

## AN EMPIRICAL STUDY OF POLITICO-ECONOMIC INTERACTION IN THE UNITED STATES

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### I. Introduction

IN modern society, where government has assumed a major role in economic affairs and where the electorate has made it increasingly responsible for material well-being, it has become important to analyse the interaction between economic and political systems. Government should no longer be regarded as exogenous to the economic system.

This is particularly the case with respect to econometric model building. As some authors have noted, an econometric model may be subject to serious *misspecification* if an *endogenous* variable (such as government expenditure) is treated as if it were *exogenous*.<sup>1</sup>

The study of politico-economic interdependence also has important consequences for *forecasting*. As the future course of economic events is strongly dependent on government action, existing macroeconomic models that regard government as exogenous are of limited use for prediction.

Furthermore, economic policy advice is often unsuccessful because it does not take political repercussions into account. A deflationary policy, for example, will hardly be adopted by a government just before an election because it carries with it a high risk of leading to government's losing the election. Politico-econometric modelling helps economists concerned with *government advising* to advance

proposals that have a reasonable chance of being put into action.

This study puts forward some simple theoretical hypotheses concerning the nature of the interrelationship between the economy and the polity, particularly with respect to (central) government. The basic relationships are reflected in the *popularity function*, which describes the impact of economic conditions on government popularity; and in the *reaction function*, which shows how government uses policy instruments to steer the economy in a desired direction. These relationships are econometrically tested with quarterly data for the United States for the period 1953–1975. In the model both voters and government are assumed to be utility maximizers, and government's behavior is restricted by various economic, political and administrative constraints.

The analysis shows that the government's (or in the case here dealt with, the president's) popularity is significantly reduced when the rate of *unemployment* and/or of *inflation* rises, and that it is significantly increased when the growth rate of *private consumption* rises. Government reacts to changes in its popularity because this is taken as an indicator of future electoral outcome. When popularity is low, it tries to steer the economy so as to increase its re-election chances; when popularity is high enough, it can afford to pursue ideologically-oriented policies, which need not always be popular with the electorate.

There have been a number of papers that have dealt with the influence of economic variables on election outcomes and on government popularity, most of which are unsatisfactory on theoretical and statistical grounds. There are, on the other hand, only a few that have been concerned with government reaction functions. Moreover, these studies have been either apolitical and interested only in the implied weights of a welfare function (e.g., Friedlaender, 1973); or they have related to only a particular section of the economy (e.g.,

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<sup>1</sup>See Crotty (1973), Goldfeld and Blinder (1972), Blinder and Solow (1974, pp. 69–77).

MacRae, 1977; Wright, 1974) and/or present no econometric estimates (e.g., Nordhaus, 1975). The present paper is based on analytical and simulation studies done by the authors (see, for example, Frey, 1974).

## II. The Popularity Function

It is assumed that voters maximize utility; they support (or do not support) the government (or president) according to whether or not they are satisfied with its (or his/her) performance. However, because of the high costs and low benefits involved, the individual citizen has little incentive to become fully informed about the government's performance. To simplify the problem of deciding whom to support, he or she makes the government responsible for the course of economic events, assuming that it has both the insight and the ability to control the economy. We shall here hypothesize that government loses popularity if the rate of unemployment and/or the rate of inflation rises, and if the rate of growth of consumption (or of disposable income) falls. This corresponds to the approach taken by Kramer (1971) in his pathbreaking study of election functions.<sup>2</sup> As Stigler (1973) and Fair (1975) have pointed out, this implies that (a) voters do not consider how the other party (or parties) would have done under the same conditions; (b) they do not take into account whether underlying economic conditions have been favorable or not; (c) they take current (or slightly lagged) economic conditions as their sole basis for evaluation.

Presidential popularity does not depend solely upon economic factors. A correct specification requires that other influences be taken into account as well—the popularity data series, for example, also reflects a president's personality. This last influence is measured by two factors. The first is a specific *level* of popularity associated with each president. The

<sup>2</sup>Kramer also presents a survey of previous research on election functions. There are only a few estimates of the *popularity* function for the United States, the most notable being by Mueller (1970). That particular study is, however, marred by serious shortcomings, both of a theoretical (unemployment is, for example, the only variable representing economic influences) and of a statistical (there is very strong serial correlation of residuals) nature.

second is its erosion over the term of office. Through his actions, a president inevitably alienates groups of voters. Popularity therefore *depreciates* continuously over time. A dummy variable has accordingly been introduced for each president (except Ford, for whom there are too few observations available) which rises over his term of office. Popularity depreciation is consequently indicated by a negative coefficient. Nixon's depreciation variable refers to his first term (1969:I–1972:IV) only. Because of the overriding importance of the Watergate scandal, a special dummy depreciation variable (*WAT*) is introduced for his second (unfinished) term. This is designed to capture the electorate's dramatic loss of confidence in Nixon following Watergate. This dummy takes the values 1, 3, 5, 5, 5 over the period 1973:II–1974:II, and is otherwise zero. Testing has shown that alternative values for the depreciation variables do not affect the results.

Equation (1) shows the formulation of the presidential popularity function:

$$\begin{aligned} \text{Popularity} = & \pi_1 (\text{inflation})_{t-1} \\ & + \pi_2 (\text{unemployment}) \\ & + \pi_3 (\text{growth of consumption}) \\ & + \pi_L (\text{popularity level of each} \\ & \quad \text{president}) \\ & + \pi_D (\text{popularity depreciation} \\ & \quad \text{for each president}) \\ & + \pi_{WAT} (\text{Watergate variable for} \\ & \quad \text{Nixon}) + \epsilon_t. \end{aligned} \quad (1)$$

It is assumed that all other influences are random and they are therefore included in  $\epsilon_t$ . The variables used above are more fully described in the appendix. Popularity is a data series regularly collected by the Gallup Poll and shows the percentage share of the population "approving or disapproving the way Mr. ... handles his job as president."

The theoretically expected signs of the coefficients in equation (1) are  $\pi_1, \pi_2 < 0$ ,  $\pi_3 > 0$ ,  $\pi_D$  (for each president),  $\pi_{WAT} < 0$ . Price rises are included with a one-quarter lag, under the assumption that consumers need some time

TABLE 1.—THE EFFECT OF TWO ECONOMIC VARIABLES ON PRESIDENTIAL POPULARITY; 1953:II–1975:II

| Equation | Economic Variables                |                         |  | Personality Factors         |                           |                   |                  |
|----------|-----------------------------------|-------------------------|--|-----------------------------|---------------------------|-------------------|------------------|
|          | Inflation<br>( $t-1$ )<br>$\pi_1$ | Unemployment<br>$\pi_2$ | Growth<br>of Nominal<br>Consumption<br>$\pi_3$ | Popularity Level<br>$\pi_L$ |                           |                   |                  |
|          |                                   |                         |  | Eisenhower<br>first term.   | Eisenhower<br>second term | Kennedy           | Johnson          |
| (2)      | —                                 | -4.00<br>(-5.40)        | 0.71<br>(2.63)                                 | 83.63<br>(20.16)            | 80.67<br>(17.69)          | 104.5<br>(18.97)  | 93.35<br>(18.88) |
| (3)      | -2.05<br>(-2.43)                  | —                       | 0.85<br>(2.20)                                 | 70.02<br>(11.74)            | 66.95<br>(15.75)          | 76.36<br>(19.36)  | 69.92<br>(17.38) |
| (4)      | -1.58<br>(-2.44)                  | -4.30<br>(-5.56)        | —  | 89.90<br>(20.33)            | 88.16<br>(18.11)          | 109.31<br>(19.94) | 99.37<br>(20.76) |

Note: The figures in parentheses are  $t$ -values. D.W. indicates the Durbin-Watson coefficient,  $\rho$  the coefficient of autoregression obtained through the Cochrane-Orcutt iteration procedure, and d.f. the degrees of freedom. There is only one depreciation dummy for Eisenhower, and for Kennedy and Johnson it is estimated jointly in order to increase the number of observations and to save space.

before they notice an increase (or decrease) in the rate of inflation.<sup>3</sup>

The simultaneous inclusion of the three economic variables may lead to statistical difficulties as they are correlated among themselves. The correlation coefficient between the rate of unemployment  $UR$  and of inflation  $RP_{t-1}$  is 0.25; that between unemployment and the nominal growth rate of consumption  $RCN$  is  $-0.29$ ; and that between the rate of inflation and the growth of consumption is  $-0.56$ . Multicollinearity is accordingly not so strong as to invalidate estimation of equation (1), but it is advisable as a first step to estimate the popularity function omitting one of the economic variables in turn.

The estimates shown in table 1 have a good statistical fit. As there is a possibility of serial correlation in the least-squares estimate, the variables have been transformed using the Cochrane-Orcutt procedures. All the coeffi-

cients of the economic variables are statistically significant at the 95% confidence level; the parameter estimates correspond to a priori theoretical expectations and are remarkably stable. While the absolute level of each president's popularity is different in equations (2)–(4), their *relative* size is stable; for example, Kennedy always has the highest level and Nixon the lowest. Only the joint popularity depreciation of Kennedy/Johnson corresponds to theoretical a priori expectations and is statistically significant. This reflects at least in part the increasing unpopularity of the war in Vietnam. It was found that neither Eisenhower nor Nixon (first term only) suffered an autonomous popularity decline while in office. Watergate, however, had a very clear effect on Nixon's popularity during his second term.

The estimation results of table 1 suggest that the theoretical model and its specification capture the underlying structure reasonably well. They show in particular that *each* of the three economic variables has an important effect on presidential popularity. This suggests that Mueller's (1970) specification of the

<sup>3</sup>The results do not change if the growth of consumption is replaced by the growth rate of nominal disposable income. If a different lag structure is used, the level of significance of the economic parameters falls.

TABLE 2.—THE EFFECT OF THE THREE ECONOMIC VARIABLES ON PRESIDENTIAL POPULARITY; 1953:II–1975:II

| Equation | Economic Variables    |                  |                  |                  | Personality Factors         |                  |                  |                  |
|----------|-----------------------|------------------|------------------|------------------|-----------------------------|------------------|------------------|------------------|
|          | $RP_{t-1}$<br>$\pi_1$ | $UR$<br>$\pi_2$  | $RCN$<br>$\pi_3$ | $RCR$<br>$\pi_4$ | Popularity Level<br>$\pi_L$ |                  |                  |                  |
|          |                       |                  |                  |                  | EI                          | EII              | K                | J                |
| (5)      | -1.00<br>(-1.98)      | -4.03<br>(-5.23) | 0.52<br>(1.69)   | —                | 86.20<br>(17.91)            | 84.08<br>(15.72) | 105.6<br>(17.93) | 95.04<br>(17.43) |
| (6)      | -0.97<br>(-1.22)      | -4.20<br>(-5.44) | —                | 0.36<br>(1.67)   | 87.96<br>(19.03)            | 86.14<br>(16.97) | 107.2<br>(18.87) | 96.87<br>(18.92) |

Notes: See table 1.

TABLE 1.—(continued)

| Personality Factors         |                  |                                    |                   |                |                          | Test Statistics |      |        |      |
|-----------------------------|------------------|------------------------------------|-------------------|----------------|--------------------------|-----------------|------|--------|------|
| Popularity Level<br>$\pi_L$ |                  | Popularity Depreciation<br>$\pi_D$ |                   |                |                          | $\bar{R}^2$     | D.W. | $\rho$ | d.f. |
| Nixon                       | Ford             | E                                  | K/J               | N              | Watergate<br>$\pi_{WAT}$ |                 |      |        |      |
| 73.00<br>(18.40)            | 79.71<br>(13.69) | .11<br>(.55)                       | -2.14<br>(-12.07) | .10<br>(.35)   | -5.40<br>(-7.14)         | .90             | 1.97 | .22    | 79   |
| 63.15<br>(11.57)            | 76.20<br>(7.67)  | -.23<br>(-.69)                     | -1.27<br>(-4.77)  | -.29<br>(-.79) | -4.70<br>(-3.71)         | .90             | 1.99 | .25    | 79   |
| 83.68<br>(18.24)            | 99.50<br>(10.41) | .11<br>(.52)                       | -1.93<br>(-9.48)  | .14<br>(.46)   | -4.87<br>(-5.32)         | .90             | 2.00 | .31    | 79   |

popularity function, including unemployment as the only economic variable in the regression equation, is incorrect.

The joint influence of all three economic variables on presidential popularity is shown in table 2. The effect of substituting the real (*RCR*) for the nominal (*RCN*) growth of consumption is also shown in this table.<sup>4</sup>

Again, the statistical fit is good. A comparison with table 1 shows that in this particular case, the multicollinearity existing between economic variables does not overly affect the size but only the reported statistical significance of the estimated coefficients. In a joint regression, the rate of inflation and the growth of consumption do not seem to be statistically significant. It may also be noted that the coefficients of the personality factors are much the same as in table 1; i.e., again the Kennedy/Johnson and the Watergate depreciation variables are highly significant. The inclusion of the growth of real consumption (instead of nominal consumption) changes the

<sup>4</sup>Alternatively, the growth rate of nominal and real disposable income has been included, yielding comparable results in terms of the size and level of statistical significance of all parameters.

other coefficients very little. Both seem to do equally well, with a slight presumption in favor of nominal consumption,<sup>5</sup> suggesting that the population may have "money illusion" not only with respect to income, but also with respect to expenditures because, for example, higher prices due to inflation may be (mistakenly) taken as indicators of better quality.

To summarize: Correct specification of a popularity function (and probably of an election function) should take into account the effects of both the economic situation and the particular personality of each president.<sup>6</sup> The quantitative effects of economic conditions are sizeable: A one percentage point increase in the rate of inflation decreases presidential popularity by one half to one percentage point; an increase in unemployment of one percentage point decreases popularity by somewhat more than four percentage points; and a one

<sup>5</sup>This is also based on a comparison of estimates corresponding to those of table 1, which due to space limitations are not reproduced here.

<sup>6</sup>When the personality factors are excluded, the coefficients of unemployment and growth of consumption (or of income) become insignificant, and the  $\bar{R}^2$  drops sharply.

TABLE 2.—(continued)

| Personality Factors         |                 |                                    |                   |              |                  | Test Statistics |      |        |      |
|-----------------------------|-----------------|------------------------------------|-------------------|--------------|------------------|-----------------|------|--------|------|
| Popularity Level<br>$\pi_L$ |                 | Popularity Depreciation<br>$\pi_D$ |                   |              |                  | $\bar{R}^2$     | D.W. | $\rho$ | d.f. |
| N                           | F               | E                                  | K/J               | N            | $\pi_{WAT}$      |                 |      |        |      |
| 77.96<br>(13.77)            | 91.59<br>(8.75) | .08<br>(.37)                       | -2.00<br>(-10.02) | .12<br>(.38) | -4.84<br>(-5.44) | .91             | 1.98 | .29    | 78   |
| 80.80<br>(15.98)            | 96.34<br>(9.84) | .09<br>(.41)                       | -1.95<br>(-9.59)  | .12<br>(.39) | -4.65<br>(-5.01) | .91             | 1.99 | .31    | 78   |

percentage point increase in the growth rate of nominal consumption increases presidential popularity by about seven-tenths of a percentage point.

### III. The Reaction Function

The reaction function describes the second major link of interdependence between the economy and polity: i.e., it shows how government (the president) influences the state of the economy in order to stay in power or, if re-election is considered likely due to high current popularity, to implement ideological views.

It is assumed that the government maximizes its *own* utility subject to various constraints.<sup>7</sup> This assumption deviates fundamentally from the one commonly advanced, which holds that government seeks to maximize the welfare of the population. The government (or in our case, the president) derives utility from pursuing its (his/her) goals which may—in this context—be called “ideological.” For the United States it seems appropriate to assign specific “views of society” to *each* president.

Presidents are subject to three types of constraint on their behavior:

*A. Administrative Constraint:* It is realistic to assume that the government bureaucracy does not simply follow the wishes of the president but rather tries to maximize its own utility. Members of a public bureaucracy tend to resist any changes in the structure of expenditures because this threatens to destroy the positions

of the bureaucracy's now powerful members. They have, moreover, a clear interest in the continuous expansion of expenditures and of jobs as this increases their income and influence.<sup>8</sup>

This constraint on government may be modelled by assuming that last year's expenditures determine current expenditures.<sup>9</sup>

*B. Economic Constraints:* There are two types of economic constraints. The government is bound first of all by the *structure of the economy*, which specifies how economic policy instruments influence the variables included in the voters' utility function. The parameters of the government's reaction function, therefore, implicitly reflect the specific structure of the economy. The second is the *budget constraint*. Tax receipts indicate the general financial framework within which the government may operate. The government can, however, engage in borrowing even more than private consumers; and it can simply print money. Tax revenue is therefore not an absolute constraint on expenditures, but it is still of considerable importance as borrowing opportunities may depend largely on the existence of a “reasonable” relationship between tax revenue and expenditures. This is particularly true for the United States, where the financial community and the public at large seem to be committed to a “balanced budget.”

The theoretical assumption to be tested is that government expenditures are *positively*

<sup>8</sup>See Downs (1967), Tullock (1965), and Niskanen (1971).

<sup>9</sup>This behavioral assumption has been used by Wildavsky (1964) in his empirical studies.

<sup>7</sup>This behavioral assumption has been theoretically explored by Frey and Lau (1968).

TABLE 3.—REACTION FUNCTIONS; 1953:II–1975:II

| Equation | Dependent Variable | Lagged Dependent Variable<br>$\rho_0$ | Constant         | Constraints                     |  |                                   |
|----------|--------------------|---------------------------------------|------------------|---------------------------------|--|-----------------------------------|
|          |                    |                                       |                  | Government Receipts<br>$\rho_1$ | Squared Popularity Deficit<br>$\rho_2$ | Time before Elections<br>$\rho_3$ |
| (8)      | <i>GX</i>          | 0.64<br>(9.23)                        | -0.45<br>(-0.87) | 0.08<br>(5.42)                  | 0.002<br>(2.49)                        | 0.37<br>(3.39)                    |
| (9)      | <i>TR</i>          | 1.03<br>(11.71)                       | -2.21<br>(-3.25) | 0.11<br>(2.43)                  | 0.002<br>(2.55)                        | 0.03<br>(0.52)                    |
| (10)     | <i>JOB</i>         | 0.75<br>(8.97)                        | 3701.4<br>(3.72) | 10.95<br>(1.99)                 | 0.02<br>(2.36)                         | 5.96<br>(1.77)                    |

Note: *t* indicates the test statistic against autocorrelation of the residuals with lagged dependent variables.

related to government receipts (*GRE*). It should be noted that this hypothesis clashes in many instances with the simple Keynesian prescription of anti-cyclical expenditures.

*C. Re-election Constraint:* Within the framework of a politico-economic model, the most important constraint on government behavior is that politicians want to stay in power. They can pursue their goals only if they are and remain in office.<sup>10</sup> Current popularity is used as a convenient and widely observed indicator of probable election outcome, provided that the underlying conditions do not change radically.

It is assumed that a president can be confident of re-election if a certain target popularity share ( $POP^*$ ) is reached or surpassed. This target popularity share depends on the president's degree of risk aversion and the exact structural conditions of the presidential race. E.g., if the president expects to be opposed by more than one serious contender, the target percentage may be lower. For simplicity's sake,  $POP^*$  is taken to be constant at 58%.<sup>11</sup>

The dynamic maximization problem (or even differential game) as set up would, of course, be much too complex for any government to solve. Rather it is assumed that a *satisficing*

strategy is used which differentiates between the following two basic states.

*1. State of Popularity Deficit:* Current popularity ( $POP$ ) is smaller than the target ( $POP^*$ ) and the president sees that he will not be re-elected if conditions remain unchanged. He therefore undertakes *expansionary* policies by increasing public expenditures and government employment, expecting that the induced changes in the state of the economy will increase his popularity with voters and secure re-election. This expectation is realistic in that empirical estimates of the popularity function indicate that a decrease in unemployment and an increase in the rate of growth of consumption do indeed lead to a popularity rise, if the concomitant increase in the rate of inflation is not *extremely* high.<sup>12</sup>

It is reasonable to assume that the government's reaction to a popularity deficit will be much stronger when the popularity gap is large than when it is small. The size of the change in public expenditures and jobs (employment in the government sector) is therefore taken to be proportional to  $(POP - POP^*)^2$  for  $POP < POP^*$ , and a positive coefficient is theoreti-

<sup>12</sup>There is a lot of empirical evidence that an *expansionary* policy leading to a decrease in unemployment and an increase in the growth rate of consumption *raises* government popularity, even if there is at the same time an increase in the rate of inflation. For example, government popularity fell between 1957:IV and 1958:II due to an increase in unemployment and decrease in the growth of consumption, although the rate of inflation also fell. The government undertook an expansionary policy ( $POP$  was smaller than  $POP^*$ ) that led to a decrease in unemployment, an increase in the growth of consumption, and, after two quarters, to an increase in inflation. Due to these changes in economic variables, government popularity rose by 12 percentage points from 1958:II to 1959:II.

<sup>10</sup>American presidents almost invariably seek re-election. Even after they have served two terms they are under strong pressure from their party (and especially from their vice-presidents) to pursue policies *as if* they were seeking another term. This is an attempt to ensure that their successor will be a member of their own party.

<sup>11</sup>For example, Luce and Rogow (1956, p. 93) suggest on the basis of a game theoretic analysis that it is optimal to reach between 51% and 66% of the vote. Different values of  $POP^*$  in the neighborhood of 58% do not significantly affect the result. See table 4.

TABLE 3.—(continued)

| (Ideological) Goals |                    |                    |                    | Test Statistics |      |      |
|---------------------|--------------------|--------------------|--------------------|-----------------|------|------|
| $\rho_4$            |                    |                    |                    | $\bar{R}^2$     | $h$  | d.f. |
| Eisenhower          | Kennedy            | Johnson            | Nixon              |                 |      |      |
| -.0003<br>(-.77)    | 0.0001<br>(1.27)   | -0.0003<br>(-2.10) | -0.0005<br>(-1.98) | .99             | 2.07 | 82   |
| .001<br>(.75)       | -0.0007<br>(-0.53) | -0.002<br>(-0.58)  | -0.0004<br>(-2.37) | .99             | 2.18 | 82   |
| -.05<br>(-.57)      | -0.04<br>(-0.51)   | 0.43<br>(2.27)     | -0.42<br>(-0.63)   | .99             | 2.09 | 82   |

cally expected. (For the period 1973:IV–1974:II when Nixon's popularity was so extraordinarily low due to the Watergate scandal, it is assumed that the president was no longer able to affect his popularity significantly by economic actions.)

As current popularity is an indicator of future election outcome, government will certainly react much more strongly when a popularity deficit appears shortly before an election date than when it appears a long time in advance. The amount of time before an election is reflected in a dummy variable, *TBE*, which takes the values 1, 2, 3, ..., 8 starting with the beginning of the second half of each presidential term and ending one quarter before the election date. As the expansionary measures are (*ceteris paribus*) assumed to be higher the closer the election (given  $POP < POP^*$ ), a positive coefficient is expected. (For  $POP \geq POP^*$ ,  $TBE = 0$ .)

2. *State of Popularity Surplus*: When current popularity is equal to or higher than is necessary for re-election ( $POP \geq POP^*$ ); the president is able to put his ideological views into practice. It may again be assumed that he will increasingly seize this opportunity as the surplus becomes larger. The variable for each president's "ideology" is equal to 1 and multiplied by the "room" available, formulated as  $(POP - POP^*)^2$ . (For  $POP < POP^*$ , this variable is zero.) There is a presumption that for "ideological" reasons, conservative (Republican) presidents tend to restrict expenditures, *ceteris paribus*.

It is now possible to state the regression equation:

$$\begin{aligned} INSTR(t) = & \rho_0 INSTR(t-4) + \text{constant} \\ & + \rho_1 (\text{government receipts})_{t-4} \\ & + \rho_2 (\text{squared popularity} \\ & \quad \text{deficit})_{t-1} \\ & + \rho_3 (\text{time before elections}) \\ & + \rho_4 (\text{each president's ideology}) \\ & + u_t. \end{aligned} \quad (7)$$

The variables all refer to the federal government and are more fully explained in the appendix. The popularity deficit is lagged by one quarter, as the government needs time to

react. The instruments (*INSTR*) considered are

*GX*: nondefense exhaustive government expenditures (current);

*TR*: government transfers to private households (current);

*JOB*: number of civilian government jobs.

$u_t$  is a random variable. The theoretically expected signs of all coefficients are positive.

Table 3 reports the OLS regression estimates for the whole 22-year period. Due to the lagged endogenous variable  $INSTR(t-4)$  the *t*-values may be biased. Therefore, the *h*-test is also given.

All coefficients relating to political factors have the theoretically expected positive sign. Government receipts seem to be statistically significant for both components of government expenditures as well as for employment. One of the most important determinants from the point of view of a closed politico-economic model, the popularity deficit, is significant for all three instruments considered.

The regression results are quite insensitive to different values of  $POP^*$ . The estimates for exhaustive government expenditures *GX* are shown as an example in table 4.

These results indicate that for the period considered, there is empirical evidence for the United States suggesting that economic conditions influence presidential popularity, and that this in turn motivates the use of policy instruments—which then influence general economic conditions. The positive sign of  $\rho_2$  indicates that administrations undertake an expansionary policy—i.e., raise expenditures—when they experience a popularity deficit and are making an effort to raise their popularity level.

As the column referring to time before elections ( $\rho_3$ ) shows, presidents tend to significantly increase exhaustive government expenditures before elections. It is somewhat surprising that the regression results do not show similar behavior with respect to the other two policy instruments.

The coefficients relating to the ideological goals variable are mostly negative but in quite a number of cases not statistically significant. They are significant in only a few cases, two of which are for Johnson who, compared to other presidents, seems to have restricted (*ceteris*

TABLE 4.—GOVERNMENT EXPENDITURE FUNCTION (GX) WITH DIFFERENT TARGET POPULARITY SHARES (POP\*), 1953:II-1975:II

| POP* | Lagged<br>Dependent<br>Variable | Constant       | Constraints            |                                  |                             | (Ideological) Goals |                  |                    |                    | Test Statistics |          |      |
|------|---------------------------------|----------------|------------------------|----------------------------------|-----------------------------|---------------------|------------------|--------------------|--------------------|-----------------|----------|------|
|      |                                 |                | Government<br>Receipts | Squared<br>Popularity<br>Deficit | Time<br>before<br>Elections | $\rho_4$            |                  |                    |                    | $\bar{R}^2$     | <i>h</i> | d.f. |
|      | $\rho_0$                        |                | $\rho_1$               | $\rho_2$                         | $\rho_3$                    | E                   | K                | J                  | N                  |                 |          |      |
| 56%  | 0.63<br>(8.38)                  | -.35<br>(-.70) | 0.10<br>(5.08)         | 0.0015<br>(2.08)                 | 0.35<br>(3.08)              | -.0008<br>(-.84)    | 0.0002<br>(1.66) | -0.0004<br>(-2.24) | -0.0008<br>(-2.09) | .99             | 2.09     | 82   |
| 57%  | 0.66<br>(9.07)                  | -.37<br>(-.73) | 0.10<br>(4.81)         | 0.002<br>(2.55)                  | 0.36<br>(3.29)              | -.0007<br>(-.82)    | 0.0002<br>(1.54) | -0.0003<br>(-2.10) | -0.0006<br>(-1.99) | .99             | 2.10     | 82   |
| 58%  | 0.64<br>(9.23)                  | -.45<br>(-.87) | 0.08<br>(5.42)         | 0.002<br>(2.49)                  | 0.37<br>(3.39)              | -.0003<br>(-.77)    | 0.0001<br>(1.27) | -0.0003<br>(-2.10) | -0.0005<br>(-1.98) | .99             | 2.07     | 82   |
| 59%  | 0.64<br>(9.23)                  | -.41<br>(-.85) | 0.11<br>(5.62)         | 0.0020<br>(3.46)                 | 0.37<br>(3.50)              | -.0004<br>(-.63)    | 0.0001<br>(1.15) | -0.0003<br>(-2.10) | -0.0005<br>(-1.83) | .99             | 2.07     | 82   |
| 60%  | 0.62<br>(8.50)                  | -.34<br>(-.63) | 0.10<br>(5.13)         | 0.0023<br>(3.59)                 | 0.38<br>(3.63)              | -.0002<br>(-.36)    | 0.0001<br>(1.08) | -0.0002<br>(-1.74) | -0.0005<br>(-1.89) | .99             | 2.05     | 82   |

Notes: See table 3.

*paribus*) civilian government expenditures. As a priori expected, Nixon tended to reduce expenditures.

Table 5 shows the regression estimates for three subperiods: the Eisenhower administration; the combined Kennedy and Johnson administrations; and finally the combined Nixon and Ford administrations. Because quarterly data are used there are sufficient observations for meaningful statistical tests.

The subperiods presented in table 5 reveal the same general picture as does the overall period (table 3). The model accounts for a smaller share of the variance in Eisenhower's outlays for goods and jobs. There seems to be no serial correlation except possibly in the government expenditure equations. The popularity deficit appears to be highly significant in all but two equations (relating to Eisenhower), and the same is true for the budget constraint (government receipts). All presidents are influenced in their spending behavior by forthcoming elections. The instruments used are exhaustive expenditures (Eisenhower, Nixon/Ford) or transfers (Kennedy/Johnson). Job creation is not used to any great extent immediately before an election to increase the chances of winning. In more than half the equations, the ideological goal variables are statistically insignificant. However, as a priori expected, Nixon *ceteris paribus* reduced expenditures significantly following his conservative "ideology."

#### IV. Concluding Remarks

The model of the interaction between the economy and the polity (government) presented in this paper is extremely simple; it can at best be considered a first step towards the formulation of a realistic approach to politico-economic interdependence. Many important aspects are obviously still missing, such as the relationship between the government (president) and parliament (Congress), the central bank (Federal Reserve System), economic and other interest groups; a more explicit account of government bureaucracy and its relationship to particular sectors of the economy (e.g., the Department of Agriculture to the farm sector); and many others.

Taking account of the simplicity of the model and its preliminary character, the econometric estimates give quite reasonable results. The popularity function is able to explain a large share of the variance. It indicates that unemployment, inflation, and the growth of consumption have a significant influence on presidential popularity.

There are many problems to be faced in estimating government reaction functions. The theoretical hypotheses advanced are, on the whole, not refuted by empirical evidence; in particular, governments take account of their popularity when using economic policy instruments. When they are afraid of losing an election, they make an effort to influence the



TABLE 5.—REACTION FUNCTIONS FOR THE VARIOUS PRESIDENTIAL ADMINISTRATIONS; 1953:II-1975:II

| Equation | Administration                           | Dependent Variable | Lagged Variable $\rho_0$ | Constant           | Constraints                  |                                     |                                |                              | Test Statistics    |      |      |    |
|----------|--|--------------------|--------------------------|--------------------|------------------------------|-------------------------------------|--------------------------------|------------------------------|--------------------|------|------|----|
|          |  |                    |                          |                    | Government Receipts $\rho_1$ | Squared Popularity Deficit $\rho_2$ | Time before Elections $\rho_3$ | (Ideological) Goals $\rho_4$ | $\bar{R}^2$        | $h$  | d.f. |    |
|          | <u>Eisenhower (1953:II-1960:IV)</u>      |                    |                          |                    |                              |                                     |                                |                              |                    |      |      |    |
| (11)     |  | <i>GX</i>          | 0.55<br>(4.12)           | -0.22<br>(-0.23)   | 0.09<br>(2.66)               | 0.007<br>(1.93)                     | 0.68<br>(2.08)                 | -0.0002<br>(-1.84)           | .90                | 1.87 | 25   |    |
| (12)     |  | <i>TR</i>          | 0.54<br>(3.27)           | -1.21<br>(-1.96)   | 0.17<br>(2.90)               | 0.03<br>(2.29)                      | 0.22<br>(0.89)                 | -0.0006<br>(-0.91)           | .94                | 4.53 | 25   |    |
| (13)     |  | <i>JOB</i>         | 0.33<br>(2.04)           | 5980.9<br>(4.73)   | 13.04<br>(1.01)              | 0.02<br>(1.36)                      | 2.05<br>(0.09)                 | -0.03<br>(-0.48)             | .82                | 3.65 | 25   |    |
|          | <u>Kennedy-Johnson (1961:II-1968:IV)</u> |                    |                          |                    |                              |                                     |                                |                              |                    |      |      |    |
| (14)     |  | <i>GX</i>          | 0.71<br>(3.43)           | 2.09<br>(2.40)     | 0.04<br>(2.00)               | 0.001<br>(2.29)                     | 0.04<br>(1.79)                 | 0.0002<br>(1.98)             | -0.006<br>(-2.09)  | .97  | —    | 25 |
| (15)     |  | <i>TR</i>          | 0.65<br>(3.93)           | -1.33<br>(-1.89)   | 0.27<br>(4.31)               | 0.002<br>(2.71)                     | 0.08<br>(2.81)                 | -0.0001<br>(-0.43)           | -0.0004<br>(-0.75) | .99  | —    | 25 |
| (16)     |  | <i>JOB</i>         | 0.63<br>(4.99)           | 3751.7<br>(2.94)   | 24.49<br>(2.18)              | 0.08<br>(2.18)                      | 3.71<br>(0.78)                 | 0.06<br>(0.48)               | 0.47<br>(1.98)     | .99  | 2.14 | 25 |
|          | <u>Nixon-Ford (1969:II-1975:II)</u>      |                    |                          |                    |                              |                                     |                                |                              |                    |      |      |    |
| (17)     |  | <i>GX</i>          | 0.57<br>(3.91)           | -2.54<br>(-4.27)   | 0.11<br>(3.49)               | 0.0005<br>(2.93)                    | 0.23<br>(4.04)                 | -0.0009<br>(-2.17)           | .99                | 1.84 | 18   |    |
| (18)     |  | <i>TR</i>          | 0.83<br>(6.59)           | -11.29<br>(-4.39)  | 0.38<br>(4.07)               | 0.004<br>(2.76)                     | 0.05<br>(0.40)                 | -0.003<br>(-2.67)            | .99                | 2.39 | 18   |    |
| (19)     |  | <i>JOB</i>         | 0.98<br>(10.48)          | -2587.5<br>(-2.23) | 13.07<br>(1.98)              | 0.07<br>(2.13)                      | 10.50<br>(1.59)                | -0.46<br>(-2.17)             | .99                | 2.21 | 18   |    |

economy in order to increase their popularity and hence their chances of re-election. Some instruments are also used with increasing intensity as elections come nearer. There is also some indication that when presidents are confident of winning an election, they allow themselves to act according to their ideological views.

## APPENDIX

## Definitions and Data Sources

Presidential popularity (*POP*). Monthly series in percentage shares: 1953-1970 from the *Gallup Opinion Index*, Report No. 56, Feb. 1970; thereafter from Reports Nos. 57-121, March 1970-August 1975. The data used are averages over the three months of each quarter.

Civilian unemployment rate (*UR*), percentage. Rate of price inflation (*RP*): implicit price deflator for domestic sales inclusive of indirect business taxes, 1958=100, percentage rate. Growth rate of nominal consumption (*RCN*), percentage rate. Growth rate of real consumption (*RCR*), percentage rate. These economic data are taken from Ray C. Fair, *A Model of Macroeconomic Activity, Vol. II: The Empirical Model* (Cambridge, MA: Ballinger Publishing Co., 1975), pp. 37, 39, 41, 82-83.

Federal non-defense government purchases of goods and services (*GX*), current, in bil. \$. *Survey of Current Business*, section: "Finance," pp. 39-55 (1960-1975).

Transfer payments from the government sector to the household sector (*TR*), current; number of civilian jobs in the government sector (*JOB*), in thousands. Both from Ray C. Fair, *op. cit.*, pp. 37, 43.

Federal government receipt (*GRE*), current, national income and product account basis. *Survey of Current Business, op. cit.*

The variables *UR*, *RP*, *RCN*, *RCR*, *GX*, *TR*, *JOB* and *GRE* are seasonally adjusted.

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