Reprinted from THE REVIEW OF ECONOMICS AND STATISTICS
Published for Harvard University. Copyright 1978, by North-Holland Publishing Company
Vol. LX, No. 2, May, 1978

The Review *of* Economics *and* Statistics

VOL. LX MAY 1978 NUMBER 2

THE EFFECT OF ECONOMIC EVENTS ON VOTES FOR PRESIDENT

Ray C. Fair*

I. Introduction

AN important question in political economy is how, if at all, economic events affect voting behavior. Although there is by now a fairly large literature devoted to this question,[1] there is no widely agreed upon answer. Kramer (1971), for example, concluded from his analysis of U.S. voting behavior that economic fluctuations have an important influence on congressional elections, whereas Stigler (1973) concluded that they do not. This debate has been continued by Arcelus and Meltzer (1975a, b), Bloom and Price (1975), and Goodman and Kramer (1975).[2] Many of the disagreements in this area are over statistical procedures and the interpretation of empirical results, but it is also clear that there is no single theory of voting behavior to which everyone subscribes. Unfortunately, the distinction between theoretical and empirical disagreements in this literature is often not very sharp, and there has been no systematic testing of one theory against another.

This paper has two main purposes. The first is to present a model of voting behavior that is general enough to incorporate what appear to be most of the theories of voting behavior in the recent literature and that allows one to test in a systematic way one theory against the others. This work is an attempt to narrow the disagreements in the area to disagreements over the inclusion of certain variables in the model and over the size of various parameters. The second purpose of the paper is to use the model to analyze the effect of economic events on votes for president in the United States. Presidential rather than congressional elections are analyzed here because, as argued later, the model seems more appropriate for the former than for the latter. The model is presented in section II, and the empirical results are discussed in section III. Section IV contains a summary of the main conclusions of this study.

II. A General Model of Voting Behavior

Alternative Theories

The theory of voting behavior that is most consistent with standard economic theory states that a voter evaluates the current pronouncements and past performances of the competing parties, forms from this evaluation an expectation of her or his future utility under each party, and votes for the party that provides the maximum expected future utility. Voters according to this theory are self-interested and well informed. It is a theory that, according to Kramer (1971, p. 134), appears in classical democratic theory, and it is also a theory that seems to represent closely Stigler's views (1973).

Another theory of voting behavior, which is stressed in the work of Kramer (1971), states that a voter votes for the incumbent party if the party's recent performance has been "satisfactory" according to some simple standard and votes against the incumbent party otherwise. Information according to this theory is costly, and voters acquire only a small amount

Received for publication August 18, 1976. Revision accepted for publication March 18, 1977.

* Yale University.

The research described in this paper was financed by grant SOC77-03274 from the National Science Foundation. This is an expanded version of section II of my paper, "On Controlling the Economy to Win Elections," Cowles Foundation Discussion Paper No. 397, August 14, 1975. I am indebted to Orley Ashenfelter and Gerald Kramer for helpful discussions regarding the subject matter of this paper.

[1] See Kramer (1971) for a good review of the early literature on this question.

[2] See also the studies of Lepper (1974) and Tufte (1975) and Okun's comments (1973) on Stigler.

of it before making their decisions. In particular, voters do not acquire any information about the non-incumbent parties before making their decisions.

The theory of voting behavior in the classic study of Downs (1957) is probably somewhere in between the above two theories. Although Downs' voters are self-interested and do acquire some information about the non-incumbent parties, they do not appear to collect as much information about the non-incumbent parties as the first theory says they do. Downs is not, however, very precise regarding the amount of information that voters do acquire, and one possible interpretation of his theory is that it is an example of the first theory above.

The General Model

A model that incorporates all the above theories will now be described. Since the empirical work in section III concerns presidential elections, it will be useful to formulate the model in terms of presidential elections. The model can be easily changed to handle other kinds of elections. It does require, however, that there be only two major parties, which will be referred to here as Democratic and Republican. Consider now a presidential election held at time t. (In what follows, an election held at time t will sometimes be referred to as election t.) Let

U_{it}^D = voter i's expected future utility if the Democratic presidential candidate is elected at time t,

U_{it}^R = voter i's expected future utility if the Republican presidential candidate is elected at time t.

These expectations should be considered as being made at time t. Let V_{it} be a variable that is equal to one if voter i votes for the Democratic candidate at time t and to zero if voter i votes for the Republican candidate at time t. The first main postulate of the model is

$$V_{it} = \begin{cases} 1 & \text{if } U_{it}^D > U_{it}^R \\ 0 & \text{if } U_{it}^D < U_{it}^R. \end{cases} \tag{1}$$

Equation (1) is the self-interest postulate. Voter i votes for the candidate that gives the higher expected future utility.[3] This postulate is clearly consistent with the first theory mentioned above and with Downs' theory. It may or may not be consistent with the satisficing theory of Kramer, but for now it will be interpreted as being so. More will be said about this later. The postulate is not, at any rate, the key difference between Kramer's theory and the others.

The key difference between the theories is the assumption of how expectations are formed. Kramer's voters look only at the recent performance of the incumbent party; Downs' voters look at somewhat more; Stigler's voters look at considerably more. This difference between the theories can be made more precise as follows. Let

$td1$ = last election from t back that the Democratic party was in power,

$td2$ = second-to-last election from t back that the Democratic party was in power,

$tr1$ = last election from t back that the Republican party was in power,

$tr2$ = second-to-last election from t back that the Republican party was in power,

M_j = some measure of performance of the party in power during the four years prior to election j.

If the Democratic party was in power at time t, then $td1$ is equal to t; otherwise $tr1$ is equal to t. The second postulate of the model is that

$$U_{it}^D = \xi_i^D + \beta_1 \frac{M_{td1}}{(1+\rho)^{t-td1}} + \beta_2 \frac{M_{td2}}{(1+\rho)^{t-td2}}, \tag{2}$$

$$U_{it}^R = \xi_i^R + \beta_3 \frac{M_{tr1}}{(1+\rho)^{t-tr1}} + \beta_4 \frac{M_{tr2}}{(1+\rho)^{t-tr2}} \tag{3}$$

where β_1, β_2, β_3, and β_4 are unknown coefficients and ρ is an unknown discount rate.

Equations (2) and (3) determine how expectations are formed. Equation (2) states that

[3] If $U_{it}^D = U_{it}^R$, then voter i is indifferent between the two candidates, and it is easiest to assume in this case that he or she does not vote. Somewhat different assumptions in this regard are not likely to affect the following analysis in any significant way.

voter i's expected future utility under the Democratic candidate is a function of how well the Democratic party performed during the prior two times that it was in power. The performance measure is discounted from time t back at rate ρ. Equation (3) is a similar equation for voter i's expected future utility under the Republican candidate. The ξ_i^D and ξ_i^R variables are specific to voter i and are assumed not to be a function of any of the M_j variables. For now they can be ignored; they will be discussed again when aggregation issues are considered.

Equations (2) and (3) are general enough to incorporate what appear to be Stigler's views. Stigler (1973, p. 165) states that "economic theory suggests that in predicting average future performance the forecasting procedure of the voter should have two properties: 1. The forecast should reflect accumulated past experience. 2. The forecast should attach more weight to recent than to remote periods." Equations (2) and (3) do reflect accumulated past experience, and for values of ρ greater than zero, they attach more weight to recent than to remote periods. If desired, the equations could be expanded to include more than just the last two times each party was in power. This expansion may or may not be needed to incorporate Stigler's views, but for simplicity it was not done here. Equations (2) and (3) also incorporate, as will be seen below, Kramer's theory. Kramer's theory turns out to be a special case of the model, where $\rho=\infty$ and $\beta_1=\beta_3$. Since Downs' theory is somewhere in between Kramer's and Stigler's, it is also encompassed by the model.

The theoretical disagreements in the literature are thus interpreted in this paper as focusing on equations (2) and (3). They are interpreted as concerning which variables to use as measures of performance (i.e., which variable to use for the M_j variables), what the value of ρ is, and whether $\beta_1=\beta_3$. Under this interpretation, it is possible to test one theory against another by estimating the equation explaining voting behavior that is derived below using different measures of performance and seeing which measure gives the best results. For each measure, the value of ρ can be estimated along with the other coefficient values, and the hypothesis that $\beta_1=\beta_3$ can be tested in the usual way. The purpose of the work in section III is to perform these tests using data for U.S. presidential elections. Before this is done, however, the aggregation of equations (1), (2), and (3) to an equation that can be directly estimated must be considered.

A Sufficient Set of Assumptions for Aggregation

Aggregation questions are generally ignored in studies of this kind, either by starting with an aggregate specification in the first place or by merely assuming that some individual voting-behavior equation holds in the aggregate. For present purposes, however, it seems useful to present explicitly a set of assumptions that is sufficient to allow an aggregate equation to be estimated. Among other things, this should avoid any potential confusion between disagreements regarding the specification of equations (2) and (3) and disagreements regarding aggregation issues.

The following three assumptions are sufficient to allow an aggregate equation to be estimated. The first is that the coefficients β_1, β_2, β_3, β_4, and ρ in equations (2) and (3) are the same for all voters and that all voters use the same measure of performance. Differences across voters in equations (2) and (3) are reflected only in the ξ_i^D and ξ_i^R variables.

In order to discuss the second and third assumptions, it will be convenient to let

$$\psi_i=\xi_i^R-\xi_i^D, \tag{4}$$

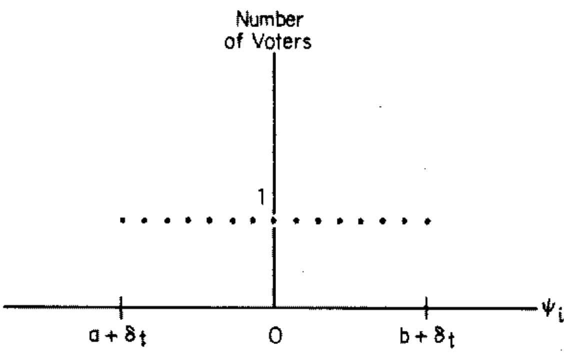
$$q_t=\beta_1\frac{M_{td1}}{(1+\rho)^{t-td1}}+\beta_2\frac{M_{td2}}{(1+\rho)^{t-td2}} -\beta_3\frac{M_{tr1}}{(1+\rho)^{t-tr1}}-\beta_4\frac{M_{tr2}}{(1+\rho)^{t-tr2}}. \tag{5}$$

Using these definitions and equations (2) and (3), equation (1) can then be written:

$$V_{it}=\begin{cases}1 & \text{if } q_t>\psi_i\\ 0 & \text{if } q_t<\psi_i.\end{cases} \tag{1'}$$

The second assumption is that ψ_i in (4) is evenly distributed across voters in each election between some numbers $a+\delta_t$ and $b+\delta_t$, as depicted in figure 1, where $a<0$ and $b>0$. δ_t is specific to election t, but a and b are constant across all elections. Since the same set of voters does not vote in each election, this assumption is somewhat stronger than the assumption that ψ_i is merely evenly distributed between $a+\delta_t$ and $b+\delta_t$ across the same set of voters in each election. If, for example, there are more voters in one election than in another, then the points between $a+\delta_t$ and $b+\delta_t$ are more tightly packed, but a and b do not change. The third assumption is much less important than the other two. It is that there are an infinite number of voters in each election. The number of voters in any one election is large enough that little is lost by making this assumption.

FIGURE 1.—ASSUMPTION ABOUT THE DISTRIBUTION OF ψ_i



Note: The number of points between $a+\delta_t$ and $b+\delta_t$ is equal to the number of voters who vote in the election. The points are evenly distributed between $a+\delta_t$ and $b+\delta_t$.

The last two assumptions imply that ψ is uniformly distributed between $a+\delta_t$ and $b+\delta_t$, where the i subscript is now dropped from ψ_i. The probability density function for ψ, denoted as $f_t(\psi)$, is

$$f_t(\psi)=\begin{cases}\dfrac{1}{b-a} & \text{for } a+\delta_t<\psi<b+\delta_t \\ 0 & \text{otherwise,}\end{cases} \tag{6}$$

and the cumulative distribution function for ψ, denoted as $F_t(\psi)$, is

$$F_t(\psi)=\begin{cases}0 & \text{for } \psi<a+\delta_t \\ \dfrac{\psi-a-\delta_t}{b-a} & \text{for } a+\delta_t\leqslant\psi\leqslant b+\delta_t \\ 1 & \text{for } \psi>b+\delta_t.\end{cases} \tag{7}$$

The density and distribution functions are different for each election because of δ_t.

Let V_t denote the percentage of the two-party vote that goes to the Democratic candidate in election t. From the above assumptions, V_t is equal to the probability that ψ is less than or equal to q_t. If, for example, q_t is halfway between $a+\delta_t$ and $b+\delta_t$, then half of the voters will vote for the Democratic candidate. The probability that ψ is less than or equal to q_t is merely $F_t(q_t)$, so that from (7):

$$V_t=-\frac{a}{b-a}+\frac{q_t}{b-a}-\frac{\delta_t}{b-a}. \tag{8}$$

It will be convenient to rewrite equation (8) as

$$V_t=\alpha_0+\alpha_1 q_t+v_t, \tag{8'}$$

where $\alpha_0=-a/(b-a)$, $\alpha_1=1/(b-a)$, and $v_t=-\delta_t/(b-a)$. Finally, combining equations (5) and (8′) yields

$$V_t=\alpha_0+\alpha_1\beta_1\frac{M_{td1}}{(1+\rho)^{t-td1}}+\alpha_1\beta_2\frac{M_{td2}}{(1+\rho)^{t-td2}} -\alpha_1\beta_3\frac{M_{tr1}}{(1+\rho)^{t-tr1}}-\alpha_1\beta_4\frac{M_{tr2}}{(1+\rho)^{t-tr2}}+v_t. \tag{9}$$

Equation (9) is the basic equation of the model. As will be seen below, given assumptions about the measure of performance and v_t, the equation can be estimated.

To summarize, the key assumption in the derivation of equation (9) from equations (1), (2), and (3) is that ψ_i in (4) is distributed as depicted in figure 1. ψ_i is voter i's "expected utility bias" in favor of the Republican party. It is, in other words, voter i's expected utility difference between the Republican and Democratic parties before any consideration is given to their past performances. The key assumption is thus that this difference differs across voters in a uniform way. If in the above analysis ψ were assumed to be, say, normally distributed rather than uniformly distributed, then V_t in equation (8) would no longer be a linear function of q_t: the normal cumulative distribution function is not linear in ψ. It is important to note, however, that V_t only varies between about 0.35 and 0.65, and so it may be that even if ψ were normally distributed, V_t would be approximately linear in q_t over its relevant range. The assumption that ψ is uniformly distributed may thus not be as restrictive as one might otherwise expect.

The Specification of v_t

The v_t term in equation (9) is equal to $-\delta_t/(b-a)$. b and a are constant across all elections, and $b-a>0$. δ_t determines the horizontal position of the distribution in figure 1. The smaller is δ_t (and thus the larger is v_t), the more favorable is election t for the Democratic party, given the M_j variables. v_t incorporates all the factors that affect V_t that are not captured by the M_j variables in equation (9). Some of these unaccounted-for factors may have trends over time, and so v_t may have a trend component. It may also be the case that an incumbent running for election has advantages over his[4] opponent that are not reflected in the M_j variables. In other words, an incumbent may be able to manipulate certain variables during his time in office before the election that have positive effects on people's expected future utility if he is elected and that are not reflected in the M_j variables. These possible effects can be accounted for, at least in part, by adding a dummy variable, denoted as $DPER_t$, to the equation explaining V_t, where $DPER_t$ takes on a value of 1 if there is a Democratic incumbent and he is running for election, of -1 if there is a Republican incumbent and he is running for election, and of 0 otherwise. v_t is thus postulated to be a function of a time trend, t, and of $DPER_t$:

$$v_t = \alpha_2 t + \alpha_3 DPER_t + \mu_t, \tag{10}$$

where α_2 and α_3 are unknown coefficients to be estimated.

The μ_t term in (10) incorporates all the factors that affect V_t other than t, $DPER_t$, and the M_j variables. If these "left out" factors are assumed to be uncorrelated with the explanatory variables in the equation, then μ_t can be taken to be an error term for purposes of estimation. There is, however, one further issue about μ_t that should be considered, which has to do with the fact that some individuals have been candidates in more than one presidential election. For the elections between 1916 and 1976, these individuals are Hoover, Roosevelt, Dewey, Eisenhower, Stevenson, and Nixon. Consider, for example, Dewey, who lost the elections of 1944 and 1948. The fact that Dewey lost the election of 1944 may convey some information about him as a vote-getter that could help in explaining the results of the 1948 election. The question is thus whether it is possible to use information on past elections to help explain the current election when either or both of the candidates in the current election have run before. The following is one way of trying to use this information.

Let *VGA* denote a candidate's independent vote-getting ability (or lack thereof), and consider μ_t as being composed of three parts:

$$\mu_t = \mu_{1t} + \mu_{2t} + \mu_{3t}, \tag{11}$$

where μ_{1t} measures the effect of the Democratic candidate's *VGA* on V_t, μ_{2t} measures the effect of the Republican candidate's *VGA* on V_t, and μ_{3t} measures the effect of all the other left out variables on V_t. It should be stressed that *VGA* is meant to reflect a candidate's vote getting ability independent of the M_j variables and of t and $DPER_t$. It reflects what might be called the candidate's "personality." The following assumption about μ_{1t}, μ_{2t}, and μ_{3t} will be made. First, an individual's *VGA* is assumed to be the same in all elections in which he is a candidate, so that, for example, $\mu_{1t} = \mu_{1t+1}$ if the same person is the Democratic candidate in elections t and $t+1$. Second, for different individuals μ_{1t} and μ_{2t} are assumed to be independently distributed random variables with zero means and common variance σ_1^2. Third and last, μ_{3t} is assumed to be an independently distributed random variable with zero mean and variance σ_3^2.

Let σ^2 denote the variance of μ_t in (11), which from the above assumptions is equal to $2\sigma_1^2 + \sigma_3^2$, and let $\lambda = \sigma_1^2/\sigma^2$. Consider now $E\mu_t\mu_{t+j}$. If elections t and $t+j$ have no individuals in common, this term is zero; if they have one individual in common, the term is $\lambda\sigma^2$; and if they have both individuals in common, the term $2\lambda\sigma^2$. The error term μ_t thus has a variance-covariance matrix of a special form. After factoring σ^2 out, the matrix has diagonal elements of 1 and off-diagonal elements that are either 0, λ, or 2λ. This information on the variance-covariance matrix of μ_t can be used when estimating the equation, since, as will be seen below, the coefficient λ can be estimated along with the other unknown coefficients.

The Specification of the Measure of Performance

Within the context of the present model, much of the disagreement in the literature can

[4] For the sample period considered in this study, all the presidents have been men, and so I have chosen to use the masculine pronouns for purposes of the present discussion.

be interpreted as a disagreement over the variables that the voters use to measure or evaluate the performance of a party during the four-year periods that the party is in power. For economic variables, two of the key questions are (1) whether voters look more at the level of economic activity or at its change and (2) which part of each four-year period do voters consider. There is, unfortunately, little theory that one can use to help answer these two questions; the questions are primarily empirical ones. Regarding the second question, for example, Stigler (1973, p. 163) notes that "there is no naturally correct period." In his empirical work on congressional elections Stigler concentrated mostly on the two-year period before the election, whereas Kramer concentrated on the one-year period before the election.

The two most obvious economic variables to consider as possible measures of performance are some measure of the rate of inflation and some measure of real output or employment. There appears to be less disagreement in the literature regarding the use of these two kinds of variables than there is regarding the other two questions just mentioned. Since all these questions are primarily empirical ones, no further discussion of them will be presented here. For the empirical work on presidential elections in the next section, a fairly systematic procedure was followed to try to determine the measure of performance actually used by the voters.

The final point to note here is that M_j can be a function of more than one variable. For purposes of the following discussion, it will be assumed that M_j is a linear function of two observed variables, X_j and Y_j:

$$M_j=\gamma_0+\gamma_1X_j+\gamma_2Y_j, \tag{12}$$

where γ_0, γ_1, and γ_2 are unknown coefficients.

The Equation to be Estimated

Equations (10) and (12) can be substituted into (9) to yield an estimable equation. Ignoring the variance-covariance matrix of μ_t for the moment, the equation that results from this substitution includes 12 unknown coefficients: α_0, α_1, α_2, α_3, β_1, β_2, β_3, β_4, γ_0, γ_1, γ_2, and ρ. Not all these coefficients, however, are identified. It is easy to see from equation (9) that it is not possible to estimate α_1 and the β coefficients separately. For purposes of the estimation work in the next section, α_1 was arbitrarily assumed to be 1.0. It is also not possible, even for $\alpha_1=1.0$, to estimate β_1, β_2, β_3, β_4, γ_0, γ_1, and γ_2 separately, and for purposes of the estimation work in the next section, β_1 was also arbitrarily assumed to be 1.0. The resulting equation thus has 10 coefficients to estimate. It is nonlinear in ρ, and there is also a nonlinear restriction on the coefficients β_2, β_3, β_4, γ_0, γ_1, and γ_2. It will be convenient to write this equation as

$$V_t=f(Z_t,\theta)+\mu_t, \quad t=1,2,\dots,T, \tag{13}$$

where T is the number of observations (elections), Z_t is the vector of observations on the explanatory variables, and θ is the vector of unknown coefficients. It should perhaps be noted that equation (13) is fairly complicated, as anyone who cares to substitute (10) and (12) into (9) can see.

Let $\sigma^2\Omega$ denote the variance-covariance matrix of μ_t. As discussed above, some of the off-diagonal elements of Ω are either λ or 2λ. The generalized least squares estimates of the coefficients of equation (13) are obtained by minimizing $\mu'\Omega^{-1}\mu$, where $\mu'=(\mu_1,\dots,\mu_T)$. Although λ is unknown, it can be estimated along with the coefficients in θ. Since equation (13) is nonlinear in coefficients, adding λ as an unknown coefficient merely increases the complexity of an already nonlinear minimization problem. This kind of problem is fairly easy to solve using standard algorithms. Counting λ, there are thus 11 coefficients to estimate in equation (13). If the error terms in (11) are assumed to be normally distributed, then the estimates that minimize $\mu'\Omega^{-1}\mu$ are maximum likelihood estimates.[5]

[5] For the results in the next section, $\mu'\Omega^{-1}\mu$ was minimized as follows. Let $V'=(V_1,\dots,V_T)$ and $F'=(f(Z_1,\theta),\dots,f(Z_T,\theta))$, so that (13) can be written

$$V=F+\mu. \tag{13'}$$

Since Ω is positive definite, it can be factored into PP', where P is nonsingular. If (13′) is then multiplied by P^{-1}, this yields

$$P^{-1}V=P^{-1}F+P^{-1}\mu \tag{13''}$$

or

$$V^*=F^*+\mu^*, \tag{13'''}$$

where the error term μ^* has variance-covariance matrix σ^2I. For the minimization problem a simple linear search on λ was performed. For each value of λ chosen in the search, Ω was first factored into PP' and then the other

For computational convenience, $\eta = 1/(1+\rho)$ was estimated instead of ρ for the work in the next section. If $\eta = 0$, then $\rho = \infty$, and so the hypothesis that $\rho = \infty$ can be tested by testing the hypothesis that $\eta = 0$. It should be noted that if $\rho = \infty$, then the M_{td2} and M_{tr2} terms in (9) are 0, and so β_2 and β_4 cannot be estimated when $\rho = \infty$.

The Special Case of Kramer's Model

Kramer's model (1971) is a special case of equations (9), (10), and (12). In the terminology of this paper, Kramer used as "measures of performance" the growth rate of real per capita income in the year of the election and the rate of inflation in the year of the election. Denote these two variables for election j as g_{1j} and p_{1j}, respectively. M_j for Kramer is thus $\gamma_0 + \gamma_1 g_{1j} + \gamma_2 p_{1j}$.[6] Since Kramer's voters look only at the performance of the incumbent party, $\rho = \infty$ in equation (9). For $\rho = \infty$, the M_{td2} and M_{tr2} terms in equation (9) are always zero, and one of the other two measure terms is also zero. The term that is not zero is the term corresponding to the party that is in power at time t.[7] Kramer's model does not include the $DPER_t$ variable, so that $\alpha_3 = 0$ in (10), and it also implicitly assumes that $\beta_1 = \beta_3$ in (9). Now, if a variable I_t is defined to be equal to 1 if the Democrats were in power at time t ($td1 = t$) and -1 if the Republicans were in power at time t ($tr1 = t$), then equations (9), (10), and (12) for Kramer's model can be combined to yield

$$\begin{aligned} V_t &= \alpha_0 + \alpha_2 t + \alpha_1 \beta_1 \gamma_0 I_t + \alpha_1 \beta_1 \gamma_1 I_t g_{1t} \\ &\quad + \alpha_1 \beta_1 \gamma_2 I_t p_{1t} + \mu_t \\ &= \alpha_0 + \alpha_2 t + a_0 I_t + a_1 I_t g_{1t} + a_2 I_t p_{1t} + \mu_t, \end{aligned} \tag{14}$$

where the parameters α_0, α_1, a_0, a_1, and a_2 can be estimated. Equation (14) is the equation that Kramer estimated for congressional and presidential elections combined except for a different treatment of the error term. He did not attempt to estimate a coefficient like λ, but he did put a restriction on the error term to incorporate a "coattails" effect on the congressional vote.

The fact that Kramer's model is a special case of the general model means that it can be interpreted as being consistent with the self-interest postulate, equation (1). It can now be seen that the main difference between Kramer's theory and the others is not the self-interest postulate, but is rather the implicit assumption for Kramer that $\rho = \infty$ in equations (2) and (3).

III. An Application of the Model to U.S. Presidential Elections

The Use of Data on Presidential Elections

Most empirical studies in this area have concentrated on U.S. congressional elections. The standard assumption in these studies is that voters hold the party that controls the presidency accountable for economic events, rather than, say, the party that controls the Congress (if it is different) or the Board of Governors of the Federal Reserve System. If this assumption is true, one would expect economic events, if they have any influence on elections at all, to influence presidential elections more than they influence congressional elections. Kramer (1971) argues that presidential elections may be more affected by personality factors and other non-economic events than are congressional elections, but this is far from obvious. It was thus decided for purposes of this study to use the data on presidential elections to estimate the above model.

---

coefficient estimates were obtained by minimizing $\mu^{*\prime}\mu^*$. For the latter minimization problem, a modified Marquardt method was used. This method, which is due to R. Fletcher, is in the Harwell Subroutine Library. The search procedure was designed to find that value of λ for which the minimum of $\mu^{*\prime}\mu^*$ is the smallest.

Once the smallest minimum was found, the variance-covariance matrix of all of the coefficient estimates (including λ) was obtained by computing numerically the second derivatives of $\mu^{*\prime}\mu^*$ with respect to the coefficients. Let Q denote the computed matrix of second derivatives, and let S denote the minimum value of $\mu^{*\prime}\mu^*$ (the sum of squared residuals). Then the variance-covariance matrix of the coefficient estimates was computed as $(2 \cdot S/(T-k))Q^{-1}$, where k is the number of coefficients estimated.

[6] In Kramer's original paper (1971) p_{1j} was not a significant explanatory variable. There were, however, some data errors in Kramer's income series, and the corrected results, which are presented in the Bobbs-Merrill reprint (PS-498), show that p_{1j} is significant.

[7] For present purposes, $(1+\infty)^0$ is defined to be 1. For the computations in the next section, 0^0 is also defined to be 1.

TABLE 1.—SOME DATA

Election Year	t	Party in Power before Election	V_t	g_{1t}	p_{1t}	u_{1t}	g^*_{1t}
1892	1	R (Harrison)	.517	7.5	−3.7	3.0	
1896	2	D (Cleveland)	.478	−3.8	−2.7	14.4	
1900	3	R (McKinley)	.468	0.9	4.8	5.0	
1904	4	R (McKinley-Roosevelt)	.400	−3.2	1.2	5.4	
1908	5	R (Roosevelt)	.455	−10.0	−0.8	8.0	
1912	6	R (Taft)	.453	4.1	4.1	4.6	
1916	7	D (Wilson)	.517	6.4	12.4	5.1	
1920	8	D (Wilson)	.361	−6.1	14.0	5.2	
1924	9	R (Harding-Coolidge)	.457	−2.2	−1.2	5.0	
1928	10	R (Coolidge)	.412	−0.6	0.8	4.2	
1932	11	R (Hoover)	.591	−14.4	−11.2	23.6	
1936	12	D (Roosevelt)	.625	12.8	0.7	16.9	
1940	13	D (Roosevelt)	.550	6.6	2.5	14.6	
1944	14	D (Roosevelt)	.538	6.2	2.0	1.2	
1948	15	D (Roosevelt-Truman)	.524	2.4	6.9	3.8	3.9
1952	16	D (Truman)	.446	2.0	1.3	3.0	0.7
1956	17	R (Eisenhower)	.422	0.4	3.1	4.1	−0.6
1960	18	R (Eisenhower)	.501	0.2	1.7	5.5	−3.2
1964	19	D (Kennedy-Johnson)	.613	3.8	1.6	5.2	3.2
1968	20	D (Johnson)	.496	3.4	4.5	3.6	4.9
1972	21	R (Nixon)	.382	4.8	4.1	5.6	5.7
1976	22	R (Nixon-Ford)	.511	5.4	5.1	7.7	3.4

Notes: V_t = Democratic share of the two-party vote in election t.
g_{1t} = growth rate of real per capita GNP in the year of election t.
p_{1t} = growth rate of the GNP deflator in the year of election t.
u_{1t} = unemployment rate in the year of election t.
g^*_{1t} = growth rate of real per capita GNP in the second and third quarters of the year of election t (annual rate).

Kramer (1971) did use the data on presidential elections in his empirical work and found that the presidential vote was not very responsive to economic conditions. He did, however, constrain the coefficient estimates in the equation explaining the presidential vote to be the same as the coefficient estimates in the equation explaining the congressional vote, and this may be an important reason for his negative results regarding the presidential vote. Lepper (1974) in the appendix to her paper presents results that reject the hypothesis that the coefficients are the same in the two equations.

The Data

For the basic estimation work, annual data on three economic variables were collected for the 1889–1976 period. The three variables are the unemployment rate (U), real GNP per capita (G), and the GNP deflator (P). The data on these three variables are presented and discussed in the appendix.

Data on V_t, the Democratic percentage of the two-party vote, were collected for the 22 presidential elections between 1892 and 1976. For the election of 1912, V_t was taken to be the ratio of Wilson's votes to the sum of the votes for Wilson, Taft, and Roosevelt. Wilson, a Democrat, won this election even though V_t is less than 0.5. For the election of 1924, V_t was taken to be the ratio of Davis' and LaFollette's votes to the sum of the votes for Davis, LaFollette, and Coolidge. For reference purposes, the data on V_t are presented in table 1, along with some other useful information.

A Digression about Being Sensible

The basic sample period used in this study is 1916–1976, for a total of 16 observations. It would clearly not be sensible with only 16 observations to try to estimate all 11 unknown coefficients (counting λ) in equation (13). An estimation of all the coefficients will have to wait for more observations to be produced. By the year 2000, for example, 6 more observations will have become available.[8] For now, a more limited attempt at estimating the model has to be made. The following work is designed to try to gain some information about the coefficients and measures of performance from the data without straining too much the

[8] If one believes that the above model is also relevant for congressional elections (with perhaps different coefficient values), then there are in this case, of course, more observations available to estimate the coefficients.

credibility of the results, given the small number of observations. The reader is left to judge whether or not this work has overstepped sensible bounds.

The Basic Test Results

A fairly systematic procedure was followed for what are called here "the basic test results." Sixteen possible measures of economic performance were considered: the growth rate of G in the year of the election, in the two-year period before the election, in the three-year period before the election, and over the entire four-year period; the absolute value of the growth rate of P for the same four periods; the level of U for the same four periods; and the change in U for the same four periods.

Four sets of results were obtained. For the first set, 16 equations were estimated, one for each measure. For each equation, M_j in (12) was taken to be $\gamma_0+\gamma_1 X_j$, where X_j is one of the 16 measures. The equations were estimated under the assumption that $\beta_1=\beta_3$ and that β_2 and β_4 are zero. This left 7 coefficients to be estimated: α_0, α_2, α_3, γ_0, γ_1, η, and λ. (Remember that $\eta=1/(1+\rho)$.) If for any of the equations the estimated value of η was negative, the equation was reestimated with the constraint $\eta=0$ imposed. Also, λ was constrained to be nonnegative.[9]

For the second set of results, the same 16 equations were estimated except that for this set the constraint that $\beta_1=\beta_3$ was relaxed. In this case there were 8 coefficients to be estimated, the original 7 plus β_3. For the third set of results, the same 16 equations were estimated as in the first set except that β_2 and β_4 were not assumed to be zero. The restriction that $\beta_2=\beta_4$ was imposed, however, and the restriction that $\beta_1=\beta_3$ was also kept, which meant that there were also 8 coefficients to be estimated in this case, the original 7 plus β_2.

The results of estimating these 48 equations can be easily summarized. In terms of fit, the best measure of performance was the growth rate of G in the year of the election (denoted here for election j as g_{1j}). The next best measure was the change in U in the year of the election (denoted here for election j as Δu_{1j}). The other 14 measures performed much worse. The third best measure for the first set of results, for example, was the absolute value of the growth rate of P in the two-year period before the election, with a standard error of the regression (S.E.) of 0.0538. This compares to the S.E. for g_{1j} of 0.0421. The four worst-fitting variables were the four level unemployment-rate variables, with S.E.s between 0.0754 and 0.0804.

The estimates of 3 of the 48 equations are presented in table 2. Equations 1 and 2 in the table are from the first set of results and provide a comparison of g_{1j} versus Δu_{1j}. The results are fairly close for the two measures, although the fit using g_{1j} is slightly better. g_{1j} and Δu_{1j} do, of course, measure roughly the same thing, namely, the change in real economic activity in the year of the election, and so it is not surprising that they yield similar results.

Before considering further test results, it is of interest to examine the results for equation 1 in table 2 in somewhat more detail. The estimate of λ is 0.24, which says that the variance of each of the two "personality" terms in (11), μ_{1t} and μ_{2t}, is about one-fourth of the total variance of the error term. There thus appears to be some information contained in past error terms that is of use in explaining the current election when either or both of the candidates in the current election have run before.

The estimate of η in equation 1 is 0, which implies a value of ρ of ∞. The unconstrained estimate of η was -0.06, with a t-value of -0.26. In equation 2 the estimate of η is 0.19, with a t-value of 0.76 and an implied value of ρ of 4.3. These results thus support the hypothesis of a large value of ρ, probably infinite.

The estimate of γ_1, the coefficient attached to g_{1j}, is 0.0116 in equation 1, which means that an increase in g_{1j} of one percentage point increases the share of the incumbent party's vote by about 1%. The estimate of α_2, the coefficient of the time trend, is positive, which means that over the sample period there appears to have been a positive trend in favor of the Democrats. The estimate of α_3, the coefficient of $DPER_t$, is 0.0352, which means that over the sample period an incumbent running for election has had an advantage not

[9] In other words, in the linear search described in footnote 5, λ was not allowed to be negative.

TABLE 2.—SOME ESTIMATES OF EQUATION (13)

Equation No.	Measure Used	Estimate of: Constant in (9) α_0	Time Trend Coefficient α_2	$DPER_t$ Coefficient α_3	Constant in (12) γ_0	X_j Coefficient γ_1	Y_j Coefficient γ_2	β_3	λ	η	Implied Value of ρ	S.E. (estimate of σ)
1.	$X_j = g_{1j}$	0.352 (8.32)	0.00726 (2.73)	0.0352 (1.54)	−0.0141 (−0.81)	0.0116 (4.61)	—	1.0[a]	0.24 (0.65)	0[a]		.0421
2.	$X_j = \Delta u_{1j}$	0.363 (7.59)	0.00677 (2.39)	0.0518 (2.17)	−0.0022 (−0.10)	−0.0231 (−4.35)	—	1.0[a]	0[a]	0.19 (0.76)	4.3	.0436
3.	$X_j = g_{1j}$	0.346 (7.14)	0.00814 (2.58)	0.0427 (1.61)	−0.0143 (−0.96)	0.0103 (2.88)	—	1.26 (0.48)[b]	0.35 (0.85)	0[a]		.0437
4.	$X_j = g_{1j}$; $Y_j = \lvert p_{2j}\rvert$	0.401 (6.45)	0.00474 (1.29)	0.0485 (1.69)	0.0043 (0.16)	0.0088 (2.12)	−0.0055 (−0.98)	1.0[a]	0.07 (0.15)	0[a]		.0422
5.	$X_j = g_{1j}$; $Y_j = a_{1j}$	0.338 (7.72)	0.00847 (3.17)	0.0404 (1.82)	−0.0183 (−1.13)	0.0123 (5.63)	−2.43 (−1.21)	1.0[a]	0.33 (0.88)	0[a]		.0411
6.	$X_j = g^*_{1j}$	0.363 (8.14)	0.00657 (2.38)	0.0231 (1.06)	−0.0027 (−0.16)	0.0118 (5.42)	—	1.0[a]	0.35 (1.26)	0.014 (0.07)	70.4	.0419

Year	1916	1920	1924	1928	1932	1936	1940	1944	1948	1952	1956	1960	1964	1968	1972	1976
Actual V_t	.517	.361	.457	.412	.591	.625	.550	.538	.524	.446	.422	.501	.613	.496	.382	.511
Predicted V_t	.510	.337	.433	.458	.579	.623	.560	.562	.515	.490	.444	.506	.567	.534	.433	.440
Error	−.007	−.024	−.024	.046	−.012	−.002	.010	.024	−.009	.044	.022	.005	−.046	.038	.051	−.071

Notes: (1) Sample period is 1916–1976, 16 observations.
(2) t-statistics are in parentheses.
(3) α_1 and β_1 in (9) are taken to be 1.0 for purposes of estimation.
(4) $\eta = 1/(1+\rho)$.
(5) λ = ratio of variance of μ_{1t} (or of μ_{2t}) to variance of μ_t in (11).
(6) g_{1j} = growth rate of real per capita GNP in the year of election j.
Δu_{1j} = change in the unemployment rate in the year of election j.
$\lvert p_{2j}\rvert$ = absolute value of the average growth rate of the GNP deflator in the two-year period before election j (annual rate).
a_{1j} = change in AF/POP in the year of election j, where AF = level of armed forces and POP = total population.
g^*_{1j} = growth rate of real per capita GNP in the second and third quarters of the year of election j (annual rate).

[a] Coefficient constrained to this value.

[b] t-statistic based on null hypothesis that $\beta_3 = 1.0$.

reflected in the other variables in the equation of about 3.5%.

Given the small number of observations and the likely collinearity among some of the explanatory variables, the t-values in equation 1 are not too bad. The estimate of γ_1 in particular has a fairly high t-value. Collinearity problems are likely to be reflected most in the estimates of α_3, γ_0, and λ. When, for example, η is zero and $\beta_1 = \beta_3$, the variable corresponding to γ_0 is just the incumbency variable I_t in equation (14), and I_t and $DPER_t$ are fairly highly correlated.

Consider now the other test results. Equation 3 in table 2 is from the second set of results. It is the same as equation 1 except that the constraint $\beta_1 = \beta_3$ is relaxed. The estimate of β_3 is 1.26, which does not differ much from the value of 1.0 for β_1. The t-value for the estimate of β_3 based on the hypothesis that $\beta_3 = 1.0$ is only 0.48, and so the hypothesis is fairly strongly supported.

When $\eta = 0$, it is not possible, as mentioned above, to estimate β_2 and β_4. Therefore, for the third set of results the constraint $\eta = 0$ could not be imposed if the unconstrained estimate turned out to be negative. Many of the estimates of η were in fact negative, and many of the other coefficient estimates were of unreasonable magnitudes. It was not possible to obtain sensible results in this case, even when using g_{1j} and Δu_{1j} as measures. The conclusion from this third set of results is thus either that there are not enough observations to obtain any information on β_2 and β_4 or that β_2 and β_4 are not part of the model because η is in fact zero.

For the fourth and last set of results, 8 equations were estimated. For each equation, M_j in (12) was taken to be a function of two variables, X_j and Y_j. The X_j variable was always g_{1j}. The variables used for Y_j, one per equation, were the absolute value of the growth rate of P in each of the four periods mentioned above and the level of U in each of the four periods. The equations were estimated under the assumption that $\beta_1 = \beta_3$ and that β_2 and β_4 are zero. This left 8 coefficients to be estimated, the 7 estimated for the first set of results plus γ_2. The variable used for Y_j in the best fitting equation of the 8 was the absolute value of the growth rate of P in the two-year period before the election (denoted here as $|p_{2j}|$). The estimates for this equation are presented in equation 4 in table 2. The estimate of γ_2, the coefficient attached to $|p_{2j}|$, is -0.0055, with a t-value of -0.98. There is thus perhaps some slight evidence that the rate of inflation has an effect on votes for president, but this evidence is clearly not very strong. None of the four unemployment variables used for the fourth set of results had t-values greater than 0.45 in absolute value.

Further Results

Before summarizing the main conclusions from the above results, it will be useful to consider a few more tests that were performed. For all the following tests, the equations were estimated under the assumption that $\beta_1 = \beta_3$ and that β_2 and β_4 are zero. In order to test for possible asymmetric effects of expansions and contractions on votes for president, a variable g_{1j}^+ was included in the measure of performance. M_j was taken to be $\gamma_0 + \gamma_1 g_{1j} + \gamma_2 g_{1j}^+$, where g_{1j} is, as above, the growth rate of G in the year of election j and where g_{1j}^+ is equal to $g_{1j} - \bar{g}$ if $g_{1j} > \bar{g}$ and to zero otherwise. $\bar{g}$ is an unknown parameter. If, for example, expansions have less effect on voting behavior than do contractions, as Bloom and Price (1975) seem to find in their analysis of congressional elections, then the estimate of γ_2 should be negative. If, on the other hand, there are no asymmetric effects, then the estimate should be zero. To test this, 7 equations were estimated, corresponding, respectively, to values of $\bar{g}$ of -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, and 4.0. The best fitting equation was for $\bar{g} = -1.0$. The estimate of γ_2 in this case was -0.0035, with a t-value of -0.59. The corresponding t-values for the other 6 equations were lower than 0.59 in absolute value. There is thus little evidence of asymmetric effects on votes for president.

The next test was of the hypothesis that U.S. involvement in wars has an effect on voting behavior. Data on the level of armed forces (AF) and total population (POP) were collected,[10] and the ratio AF/POP was taken as a

[10] The data sources for AF and POP are described in the appendix.

proxy for U.S. involvement in wars. Eight variables based on this ratio were considered: the level of AF/POP in each of the four periods considered for the basic test results above and the change in AF/POP in each of the four periods. Eight equations were estimated. For each equation, M_j was taken to be $\gamma_0 + \gamma_1 g_{1j} + \gamma_2 Y_j$, where Y_j is one of the eight variables. The variable that led to the best fit was the change in AF/POP in the year of the election. The estimates using this variable are presented in equation 5 in table 2. The estimate of γ_2 is -2.43, with a t-value of -1.21. The results thus suggest that the change in AF/POP in the year of the election may have a negative effect on votes for the incumbent party, although this evidence is not very strong.

The third test was designed to see if V_t could be better explained by using as the measure of performance the growth rate of G in only part of the year of the election rather than over the entire year. For the 1948–1976 part of the sample period, quarterly data on G are available, and from these data three variables were constructed:[11] the growth rate of G (at an annual rate) in the first three quarters of the election year, in the second and third quarters, and in the third quarter only. Three equations were then estimated. For each equation, M_j was taken to be $\gamma_0 + \gamma_1 X_j$, where X_j for the 1948–1976 period is one of the three variables and for the 1916–1944 period is g_{1j}. It did not seem sensible to try to estimate the equation only over the 1948–1976 period, and so for each of the three variables the data on g_{1j} were used for the period prior to 1948. The variable that led to the best fit of the three was the growth rate of G in the second and third quarters of the election year. The estimates using this variable are presented in equation 6 in table 2. The fit of this equation is slightly better than the fit of equation 1 in table 2, where g_{1j} is used for the entire sample period, but the results are very close. The evidence is clearly not strong enough to allow one to choose between the two measures.

Two further points about the estimates of the model should be made. First, an equation like 1 in table 2 does not fit very well the period prior to 1916. In particular, the elections of 1892, 1904, and 1908 are not explained well. As can be seen from table 1, g_{1j} was large in 1892 and yet the incumbent party lost, whereas g_{1j} was small (and negative) in 1904 and 1908 and yet the incumbent party won. When equation 1 in table 2 was estimated for the 1896–1976 period, the estimate of γ_2 dropped to 0.0073 (from 0.0116) and the standard error of the equation (S.E.) increased to 0.0524 (from 0.0421). The Chow test rejected at the 95% confidence level the hypothesis that the coefficients are the same in the two periods, 1896–1912 and 1916–1976. Although this latter result should be interpreted with some caution because of the nonlinearity of the model, it does seem clear that the period prior to 1916 is not well explained by an equation like 1 in table 2.

The second point concerns the fit of the equation over the sample period. The predicted values of V_t from equation 1 in table 2 are presented at the bottom of the table.[12] As can be seen, most elections are predicted quite well. Every election is predicted correctly regarding who would win except the elections of 1968 and 1976. The largest two errors occur for the last two elections, where the equation underpredicts the votes for Nixon in 1972 and overpredicts the votes for Ford in 1976. The conditions in 1972 and 1976 were about the same (similar values of g_{1j} and the incumbent himself running for election), and so the equation predicts similar values for V_t in the two elections. In fact, of course, Nixon won by a large amount, whereas Ford lost by a little.[13]

Although the error for 1976 is the largest one, it is still less than two estimated standard errors away from zero. The error does not seem large enough to refute an equation like 1 in table 2. If, however, Carter had won by a landslide, as some were predicting in the summer of 1976, this may have been enough in itself to eliminate the equation from further consideration. It is interesting to note that equation 6 in table 2, which uses as the measure of performance the growth rate of G

[11] The sources for the quarterly data on G are described in the appendix.

[12] The estimated value of λ was used, whenever appropriate, in computing these predicted values.

[13] About a year before the 1976 election I made a prediction that the Republican candidate would win the election with about 56% of the two-party vote ($V=0.44$). This prediction, which was fairly widely quoted, was made using an equation similar to equation 1 in table 2 and a value of g_{1j} that turned out to be fairly accurate. I am still living this one down.

in the second and third quarters of the election year, makes a smaller error in 1976 than does equation 1 (-0.058 versus -0.071). As can be seen in table 1, the growth rate in the second and third quarters was lower in 1976 than it was in 1972, whereas the growth rate over the entire year was slightly higher in 1976 than it was in 1972. Equation 6 predicts a larger percentage of the vote for Nixon in 1972 than it does for Ford in 1976, whereas equation 1 predicts about the same percentage in both years, and so equation 6 makes smaller errors in 1972 and 1976 than does equation 1.

As a last comment, it is also interesting to note that the error for 1956 is less than the error for 1952, which in part is explained by the fact that the same candidates ran in both elections and so there was considerable information on the error term in the 1952 election that could be used to help explain the 1956 election.[14]

IV. Conclusion

The main conclusions to be drawn from the results in the previous section are the following:

1. Economic events as measured by the change in real economic activity in the year of the election do appear to have an important effect on votes for president. It does not matter much whether this change is measured by the growth rate of real per capita GNP or by the change in the unemployment rate, although the former gives slightly better results than does the latter. Similar results were also obtained using the growth rate of real per capita GNP in the second and third quarters of the election year. There are, however, not enough observations available to be able to draw any definitive conclusions about the exact period within the year that the voters consider.
2. The other 14 measures of performance considered in the basic tests contributed little to the explanation of V_t. The best of these measures was the absolute value of the growth rate of the GNP deflator in the two year period before the election, which in equation 4 in table 2 has a t-value of -0.98. The only other measure that was a possible candidate for inclusion in the model was the change in AF/POP, a proxy for U.S. involvement in wars, in the year of the election, which in equation 5 in table 2 has a t-value of -1.21. The four unemployment rate variables that measured *the level* of economic activity gave the poorest results of all the measures.
3. Voters appear to have a very high discount rate, probably infinite. The unconstrained estimates of η were either negative, in which case the estimates were constrained to zero, or quite small.
4. The hypothesis that $\beta_1 = \beta_3$ was accepted.

Conclusion 1 is contrary to Kramer's results for presidential elections, but, as mentioned above, Kramer's negative results for presidential elections are probably due to the constraints he imposed on the presidential equation. Conclusion 2 is drawn after a fairly extensive and systematic search for other measures of performance, both with respect to levels versus changes and with respect to different periods within the basic four-year period. Both conclusions 1 and 3 are consistent in that they imply that voters do not look back very far. The conclusions say that the voters do not consider the past performance of the non-incumbent party and with respect to the incumbent party consider only the events within the year of the election. In terms of the general model in section II, the above conclusions support the special case of Kramer's model.

The limitations of the empirical work in section III are obvious. The results are based on only 16 observations; the equations do not fit the data well prior to 1916; and the two largest errors have occurred for the last two elections. There is also clearly a severe restriction regarding the amount of information that can ever be extracted from aggregate time-series data of the kind used in this study. Even given these limitations, however, the evidence behind the above conclusions does seem to warrant some support. Whether the conclusions hold up as more data become available is, of course, unknown. At the least, however, it is hoped that the general model

[14] If Carter and/or Ford are candidates in 1980, then there will, of course, be more information available for predicting the election than otherwise because of the available information on the 1976 error term.

developed in section II has put the disagreements in the literature in a better perspective and that it provides a useful framework for testing alternative theories.

DATA APPENDIX

The data on G, U, and P that were used in this study are presented in table A. For the data on U, the Lebergott series in U.S. Bureau of Economic Analysis (BEA) (1973, pp. 212–213) was used between 1890 and 1928 and the Bureau of Labor Statistics (BLS) series in BEA (1973, p. 213) was used between 1929 and 1970. The data for 1971 through 1976 were obtained from recent issues of *Economic Indicators* (*EI*). The data on G were obtained as follows: for 1976 from available data in *EI*; for 1947–1975 from the data in the July 1976 issue of *Survey of Current Business* (*SCB*), p. 67; for 1929–1946 from the corrected data in the September 1976 issue of *SCB*, p. 50; for 1909–1928 from the data on the BEA series in BEA (1973, pp. 182–183); and for 1889–1908 from the data on the Kendrick series in BEA (1973, p. 182). The BEA series in BEA (1973) was multiplied by 1.545 to splice it to the more recent data, and the Kendrick series in BEA (1973) was multiplied by 1.585 to splice it to the more recent data. The data on P were obtained as follows: for 1973–1976 from recent issues of *SCB*; for 1947–1972 from the January 1976 issue of *SCB*, Part II, pp. 84–85; for 1929–1946 by dividing the series on current-dollar GNP in the July 1976 issue of *SCB*, p. 67, by G; and for 1889–1928 from the data on the Kendrick series in BEA (1973, pp. 222–223). The Kendrick series was multiplied by 0.670 to splice it to the more recent data.

TABLE A.—THE DATA ON G, U, AND P
G = real per capita GNP (1972 dollars)
U = civilian unemployment rate
P = GNP deflator (1972 = 100.0)

Year	G	U	P	Year	G	U	P
1889	1276	N.A.	16.82	1933	1767	24.9	25.13
1890	1342	4.0	16.48	1934	1893	21.7	27.26
1891	1374	5.4	16.21	1935	2048	20.1	27.78
1892	1477	3.0	15.61	1936	2310	16.9	27.97
1893	1377	11.7	15.95	1937	2402	14.3	29.31
1894	1314	18.4	14.94	1938	2286	19.0	28.61
1895	1442	13.7	14.74	1939	2440	17.2	28.40
1896	1387	14.4	14.34	1940	2601	14.6	29.10
1897	1491	14.5	14.41	1941	2973	9.9	31.48
1898	1496	12.4	14.87	1942	3371	4.7	34.83
1899	1606	6.5	15.34	1943	3857	1.9	36.40
1900	1620	5.0	16.08	1944	4097	1.2	37.12
1901	1774	4.0	15.95	1945	3995	1.9	37.97
1902	1755	3.7	16.48	1946	3374	3.9	43.92
1903	1808	3.9	16.68	1947	3249	3.9	49.70
1904	1751	5.4	16.88	1948	3326	3.8	53.13
1905	1845	4.3	17.22	1949	3289	5.9	52.59
1906	2021	1.7	17.69	1950	3517	5.3	53.64
1907	2015	2.8	18.43	1951	3737	3.3	57.27
1908	1813	8.0	18.29	1952	3813	3.0	58.00
1909	1995	5.1	18.89	1953	3897	2.9	58.88
1910	2009	5.9	19.43	1954	3779	5.5	59.69
1911	2027	6.7	19.30	1955	3962	4.4	60.98
1912	2110	4.6	20.10	1956	3976	4.1	62.90
1913	2087	4.3	20.23	1957	3976	4.3	65.02
1914	1958	7.9	20.44	1958	3902	6.8	66.06
1915	1913	8.5	21.11	1959	4069	5.5	67.52
1916	2035	5.1	23.72	1960	4078	5.5	68.67
1917	2022	4.6	29.28	1961	4112	6.7	69.28
1918	2273	1.4	34.17	1962	4284	5.5	70.55
1919	2165	1.4	34.97	1963	4390	5.7	71.59
1920	2032	5.2	39.87	1964	4557	5.2	72.71
1921	1818	11.7	33.97	1965	4765	4.5	74.32
1922	2078	6.7	32.16	1966	4991	3.8	76.76
1923	2290	2.4	32.96	1967	5071	3.8	79.02
1924	2240	5.0	32.56	1968	5241	3.6	82.57
1925	2393	3.2	33.17	1969	5323	3.5	86.72
1926	2500	1.8	33.30	1970	5248	4.9	91.36
1927	2463	3.3	32.50	1971	5349	5.9	96.02
1928	2447	4.2	32.76	1972	5608	5.6	100.00
1929	2582	3.2	32.88	1973	5869	4.9	105.80
1930	2315	8.7	31.79	1974	5729	5.6	116.41
1931	2121	15.9	28.90	1975	5580	8.5	127.25
1932	1815	23.6	25.67	1976	5880	7.7	133.79

Note: N.A. = not available.

The series on V that is presented in table 1 of the main text was computed from the data in Bureau of the Census (1973, p. 364), in Bureau of the Census (1960, p. 682), and in the December 13, 1976 issue of the *New York Times*.

The quarterly series on G that was used in some of the empirical work was constructed from data in recent issues of *SCB*, starting with the January 1976 issue. The series on AF/POP that was also used in some of the empirical work was obtained as follows. The data on AF between 1896 and 1960 were taken from Lebergott (1964), tables A-3 and A-15, and between 1961 and 1976 from recent issues of *EI*. The data on *POP* between 1890 and 1959 were taken from BEA (1973, pp. 200–201), between 1960 and 1969 from Bureau of the Census (1974), table 2, and between 1970 and 1976 from recent issues of *EI*.

REFERENCES

Arcelus, Francisco, and Allan H. Meltzer, "The Effect of Aggregate Economic Variables on Congressional Elections," *The American Political Science Review* 69 (Dec. 1975a), 1232–1239.

———, "Aggregate Economic Variables and Votes for Congress: A Rejoinder," *The American Political Science Review* 69 (Dec. 1975b), 1266–1269.

Bloom, Howard S., and H. Douglas Price, "Voter Response to Short-Run Economic Conditions: The Asymmetric Effect of Prosperity and Recession," *The American Political Science Review* 69 (Dec. 1975), 1240–1254.

Downs, Anthony, *An Economic Theory of Democracy* (New York: Harper and Row, 1957).

Goodman, Saul, and Gerald H. Kramer, "Comment on Arcelus and Meltzer," *The American Political Science Review* 69 (Dec. 1975), 1255–1265.

Kramer, Gerald H., "Short-Term Fluctuations in U.S. Voting Behavior, 1896–1964," *The American Political Science Review* 65 (Mar. 1971), 131–143.

Lebergott, Stanley, *Manpower in Economic Growth: The American Record Since 1800* (New York: McGraw-Hill Book Co., 1964).

Lepper, Susan J., "Voting Behavior and Aggregate Policy Targets," *Public Choice* 18 (Summer 1974), 67–81.

Okun, Arthur M., "Comments on Stigler's Paper," *The American Economic Review* 63 (May 1973), 172–177.

Stigler, George J., "General Economic Conditions and National Elections," *The American Economic Review* 63 (May 1973), 160–167.

Tufte, Edward R., "Determinants of the Outcomes of Midterm Congressional Elections," *The American Political Science Review* 69 (Sept. 1975), 812–826.

U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957* (Washington, D.C., 1960).

———, *Statistical Abstract of the United States: 1973*, 94th edition (Washington, D.C., 1973).

———, *Population Estimates and Projections*, Current Population Reports, Series P-25, No. 521, May 1974.

U.S. Bureau of Economic Analysis, *Long Term Economic Growth 1869–1970* (Washington, D.C., 1973).