of 20 % enables the government to invest into the future by rapidly stepping up long-run expenditures (PI and PEL). As the government is very confident of ^{its} reelection, it reduces short-run public expenditures to zero up ^{to} the first election. The rapid increase of political investment and of total public expenditures leads, however, to a displacement of consumption. Though public services are rising all through, government popularity and its expected vote share therefore fall somewhat ($S(16) = 66\%$). The real capital stock and national income continually rise in all periods due to the heavy public investment. Between periods 12 and 32 this capacity effect is about equally strong as the displacement effect: consumption fluctuates around 233. Thereafter the capacity effect dominates, and the government's vote share reaches the upper limit of 100 %, the variables being connected in a "virtuous" circle.

Run 2

With an exogenous popularity increase of 10 % only, the government is somewhat less confident (compared to run 1) to win the upcoming election. Long run public expenditures are increased less quickly, short run expenditures reduced more slowly. The net effect is a moderate reduction of the supply of public services in the first term. Though ~~the~~ real capital and income rise as quickly in the first term, consumption drops considerably due to the displacement effect. The first reelection is won with a 56 % of the vote. While the real capital stock and national income grow continually the government only slowly ^{can} allow itself over the next terms to concentrate more on long-run expenditures. The take-off into a virtuous circle of increasing consumption, public services and a maximum vote share takes place only after period 40.

Run 3 (fig. 2a, b, c)

With an only minor exogenous popularity increase of 5 % the government just manages to win the first election but can barely raise expenditures for future public services (PEL, PEM). The same holds true

Fig. 1 Exogenous Popularity Increase of +20%

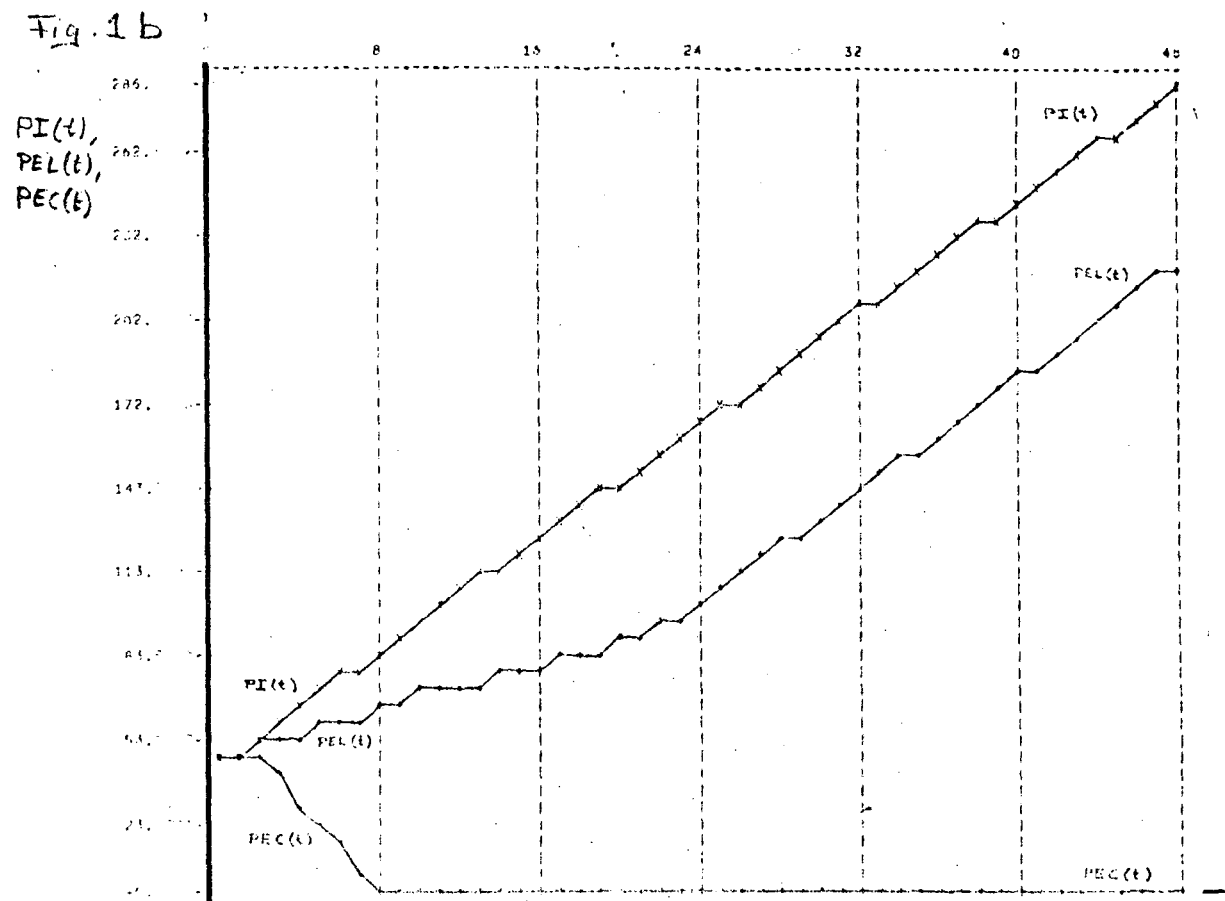
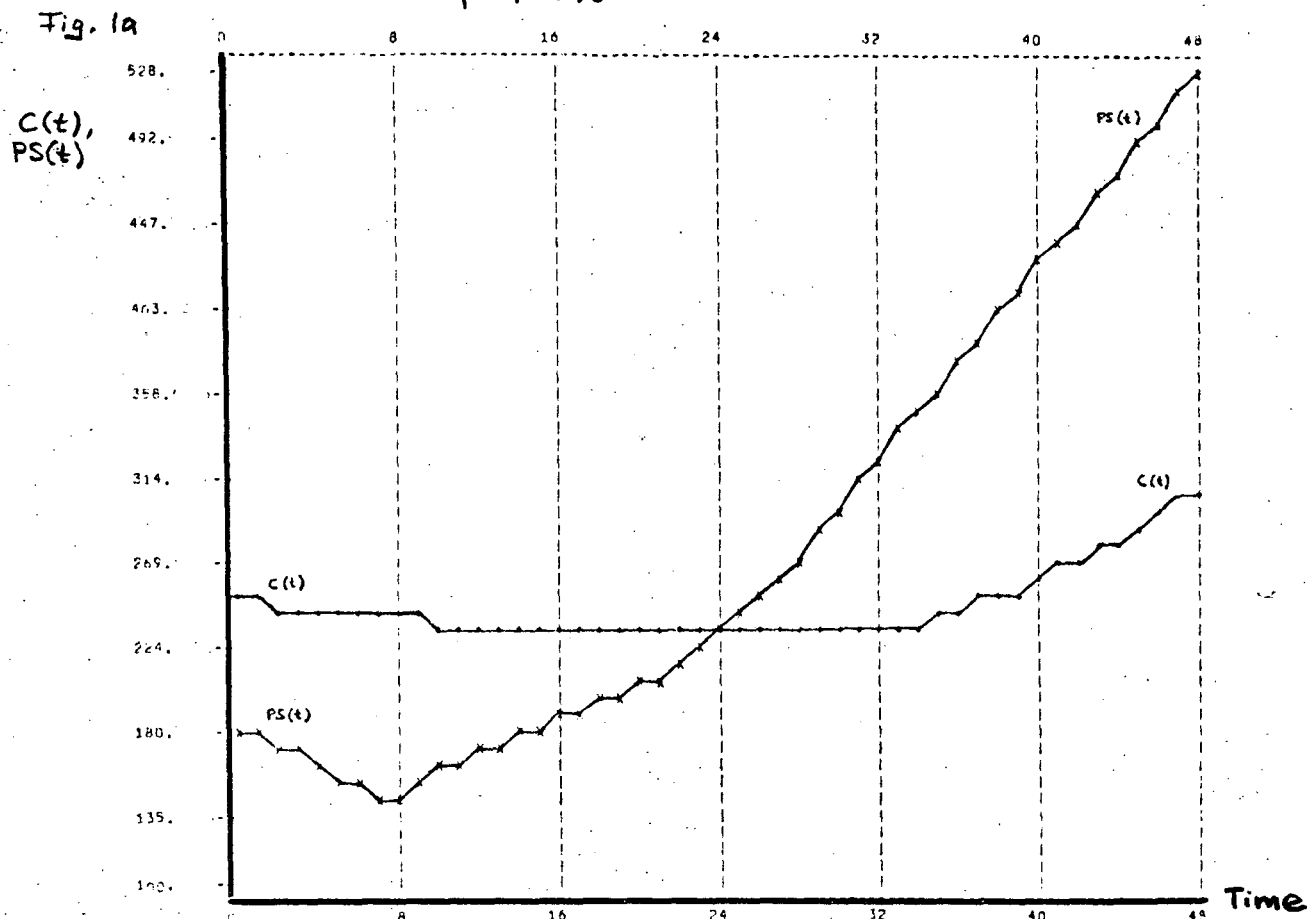
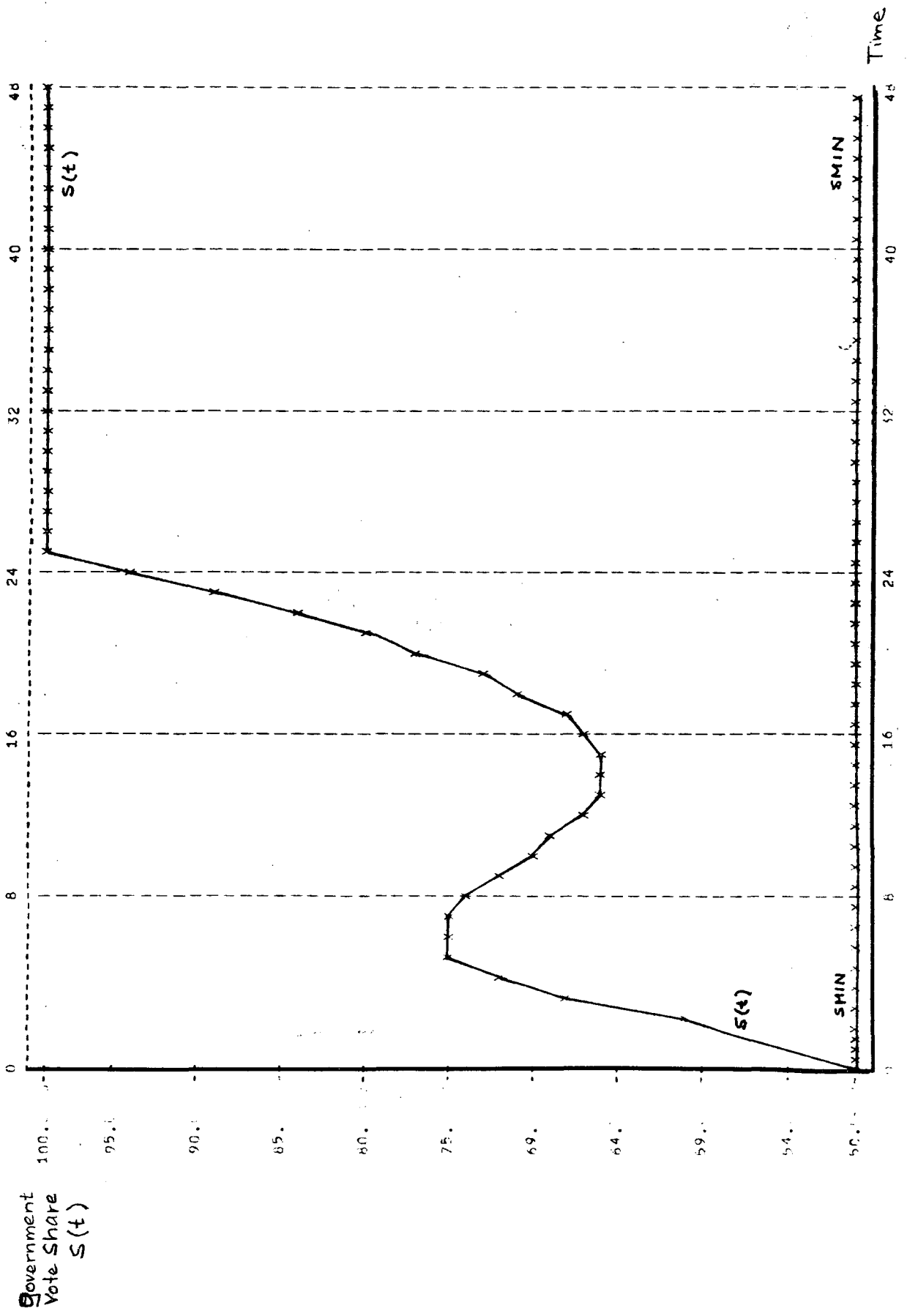


Fig. 1 c



- 110 -
 Fig. 2 Exogenous Popularity Increase
 of +5%

Fig. 2a

$C(t)$,
 $PS(t)$

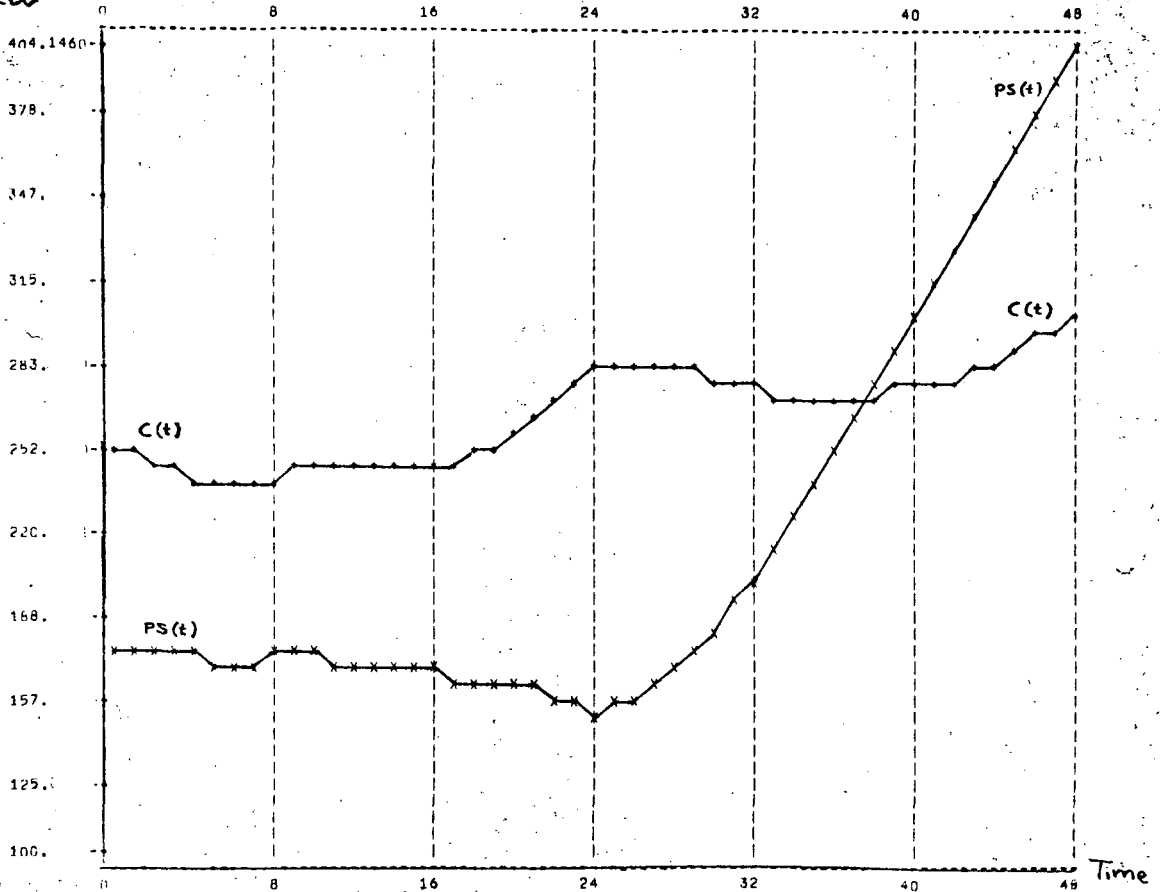


Fig. 2b

$PI(t)$,
 $PEL(t)$,
 $PEC(t)$

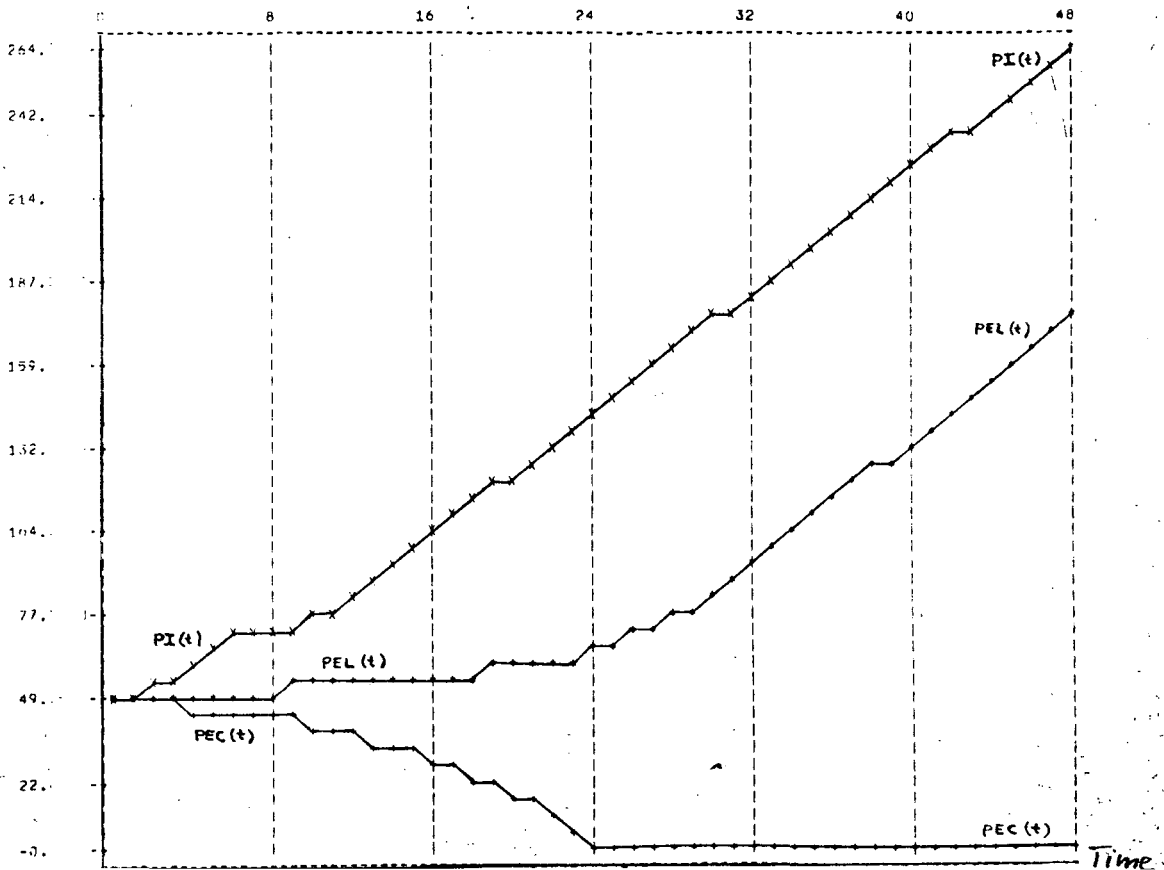


Fig. 2c

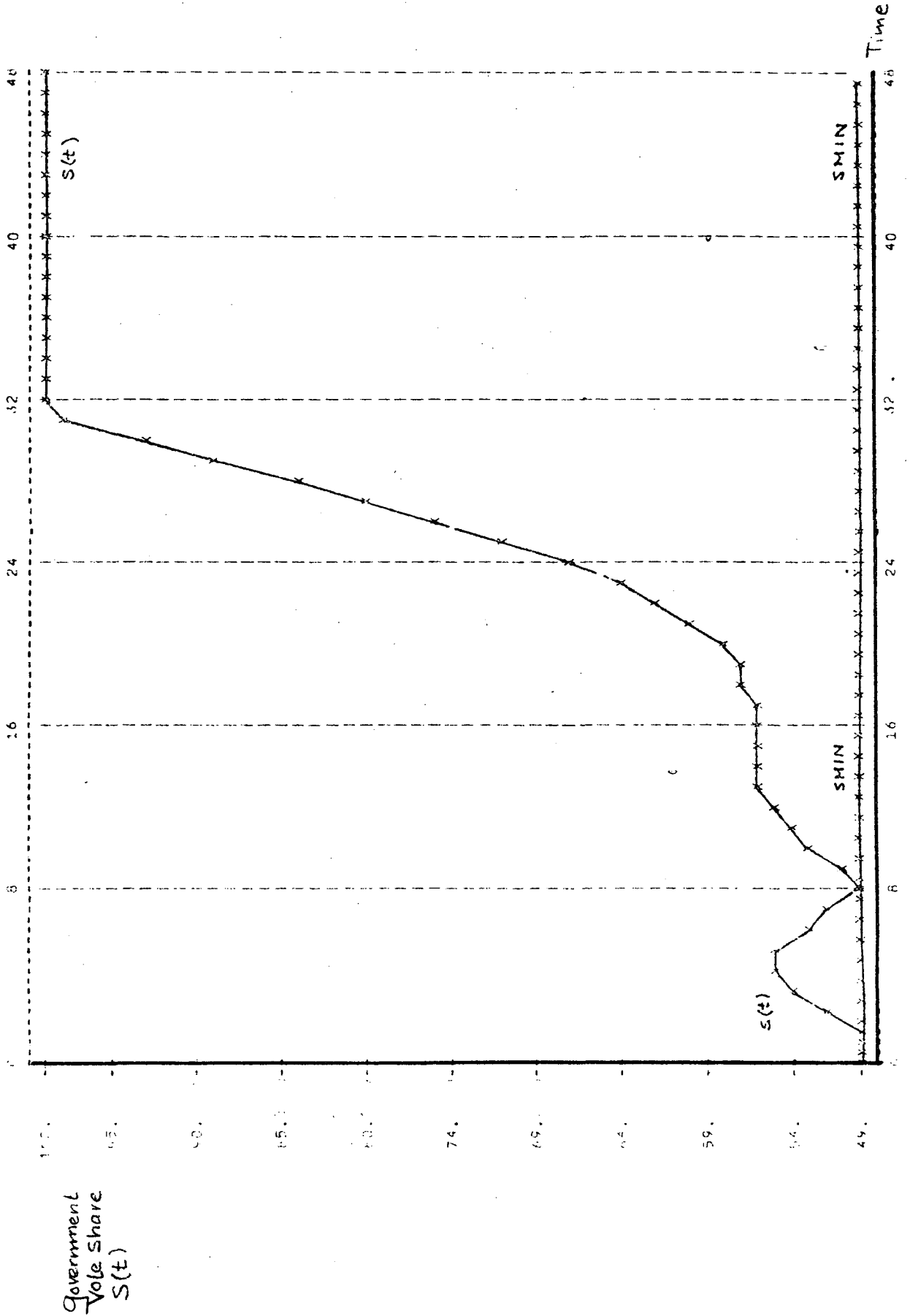


Table 5: Simulation runs for positive and negative shocks: Consumption, C, public services PS and the government's vote share S in election periods.

Run	Exogenous popularity shocks	Variables	Initial Equilibrium	Election periods					
				8	16	24	32	40	48
1	+ 20 %	C	250	247	232	234	233	260	309
		PS	178	146	189	231	324	426	528
		S	50	73.54	66.51	94.48	100	100	100
2	+ 10 %	C	250	235	261	271	257	262	292
		PS	178	166	165	171	240	341	443
		S	50	55.71	59.44	79.50	100	100	100
3	+ 5 %	C	250	242	246	283	276	276	302
		PS	178	174	167	153	203	302	404
		S	50	50.02	56.50	67.95	100	100	100
4	- 5 %	C	250	259	252	237	209	177	156
		PS	178	181	186	191	188	171	162
		S _{P₁}	50	50.06	(42.39)	63.89	(34.16)	56.79	59.74
				57.61	(36.11)	65.84	(43.21)		
5	- 10 %	C	250	267	229	205	168	179	145
		PS	178	185	195	188	161	173	188
		S _{P₁}	50	50.11	(33.68)	68.01	50.90	52.75	(32.28)
				66.32	(31.99)			67.72	
6	- 20 %	C	250	256	190	165	171	125	108
		PS	178	197	219	164	185	204	168
		S _{P₁}	50	(41.19)	86.93	51.27	(48.14)	75.75	(48.01)
			58.81	(13.07)		51.86	(24.25)	51.99	

Note: The figures for consumption and public services are rounded. In the rows for vote shares, the upper figure shows the election outcome for "party" 1, the lower for "party" 2. Figures in parentheses indicate an insufficient vote share ($S < SMIN$) and a change of government.

for the following election term, in which consumption and public services stay nearly constant. After the election victory at $t=16$, the capacity effect of the increase in political investment leads to a rise of consumption while public services fall somewhat mainly due to the now possible reduction of current public expenditures. The effect is a more comfortable victory at the next elections. Now the government is able to invest into future public services which yields a maximum vote share at $t=32$ despite a consumption set-back due to displacement.

Run 4 (fig. 3a, b, c)

The government's policy is quite different when it suffers an exogenous popularity decrease, even if only as small as -5%. Fearing not to be reelected, investment into real capital and (less strongly) long and medium run public expenditures are reduced. At the same time short run public expenditures are somewhat increased. This drives up both consumption and the supply of public services, and the government is reelected. In the new term, at first a long run policy is pursued but the concomitant popularity fall forces the government to reduce long run expenditures (PI, PEL and PEM) and to strongly step up expenditures with an immediate effect on public services output. Though this reversal of policy has a positive effect on both consumption and public services, the government receives only 42 % of the vote and is thus defeated.

The new government comes into power with a relatively low majority (58 %) and is therefore soon forced to pursue a short run policy: it manages to increase public expenditure output somewhat, but consumption steadily decreases. The real capital stock gradually falls as political investment is reduced to zero. The government stays in power over one period, only, as its vote share does not go beyond 36 % in $t = 24$.

The following governments are confronted with the same situation. The real capital stock and national income gradually fall as no party in power can afford to undertake any significant investments, and public services output experience a long run fall for the same reason. There are, however, some short run fluctuations within this long run trend, and in period 48 a government manages to be reelected, partly because voters expectations have been strongly adjusted downwards.

Fig 3 Exogenous Popularity Decrease of -5%

Fig. 3a

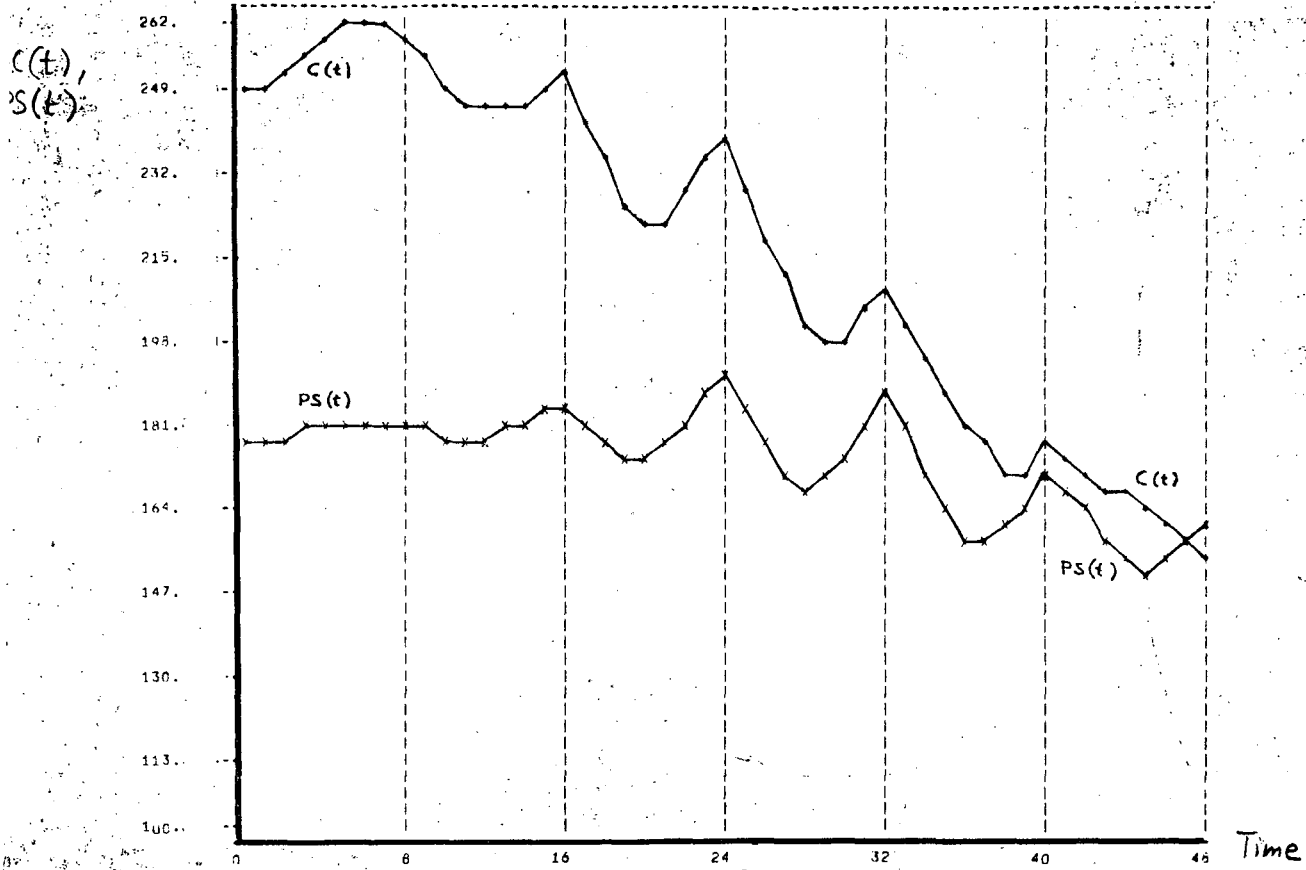


Fig. 3 b

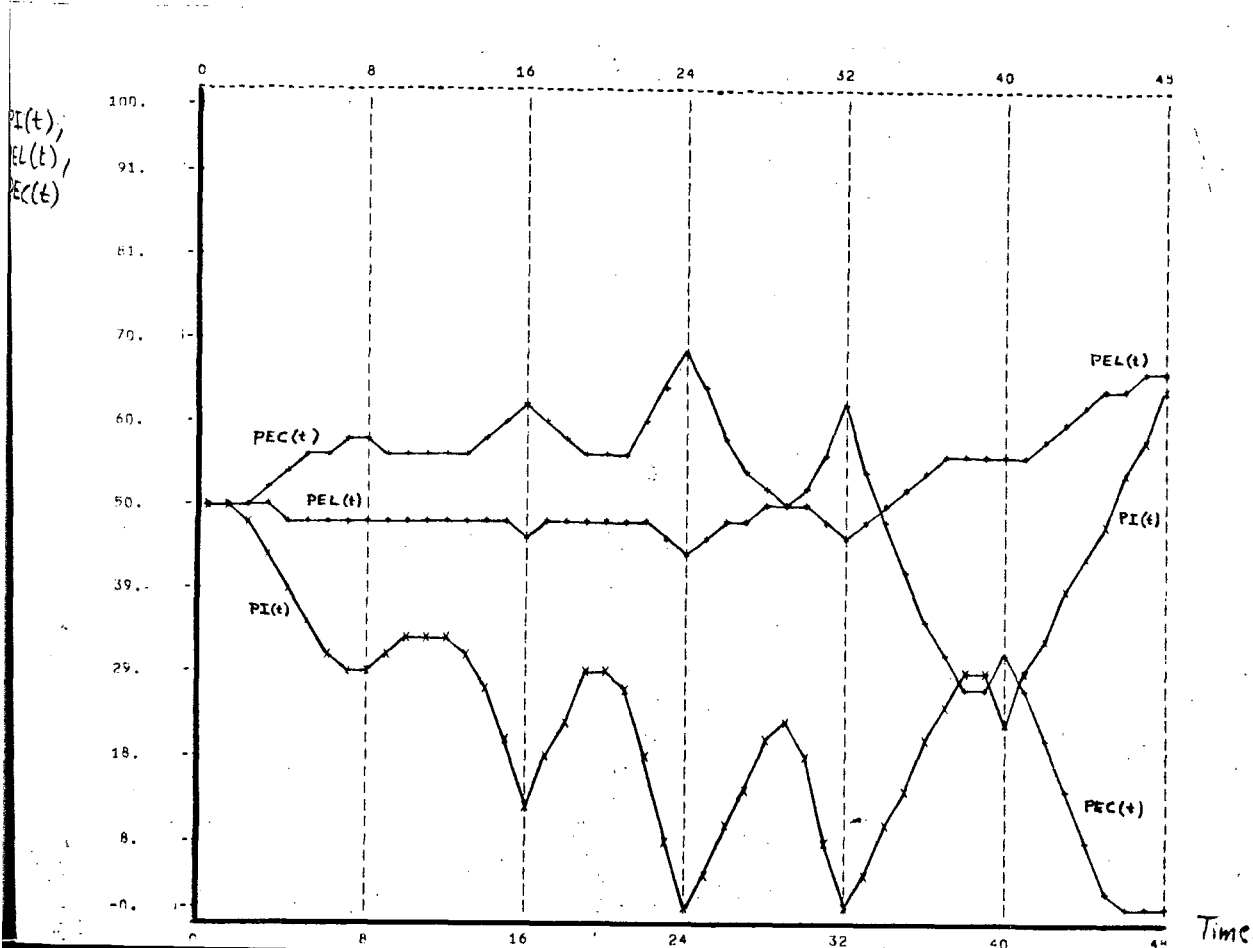
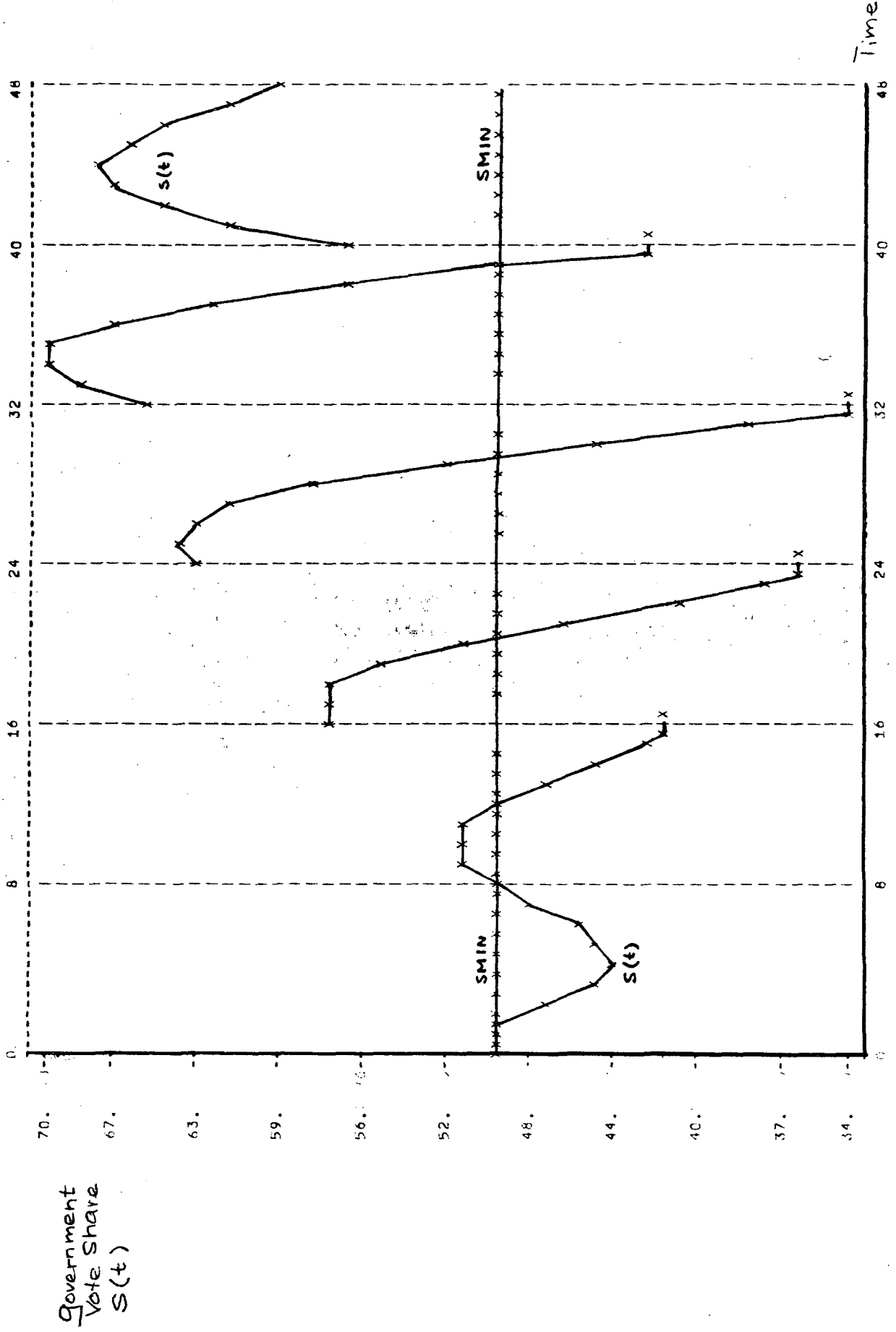


Fig. 3c



-191C-
 Fig. 4 Exogenous Popularity Decrease
 of -20%

Fig. 4a

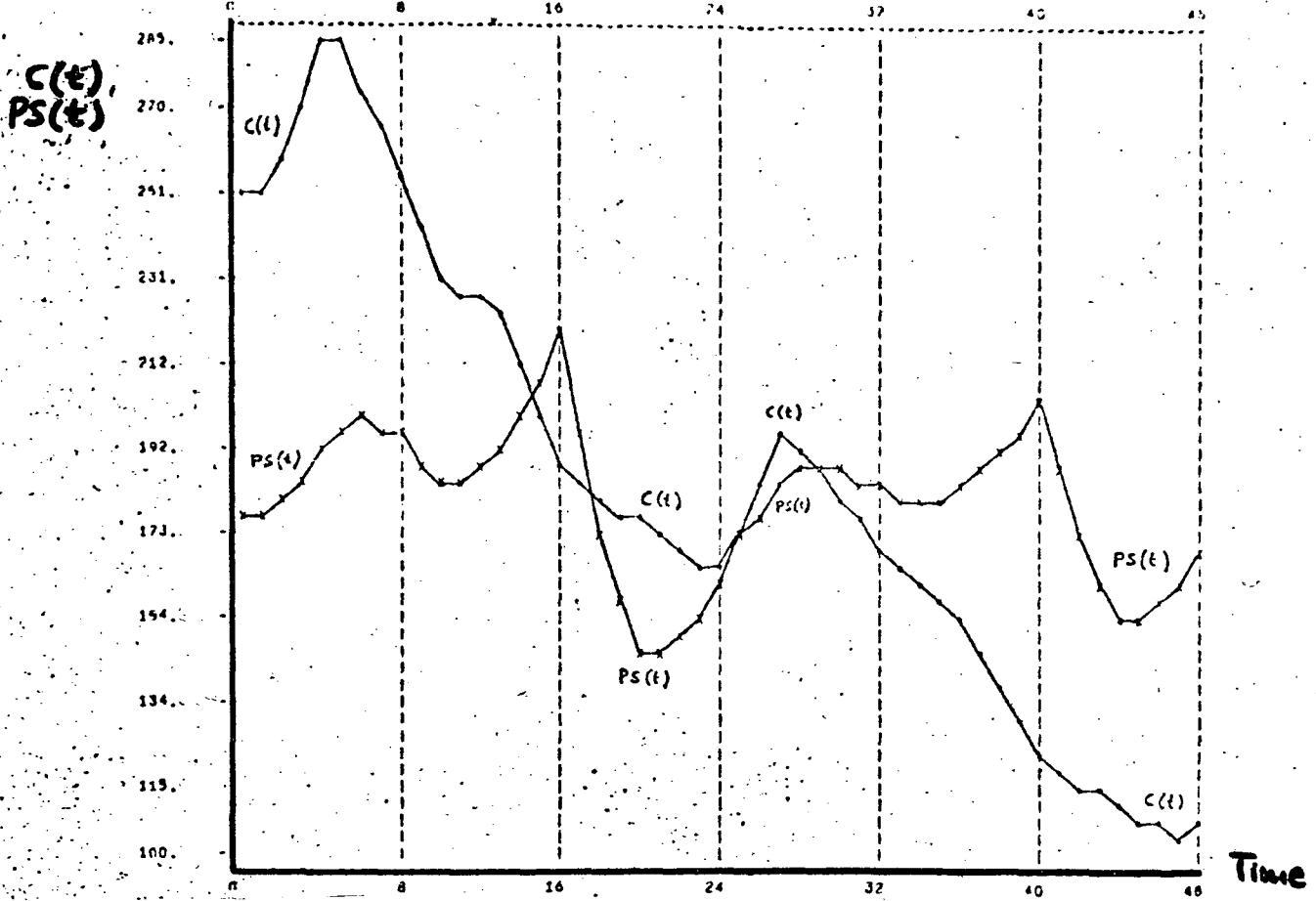


Fig. 4b

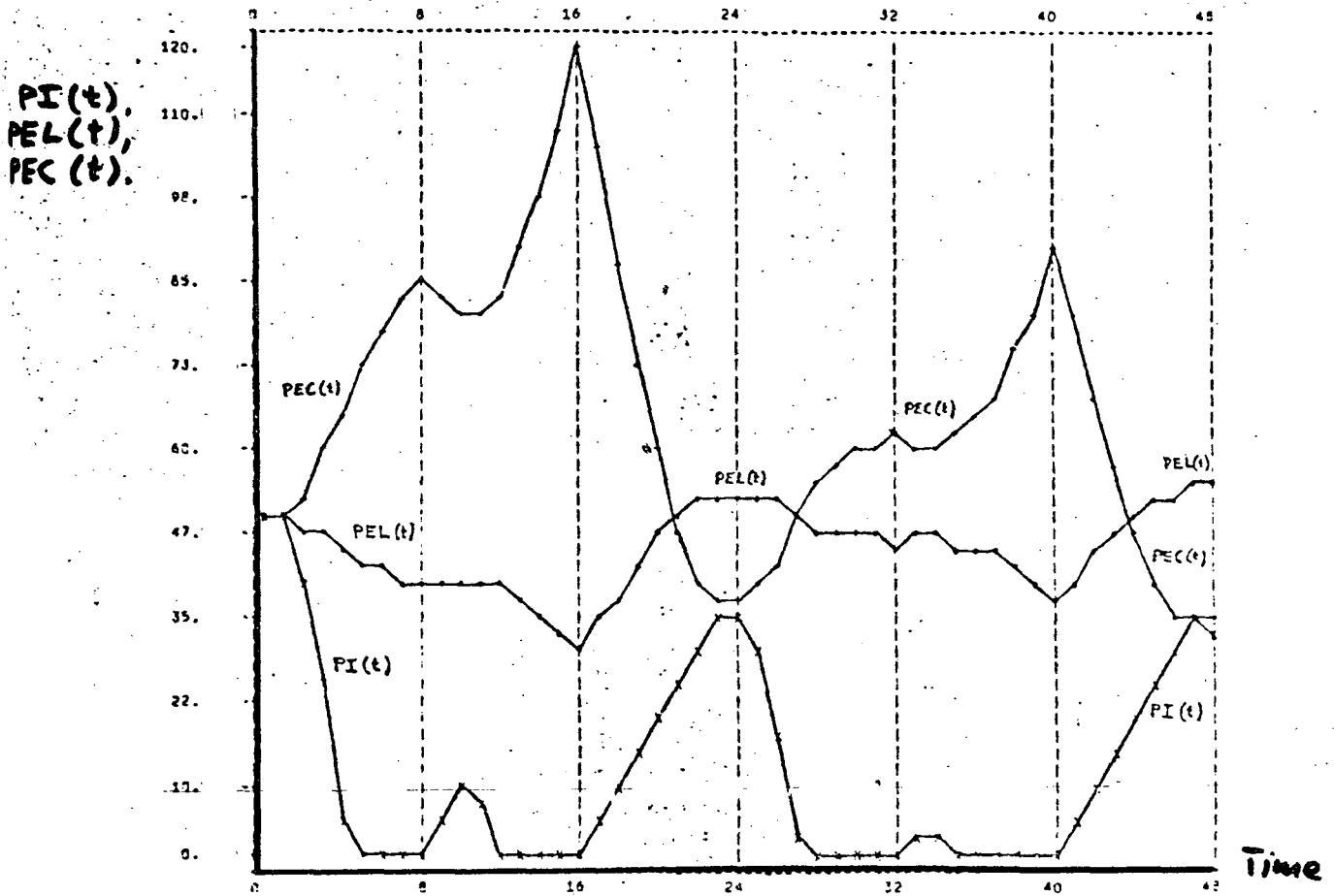
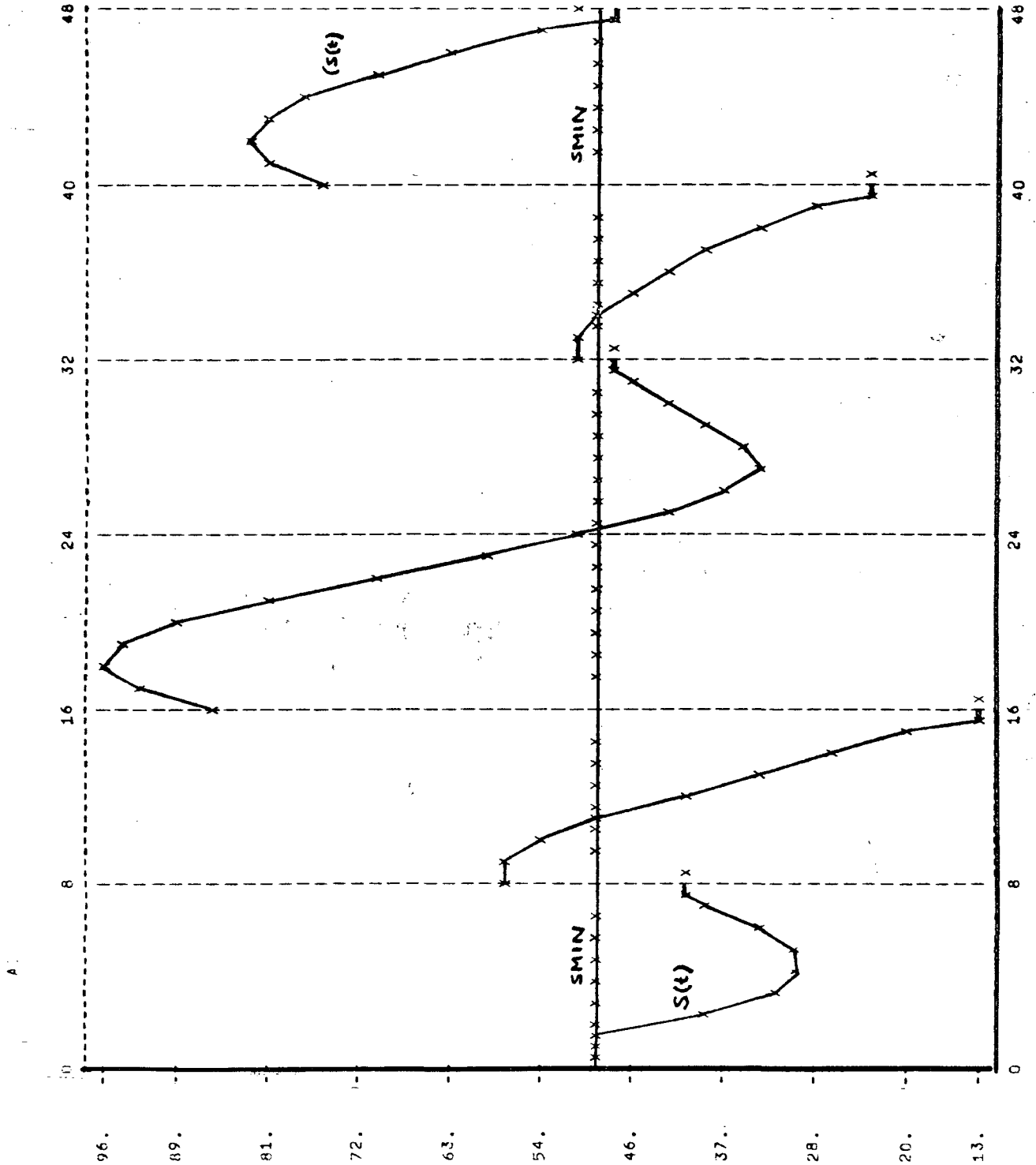


Fig. 4C



Run 5

Due to the larger exogenous downward shock of -10 %, the government takes even more decisive action than in the previous run to win for a second term: especially political investment are reduced (from 50 to 9), and short run public expenditures increased (from 50 to 65) even more strongly. The elections at $t = 8$ are won with a vote share of slightly over 50 %. The defeat at the next election is, of course, even more pronounced as consumption clearly falls due to insufficient investment during the first election term. The increased supply of public services brought about by short run expenditures cannot counterbalance this effect.

The new government comes in with a considerable majority (66 %) but inherits a bad economic situation. The real capital stock, consumption and now moreover public services fall over the period such that a heavy election defeat results ($S(24) = 32 %$). The first party which now resumes power is able to be reelected for a second consecutive period as it can use its initially high majority to invest into future public output, and the fall in consumption and public services does not have much effect on popularity as voters' expectations are already low.

Run 6 (Fig. 4a, b, c)

With an exogenous popularity loss of -20 % which is twice as large as in run 5, the general picture is similar. The real capital stock and consumption have a long run falling trend. Public services show more marked short-run fluctuations than consumption. There are many government changes, but after a large victory, i.e. a heavy defeat of the party in power, the new government is sometimes able to get reelected for another term (here at $t = 24$).

V. BUREAUCRATIC BEHAVIOUR

Governments only partially control policy instruments, bureaucracy also has an important say. Within the politico-economic model developed, this influence shows in two forms:

- (a) Bureaucracies resist structural changes for various reasons, e.g. because established positions may be threatened and ^{the lack of} information hinder quick adaptation. Empirical studies show that bureaucracies act "incrementally" (WILDAUSKY 1964). They are only willing - or can only be forced - to follow part of governmental expenditure intentions.

(b) Income, career and prestige of any bureaucrat is closely linked with the size of the entity a member is acting in. Each bureaucrat is interested in continually increasing the size of overall bureaucracy and hence of the budget. Bureaucrats are even described as 'budget maximizers' (NISKANEN 1971).

These two effects may be formalized as

$$(20a) \quad PIB(t) = INC_{PI} \cdot PIB(t-1) + b_{PI} \cdot [PI(t) - PI(t-1)] ;$$

$$(20b) \quad PELB(t) = INC_{PEL} \cdot PELB(t-1) + b_{PEL} \cdot [PEL(t) - PEL(t-1)] ;$$

$$(20c) \quad PEMB(t) = INC_{PEM} \cdot PEMB(t-1) + b_{PEM} \cdot [PEM(t) - PEM(t-1)] ;$$

$$(20d) \quad PECB(t) = INC_{PEC} \cdot PECB(t-1) + b_{PEC} \cdot [PEC(t) - PEC(t-1)] .$$

The letter B after an expenditure category PI, PEC and PEL indicates the actual allocation undertaken by the bureaucracy. The first expression on the right hand side shows the auto-dynamic, effect of continually rising expenditures (all $INC > 1$), the second expression indicates that only the fraction b of an intended expenditure change of the government actually materializes.

This bureaucratic behaviour is now introduced into the long run maximization model. It is assumed that the bureaucracy autonomously spends 1 % per period more in every sector, and that only 95 % of the changes of instruments intended by the government are actually undertaken (in any period)¹⁾. For reasons of space, only a verbal account of the results is given. Table 7 gives the vote shares for the model with bureaucracy; it should be contrasted to table 6. The interference of bureaucracy with the government's plans means that no stationary equilibrium exists any longer, and that there is a continuous tendency for any government to lose votes. While the government is able to manage the politico-economic system such that it survives exogenous popularity falls of -5% and -10% for one term ($S = 50.06\%$ and 50.11%) respectively, as shown in table 6), the lack of adaption and incremental behaviour of the bureaucracy prohibits this success ($S = 47.34\%$ and 47.14% , respectively).

1) $INC_{PI} = INC_{PEL} = INC_{PEM} = INC_{PEC} = 1.01$
 $b_{PI} = b_{PEL} = b_{PEM} = 0.95 \quad (b_{PEC} = 0.96)$

Table 7: Simulation runs for the politico-economic model with bureaucracy

	Vote share	election date						
		0	8	16	24	32	40	48
no exogenous shock	P ₁	50	(47.49)	54.11	(43.19)	58.43	(42.93)	
	P ₂		52.51	(45.45)	56.81	(41.57)	57.07	53.03
exogenous popularity shock								
+ 20 %	S	50	71.43	62.80	87.76	100	100	100
+ 10 %	S	50	53.99	57.61	72.69	99.97	100	100
+ 5 %	P ₁	50	(47.62)					
	P ₂		52.38	51.96	64.87	91.73	100	100
- 5 %	P ₁	50	(47.34)	63.70	(30.36)	51.74	63.47	69.08
	P ₂		52.66	(36.10)	69.64	(48.26)		
- 10 %	P ₁	50	(47.11)	88.71	62.26	(46.15)	77.79	53.35
	P ₂		52.86	(11.29)		53.88	(22.21)	
- 20 %	P ₁	50	(35.64)	81.86	55.82	(42.78)	72.28	(47.22)
	P ₂		64.35	(18.14)		57.22	(27.72)	52.68

VI. CONCLUDING REMARKS

The model formulated and the various simulation runs discussed serve three main purposes:

First of all it should contribute to a better understanding of political-economic interaction with special emphasis on the intertemporal fluctuations in the supply of public services.

Secondly, it serves as a first step towards an endogenous treatment of the government sector in economic models. This applies particularly to macro-econometric models whose use as a forecasting device is severely limited. The future course of the economy depends in a modern society to a very large extent on the government's actions, which in all existing econometric models are exogenous. ^(with the exception of...) There is a

serious imbalance in present econometric model building because on the one hand purely economic aspects are by now treated in a very refined way, but on the other hand nothing is said about government behaviour. The "reaction functions" (see e.g. FRIEDLAENDER 1973) serve only a specific purpose, namely to reveal the government's preferences under the (completely unrealistic) assumption that there are no political influences. They represent "measurement without theory" in political economy.

Closely related is the third purpose. The approach should serve to understand more fully the problems connected with the formal estimation of politico-economic relations ("politometrics") such as the popularity function or the determinants of the supply of public services (in the sense of e.g. PRYOR 1968).

No general discussion of the merits and demerits of simulations is intended here. It must be pointed out, however, that the simulation runs presented are not thought to directly represent reality; they should rather give a "feeling" of how the interaction of political and economic systems may be modeled. Realism is approached only when the economic system is represented by a full-scale econometric model, the political and interacting equations are empirically estimated, and all are combined. Obviously the analytic method is in some respects more powerful but has the disadvantage that it is difficult to deal with large models without having to deal almost exclusively with the mathematical instead of the material aspects. It has been attempted here to combine the analytic and simulation approaches.

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Exogenous popularity decrease of -5% at t=1
 when the government aims at maximizing the length of being in power.
 complete simulation figures.

PER-	CONSUM	PUB.SERV.	POP(T)	POP(T)	POL.D.P.	POL.CAP.	PER-GOV.VOTES	POI.INV.	PUB.EXP.LONG	PUB.EXP.MIDDLE	PUB.EXP.CONSUM	PER-
IND	C(T)	PS(T)	PS(T)	PK(T)	PK(T)	S(T)	PI(T)	PEL(T)	PEM(T)	PEC(T)	IOD	IOD
0	250.00	177.50	50.00	250.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	0
1	250.00	177.50	45.00	250.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	1
2	252.00	178.38	45.53	245.00	49.00	47.50	47.63	49.75	49.75	50.88	50.88	2
3	255.39	179.86	46.79	241.53	48.31	45.77	43.60	49.33	49.33	52.36	52.36	3
4	258.98	181.32	48.59	240.02	48.00	45.01	38.86	48.83	48.83	54.10	54.10	4
5	261.68	182.47	50.54	240.61	48.12	45.30	34.40	48.36	48.36	55.75	55.75	5
6	262.66	182.77	52.11	243.03	48.61	46.51	31.09	48.01	48.01	56.97	56.97	6
7	261.56	182.24	52.89	246.53	49.31	48.27	29.44	47.84	47.84	57.57	57.57	7
8	258.57**	181.12**	52.66**	250.12**	50.02**	50.06**	29.50**	47.84**	47.84**	57.55**	57.55**	8**
9	254.35	179.78	51.45	252.75	50.55	51.38	30.81	47.98	47.98	57.07	57.07	9
10	249.89	178.66	49.56	253.65	50.73	51.83	32.54	48.16	48.16	56.43	56.43	10
11	246.23	178.14	47.45	252.48	50.50	51.24	33.72	48.29	48.29	56.00	56.00	11
12	244.17	178.46	45.63	249.43	49.89	49.72	33.45	48.26	48.26	56.10	56.10	12
13	244.08	179.64	44.54	245.17	49.03	47.59	31.16	48.02	48.02	56.94	56.94	13
14	245.81	181.50	44.41	240.67	48.13	45.34	26.73	47.55	47.55	58.57	58.57	14
15	248.70	183.68	45.22	236.95	47.39	43.47	20.53	46.90	46.90	60.86	60.86	15
16	251.77**	185.77**	46.70**	234.78**	46.96**	42.39**	13.29**	46.14**	46.14**	63.52**	63.52**	16**
17	243.53	181.97	52.19	265.48	53.10	57.74	18.32	46.91	46.91	60.81	60.81	17
18	234.95	177.89	49.03	264.57	52.91	57.29	23.34	47.64	47.64	58.26	58.26	18
19	226.74	176.00	44.93	260.69	52.14	55.34	28.36	48.17	48.17	56.39	56.39	19
20	222.34	175.16	41.11	253.48	50.70	51.74	30.02	48.35	48.35	55.79	55.79	20
21	222.72	177.93	38.97	243.89	48.78	46.95	27.11	48.04	48.04	56.85	56.85	21
22	227.36	181.93	39.02	234.08	46.82	42.04	19.55	47.25	47.25	59.64	59.64	22
23	234.60	186.48	41.19	226.28	45.26	38.14	8.29	46.06	46.06	63.79	63.79	23
24	237.41**	190.67**	43.83**	222.22**	44.44**	36.11**	0.00**	44.67**	44.67**	68.65**	68.65**	24**
25	237.41**	190.67**	43.83**	222.22**	44.44**	36.11**	0.00**	44.67**	44.67**	68.65**	68.65**	25**

EIFC-8
 TION
 EIFC-16
 GOV.
 CHAN-16
 GF
 EIFC-24
 GOV.
 CHAN-24

PER- IOD	CONSUM C(T)	PUB.SERV. PS(T)	POPULARITY POP(T)	POL.DEP. PD(T)	POL.CAP. PK(T)	PER- IOD	GOV.VOTES S(T)	POL.INV. PI(T)	PUB.EXP. LONG REL(T)	PUB.EXP. MIDDLE PEM(T)	PUB.EXP. CONSUM PEC(T)	PER- IOD
EIFC-24 *	237.41**	190.67**	43.83**	44.44**	222.22**	24 *	36.11**	0.00**	44.67**	44.67**	68.65**	24**
GOV- CHAN-24 *	237.41**	190.67**	56.17**	55.56**	277.78**	24 *	63.89**	0.00**	44.67**	44.67**	68.65**	24**
GF												
25	229.19	183.91	55.37	55.68	278.40	25	64.20	5.02	46.09	46.09	63.68	25
26	219.74	176.28	51.83	55.62	278.09	26	64.04	10.05	47.49	47.49	58.77	26
27	211.16	172.00	47.05	54.86	274.30	27	62.15	15.07	48.71	48.71	54.52	27
28	203.06	168.79	41.67	53.30	266.49	28	58.24	20.09	49.53	49.53	51.63	28
29	197.80	171.32	37.27	50.97	254.86	29	52.43	22.40	49.78	49.78	50.78	29
30	198.98	175.78	35.12	48.23	241.15	30	45.58	18.20	49.33	49.33	52.33	30
31	205.86	181.61	35.89	45.61	228.05	31	39.02	7.77	48.24	48.24	56.17	31
EIFC-32 *	208.63**	187.80**	37.86**	43.67**	218.33**	32 *	34.16**	0.00**	46.65**	46.65**	61.71**	32**
GOV- CHAN-32 *	208.63**	187.80**	62.14**	56.33**	281.67**	32 *	65.84**	0.00**	46.65**	46.65**	61.71**	32**
GF												
33	201.97	180.31	61.11	57.50	287.48	33	68.74	5.02	48.53	48.53	55.15	33
34	194.39	170.68	57.51	58.22	291.09	34	70.54	10.05	50.58	50.58	47.96	34
35	187.92	164.24	52.81	58.08	290.38	35	70.19	15.07	52.60	52.60	40.90	35
36	182.10	158.24	47.55	57.02	285.11	36	67.56	20.09	54.36	54.36	34.75	36
37	176.58	158.65	42.88	55.13	275.65	37	62.82	25.12	55.64	55.64	30.26	37
38	171.09	161.25	38.90	52.68	263.39	38	56.70	30.14	56.31	56.31	27.92	38
39	170.70	165.61	36.72	49.92	249.62	39	49.81	29.96	56.29	56.29	27.99	39
EIFC-40 *	176.50**	171.22**	37.21**	47.28**	236.41**	40 *	43.21**	23.50**	55.61**	55.61**	30.36**	40**
GOV- CHAN-40 *	176.50**	171.22**	62.79**	52.72**	263.59**	40 *	56.79**	23.50**	55.61**	55.61**	30.36**	40**
GF												
41	173.57	168.85	62.21	54.73	273.66	41	61.83	28.53	56.79	56.79	26.22	41
42	169.99	163.56	60.35	56.23	281.14	42	65.57	33.55	58.35	58.35	20.77	42
43	167.70	158.72	57.93	57.05	285.26	43	67.63	38.57	60.11	60.11	14.60	43
44	166.37	153.24	55.23	57.23	286.14	44	68.07	43.59	61.92	61.92	8.28	44
45	165.73	150.94	52.91	56.83	284.14	45	67.07	48.62	63.63	63.63	2.30	45
46	162.64	152.90	50.94	56.04	280.22	46	65.11	53.64	65.14	65.14	0.00	46
47	158.57	157.33	49.38	55.02	275.12	47	62.56	58.66	66.39	66.39	0.00	47
EIFC-48 *	155.87**	161.60**	48.37**	53.90**	269.48**	48 *	59.74**	63.69**	67.37**	67.37**	0.00**	48**
TIAN												

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PER- IOD	TOT. PUB. EXPENDIT.	PUB. EXP. WITH BUF.	PRIV. I	GR. NAT. P.	CAP. KOEF.	PER-CAPITAL	DEPRIC.	TOTAL IN.	CONSUM EXPECT.	PUB. SERV. EXPECT.	PER- IOD	
	PT(T)	PTB(T)	I(T)	Y(T)	KK(T)	K(I)	D(T)	TI(T)	EC(T)	EPS(T)	IOD	
0	200.00	200.00	50.00	500.00	0.17	0	2000.00	100.00	100.00	250.00	177.50	0
1	200.00	200.00	50.00	500.00	0.18	1	2000.00	100.00	100.00	250.00	177.50	1
2	198.00	198.00	50.00	500.00	0.18	2	2000.00	100.00	97.63	250.64	177.76	2
3	194.61	194.61	50.00	500.00	0.18	3	1997.63	99.88	93.60	252.16	178.39	3
4	190.62	190.62	49.97	499.57	0.18	4	1991.35	99.57	88.83	254.34	179.27	4
5	186.86	186.86	49.87	498.42	0.18	5	1980.60	99.03	84.27	256.69	180.23	5
6	184.07	184.07	49.72	496.45	0.18	6	1965.85	98.29	80.80	258.60	180.99	6
7	182.69	182.69	49.50	493.75	0.18	7	1948.36	97.42	78.94	259.55	181.37	7
EI FC- TION 8 *	182.73**	182.73**	49.24**	490.54**	0.18**	8 *	1929.88**	96.49**	78.74**	259.23**	181.29**	8**
9	183.84	183.84	48.97	487.16	0.18	9	1912.12	95.61	79.78	257.67	180.84	9
10	185.30	185.30	48.71	483.90	0.18	10	1896.30	94.81	81.25	255.18	180.19	10
11	186.29	186.29	48.48	481.00	0.18	11	1882.73	94.14	82.20	252.32	179.57	11
12	186.06	186.06	48.28	478.51	0.18	12	1870.80	93.54	81.73	249.71	179.24	12
13	184.13	184.13	48.11	476.32	0.18	13	1858.99	92.95	79.26	247.91	179.36	13
14	180.40	180.40	47.93	474.14	0.19	14	1845.30	92.26	74.66	247.24	180.00	14
15	175.18	175.18	47.73	471.60	0.19	15	1827.69	91.38	68.25	247.70	181.11	15
EI FC- TION 16 *	169.09**	169.09**	47.47**	468.33**	0.19**	16 *	1804.56**	90.23**	60.76**	249.01**	182.50**	16**
17	172.95	172.95	47.12	464.00	0.19	17	1775.09	88.75	65.44	247.38	182.34	17
18	176.88	176.88	46.68	458.51	0.19	18	1751.77	87.59	70.02	243.40	181.01	18
19	181.10	181.10	46.33	454.17	0.19	19	1734.21	86.71	74.70	238.07	179.50	19
20	182.49	182.49	46.07	450.91	0.19	20	1722.19	86.11	76.09	233.04	178.20	20
21	180.05	180.05	45.89	448.67	0.19	21	1712.17	85.61	73.01	229.74	178.12	21
22	173.69	173.69	45.74	446.79	0.19	22	1699.57	84.98	65.30	228.98	179.26	22
23	164.20	164.20	45.55	444.41	0.19	23	1679.89	83.99	53.84	230.79	181.43	23
EI FC- TION 24 *	157.99**	157.99**	45.25**	440.66**	0.19**	24 *	1649.74**	82.49**	45.25**	232.91**	184.20**	24**

PER- IOD	TOT. PUB. EXPENDIT.	PUB. EXP. WITH BUR.	PRIV. I	GR. NAT. P.	ICAP. COEF.	PER-CAPITAL	DEPRIC.	TOTAL IN.	CONSUM.	PUB. SERV.
IOD	P(T)	PTH(T)	I(T)	Y(T)	KK(T)	K(I)	D(T)	Y(T)	EC(T)	EPS(T)
EIFC-24 TION	157.99**	157.99**	45.25**	440.66**	0.19**	1649.74**	82.49**	45.25**	232.91**	184.20**
25	160.89	160.89	44.79	434.87	0.19	1612.50	80.63	49.81	231.72	184.11
26	163.80	163.80	44.22	427.76	0.19	1581.69	79.08	54.27	227.89	181.76
27	167.00	167.00	43.75	421.92	0.19	1556.87	77.84	58.82	222.54	178.84
28	170.79	170.79	43.38	417.22	0.19	1537.85	76.89	63.47	216.30	175.82
29	172.75	172.73	43.09	413.63	0.19	1524.43	76.22	65.49	210.38	174.47
30	169.20	169.20	42.89	411.06	0.19	1513.70	75.68	61.08	206.73	174.87
31	160.42	160.42	42.72	408.99	0.20	1499.10	74.95	50.49	206.45	176.89
EIFC-32 TION	155.02**	155.02**	42.49**	406.14**	0.20**	1474.63**	73.73**	42.49**	207.15**	180.16**
33	157.23	157.23	42.10	401.31	0.20	1443.39	72.17	47.13	205.49	180.21
34	159.17	159.17	41.61	395.17	0.19	1418.35	70.92	51.66	201.94	177.35
35	161.17	161.17	41.22	390.31	0.19	1399.09	69.95	56.29	197.45	173.42
36	163.56	163.56	40.93	386.59	0.19	1385.43	69.27	61.02	192.54	168.86
37	166.66	166.66	40.72	383.96	0.19	1377.18	68.86	65.83	187.43	165.81
38	170.68	170.68	40.59	382.36	0.20	1374.15	68.71	70.73	182.20	164.44
39	170.52	170.52	40.54	381.76	0.20	1376.17	68.81	70.50	178.52	164.79
EIFC-40 TION	165.09**	165.09**	40.57**	382.16**	0.20**	1377.86**	68.89**	64.08**	177.88**	166.72**
41	168.34	168.34	40.60	382.50	0.20	1373.04	68.65	69.13	176.50	167.36
42	171.02	171.02	40.52	381.54	0.20	1373.51	68.68	74.07	174.42	166.22
43	173.40	173.40	40.53	381.63	0.20	1378.91	68.95	79.10	172.27	163.97
44	175.71	175.71	40.62	382.70	0.20	1389.07	69.45	84.21	170.38	160.75
45	178.18	178.18	40.77	384.68	0.20	1403.82	70.19	89.39	168.89	157.81
46	183.92	183.92	41.01	387.56	0.20	1423.02	71.15	94.65	166.89	156.34
47	191.45	191.45	41.31	391.33	0.20	1446.52	72.33	99.97	164.23	156.63
EIFC-48 TION	198.42**	198.42**	41.68**	395.97**	0.20**	1474.16**	73.71**	105.36**	161.55**	158.12**
48	198.42	198.42	41.68	395.97	0.20	1474.16	73.71	105.36	161.55	158.12

AIM OF THE GOVERNMENT: MAXIMIZATION OF THE WINNING THE ELECTIONS OVER THE TIME.

PERIOD 1							PERIOD 2						
PER-POPULAR	POL.	FCI.CAP.	POL.INV.	PUB.EXP.	PER-		PER-POPULAR	POL.	FCI.CAP.	POL.INV.	PUB.EXP.	PER-	
OPPOSIT.	DEPREC.C.	OPPOSIT.					OPPOSIT.	DEPREC.C.	OPPOSIT.				
ID	POP(T)	PDC(T)	FKO(T)	PI(T)	PEL(T)	ID	ID	POP(T)	PDC(T)	FKO(T)	PI(T)	PEL(T)	ID
0	50.00	50.00	250.00	50.00	50.00	0	ELEC-24 *	43.83**	44.44**	222.22**	0.00**	44.67**	24 *
1	55.00	50.00	250.00	50.00	50.00	1	25	44.63	44.32	221.60	5.02	46.09	25
2	54.47	51.00	255.00	47.63	49.75	2	26	48.17	44.38	221.91	10.05	47.49	26
3	53.21	51.69	258.47	43.60	49.33	3	27	52.95	45.14	225.70	15.07	48.71	27
4	51.41	52.00	259.98	38.86	48.83	4	28	58.33	46.70	233.51	20.09	49.53	28
5	49.46	51.88	259.39	34.40	48.36	5	29	62.73	49.03	245.14	22.40	49.78	29
6	47.69	51.39	256.97	31.09	48.01	6	30	64.88	51.77	258.85	18.20	49.33	30
7	47.11	50.69	253.47	29.44	47.84	7	31	64.11	54.39	271.95	7.77	48.24	31
ELEC-8 *	47.34**	49.98**	249.88**	29.50**	47.84**	8 *	ELEC-32 *	37.86**	43.67**	218.33**	0.00**	46.65**	32 *
9	48.55	49.45	247.25	30.81	47.98	9	33	38.89	42.50	212.52	5.02	48.53	33
10	50.44	49.27	246.35	32.54	48.16	10	34	42.49	41.78	208.91	10.05	50.58	34
11	52.55	49.50	247.52	33.72	48.29	11	35	47.19	41.92	209.62	15.07	52.60	35
12	54.37	50.11	250.57	33.45	48.26	12	36	52.45	42.98	214.89	20.09	54.36	36
13	55.46	50.97	254.83	31.16	48.02	13	37	57.12	44.87	224.35	25.12	55.64	37
14	55.59	51.87	259.33	26.73	47.55	14	38	61.10	47.32	236.61	30.14	56.31	38
15	54.78	52.61	263.05	20.53	46.90	15	39	63.28	50.08	250.38	29.96	56.29	39
ELEC-16 *	46.70**	46.96**	234.78**	13.29**	46.14**	16 *	ELEC-40 *	37.21**	47.28**	236.41**	23.50**	55.61**	40 *
17	47.81	46.90	234.52	18.32	46.91	17	41	37.79	45.27	226.34	28.53	56.79	41
18	50.97	47.09	235.43	23.34	47.64	18	42	39.65	43.77	218.86	33.55	58.35	42
19	55.07	47.86	239.31	28.36	48.17	19	43	42.07	42.95	214.74	38.57	60.11	43
20	58.89	49.30	246.52	30.02	48.35	20	44	44.77	42.77	213.86	43.59	61.92	44
21	61.03	51.22	256.11	27.11	48.04	21	45	47.09	43.17	215.86	48.62	63.63	45
22	60.98	53.18	265.92	19.55	47.25	22	46	49.06	43.96	219.78	53.64	65.14	46
23	58.81	54.74	273.72	8.29	46.06	23	47	50.62	44.98	224.88	58.66	66.39	47
ELEC-24 *	43.83**	44.44**	222.22**	0.00**	44.67**	24 *	ELEC-48 *	51.63**	46.10**	230.52**	63.69**	67.37**	48 *

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