FISCAL POLICY, ECONOMIC CONDITIONS, AND TERMS IN OFFICE: SIMULATING PRESIDENTIAL ELECTION OUTCOMES

Alfred G. Cuzán
Department of Government
The University of West Florida
Pensacola, FL 32514
acuzan@uwf.edu

Richard J. Heggen
Department of Civil Engineering
The University of New Mexico
Albuquerque, NM

and

Charles M. Bundrick
Department of Mathematics and Statistics
The University of West Florida
Pensacola, FL 32514

Abstract

This paper reports on a set of simulations of a fiscal model of American presidential elections previously developed by the authors in which, independently of economic conditions, fiscal expansion and consecutive terms in office combine to reduce the percent of the two-party vote going to the incumbents, thus contributing to their defeat. The model adequately fits the data on all thirty elections held since 1880. The purpose of the simulations is to explore important attributes of the model not readily apparent in the historical data. The model views voters as averse but incumbents as favorably inclined to fiscal expansion. Theoretically, the confluence of these contrary currents should give rise to a fiscal-electoral cycle. To see if this is the case, 1,000 elections are simulated. Two feedback loops are observed, the joint operation of which results in the expected fiscal-electoral cycle. The cycle places a natural limit on the number of consecutive terms a party will remain in control of the White House. These findings suggest crucial behavioral differences between democracies and dictatorships.

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Alfred G. Cuzán, Richard J. Heggen, and Charles M. Bundrick
Department of Government, The University of West Florida, Pensacola, FL 32514

This paper reports on a set of simulations of a fiscal model of American presidential elections previously developed by the authors in which, controlling for economic conditions, fiscal expansion and consecutive terms in office combine to reduce the percent of the two-party vote going to the incumbents, thus contributing to their defeat. The model adequately fits the data on all thirty elections held since 1880. The purpose of the simulations is to explore important attributes of the model not readily apparent in the historical data. The model posits that, on the one hand, voter support for the incumbents is a negative function of fiscal expansion and, on the other, that the governing party wishes manage the biggest budget voters will buy. In other words, elections are viewed as the moment when tight-fisted voters settle accounts with open-handed incumbents. Theoretically, the confluence of these contrary currents should give rise to a fiscal-electoral cycle. To see if this is the case, 1,000 elections are simulated. Two feedback loops are observed, the joint operation of which results in the expected fiscal-electoral cycle. The cycle places systemic limits on the number of consecutive terms a party will remain in control of the White House. These findings suggest crucial behavioral differences between democracies and dictatorships.

Keywords: fiscal policy, presidential elections, simulations

INTRODUCTION

Computer simulation is an increasingly common tool in political science. Preliminary survey of the literature reveals that among the phenomena explored with this method are the allocation of campaign resources by American presidential candidates (Gurian, 1993), the effect of presidential performance on the electoral success of governors of the same party (Simon, 1989), the likelihood that voters will split their votes for president and congress (Alessina and Rosenthal, 1995), the probability of amending the U.S. constitution under different rules and opinion distributions across small and large states (Whicker and Strickland, 1990), the effect of perceived leadership on the part of a British prime minister on the popularity of the government (Jones and Hudson, 1996), the impact of random shocks on the survival of cabinet governments in Ireland and Germany (Laver and Shepsle, 1998), the representativeness of Canadian parliamentary electoral rules (Weaver, 1997), relations between the legislature and autonomous agencies in Costa Rica (Taylor, 1995), and the rise and decline of hegemony in interstate relations (Cusack and Zimmer, 1989, Simon and Starr, 1996).

This article reports on another such exercise, one used to simulate the behavior of a model of U.S. presidential elections previously developed by the authors (Cuzán and Heggen, 1984, Cuzán and Heggen, 1985, Cuzán and Bundrick, 1992, Cuzán and Bundrick, 1996, Cuzán and Bundrick, 1999, Cuzán and Bundrick, 2000). The model uses fiscal policy, economic conditions, and the number of consecutive terms in the White House to account for the percent of the two-party vote going to the incumbents over thirty presidential elections held since 1880. The model fits the data rather well (R^2=.75). Thirty elections, however, is a small number. The purpose of this simulation, the product of interdisciplinary collaboration (one author each from political science, civil engineering, and statistics), is to explore attributes of the model not readily apparent in the historical data.

THE MODEL

TABLE 1. Variable Definitions and Measurements describes nine variables used to construct our presidential election model. The percent of the two-party vote going to the incumbents (VOTE2) constitutes the dependent variable. To estimate it, initially five "explanatory" or "predictor" variables are used: FISCAL, TERMS, GROWTH (g3), INFLATION (p15), and PRESIDENT. The last four, albeit in varying specifications, are standard in presidential election models (see, e.g., the collection of articles in Garand & Campbell, 1996). *Ceteris paribus*, the better the economy performs in terms of growth (high) and inflation (low), the higher the vote going to the governing party. Also, other things equal, the longer the incumbents occupy the White House, the more voters come to believe that it is "time for a change" (Abramowitz, 1996, 436). Finally, it is believed that, whether the president himself is running for election is an important forecasting "key" (Campbell, 1996, 424).

What makes our model different from most other models of American presidential elections is the incorporation of fiscal policy as one of the predictors.[1] FISCAL, a binary variable, is constructed from three measures of federal government spending relative to the economy: F and its derivations, F' and F''. F is the percent of Gross National Product spent by the federal government; F' is the percent change in F between presidential election years; and F'' is the arithmetic change in F' between election years. F' and F'' combine to make up FISCAL. When F' is positive and F'' is not negative, it means that, compared to the previous presidential term, spending has gone up at either the same or faster rate. This amounts to an *expansionary* fiscal policy. By contrast, fiscal policy is *cut-back* if either F' or F'' is negative; even if F' is positive, a negative value for F'' means that, compared to the preceding term, the growth in spending has slowed down, i.e., there has been a fiscal deceleration. There is a third possibility, that of

[1]1. To the best of our knowledge, only Niskanen (1975, 1979) and Peltzman (1990, 1992) explore the impact of fiscal policy (measured as changes in real per capita federal expenditures) on the presidential incumbent's vote, the former over the 1896-1972 period and the latter after World War II.

a steady-state policy, but since it is not present in the data (see **APPENDIX 2. Data: 1880-1996**) we shall ignore it.

TABLE 1. Variable Definitions and Measurements

Variable	Definitions and measurements
VOTE2	Percent of the two-party vote going to the incumbent party candidate (adapted from Fair 1996).
GROWTH (g3)	The annualized rate of growth of real per capita GDP through the first three quarters of the presidential election year (borrowed from Fair (1996).
INFLATION (p15)	The annualized rate of growth of the GDP price index in the first fifteen quarters of the presidential term (borrowed from Fair 1996).
PRESIDENT (PRE)	PRESIDENT = 1 if president ran for reelection. PRESIDENT = 0 if president did not run.
TERMS (T)	Number of consecutive terms by presidents of the same party.
F	Federal spending as a percent of Gross National Product. $F = \frac{\text{Federal outlays}}{\text{GNP}} \times 100$
F'	Percent change in F between presidential election years. $F' = \frac{F_t - F_{t-1}}{F_{t-1}}$ where t is an election year and t-1 the previous election year.
F''	The arithmetic change in F' between presidential election years. $F'' = F'_t - F'_{t-1}$
FISCAL	Fiscal policy implemented during a presidential term: expansionary (1), cut-back (-1), or steady-state (0). FISCAL = 1 if $F'>2$ *and* $-2 \leq F''$ FISCAL = -1 if $F'<-2$ or $F''<-2$ FISCAL = 0 if $-2 \leq F' \leq 2$ and $-2 \leq F''$

Analogizing from economics, we assume that voters view the federal government as a supplier of a bundle of goods and services, the price of which is indicated by the share of the economy absorbed by federal spending. (On model-building by analogy, see Morris, 1970; see also Downs, 1957.) Naturally, voters want to keep this "price" down. In another economic parallel, in response to shocks or slowly-changing attitudes, from time to time voters are willing to spend more to enlarge the bundle or increase the quality of goods and services procured through the federal government (this is what economists call a shift in the demand schedule). Even in those circumstances, however, voters remain unwilling to spend more than necessary to satisfy their wants. There being only one federal government, the electorate has no competing supplier of services against which to compare "prices" (although they do at the sub-national level--see Besley & Case, 1995). What can be done, however, is to observe whether the federal share of the economy has risen or fallen, or gone up faster or more slowly between presidential election years. (On political parallels for market information, see Wittman, 1995.) Accordingly, we hypothesize that, depending on whether the former or the latter comparison is relevant, a majority of voters will turn out incumbents who preside over an unambiguous increase in federal spending and reelect those who reduce it or slow down budgetary growth. In this interpretation, voters view the president as the federal "manager," held accountable for keeping the cost of Washington down. If, during his watch, fiscal policy has been expansionary, the president is "fired" or his party's nominee not "hired." On the other hand, if fiscal policy has been cut-back, the incumbents are granted another four-year lease on 1600 Pennsylvania Avenue.

For their part, incumbents (the president and his team, who constitute the governing party) are presumed to want to spend as much as the voters will allow. In other words, their objective is to administer the biggest budget that is consistent with reelection. This is comparable to a firm charging the highest price the market will bear. Greater spending is desirable for a number of reasons. Existing law provides for automatic increases for many programs. To counter budgetary inertia, the administration would have to overcome resistance to changing the law on the part of those claiming to represent that portion of the population likely to lose anticipated benefits. This is costly. On the other hand, a larger budget allows the incumbents to appease groups clamoring for more resources for their pet programs, to bargain for congressional support for the president's agenda, and to put their own imprint on public policy. In sum, incumbents are prone to increase federal spending. But budget maximization is not unconstrained. There is utility to be derived from exercising the powers of the presidency, i.e., occupancy of the White House is an end in itself. Since continuing control is contingent on obtaining a majority of the two-party vote at the next election, it is assumed that the governing party seeks to discover how big a budget the voters will "buy." With every additional term in office, the incumbents become more confident, hence more willing to probe the fiscal limits of the electorate.

Having defined and laid out the logic of the fiscal-electoral behavior that is at its core, we estimate the following Ordinary Least Squares model of the incumbents' vote:

$$VOTE2 = {}_0 + b_1FISCAL + b_2GROWTH + b_3INFLATION + b_4TERMS + b_5PRESIDENT +$$

where all variables are defined and specified as shown in **TABLE 1. Variable Definitions and Measurements**, $b_1, \ldots, b_5$ are coefficients, ${}_0$ is a constant (intercept), and is an error term mimicking randomness in the data.

TABLE 2. OLS Estimates of VOTE2: 1880-1996 displays the Ordinary Least Squares estimates of the incumbents' share of the two-party vote. Note that all variables but one are statistically significant in the expected direction: negative with FISCAL, INFLATION and TERMS, and positive with GROWTH. As expected, a policy of fiscal expansion is costly,

TABLE 2. OLS Estimates of VOTE2: 1880-1996
(t-statistics in parentheses)

FISCAL	-2.50***
	(-3.72)
TERMS	-1.35***
	(-2.69)
GROWTH (g3)	0.44***
	(3.63)
INFLATION (p15)	-0.51**
	(-2.49)
PRESIDENT	1.45
	(0.96)
Intercept	55.84***
	(28.50)
SEE	3.4
N	30
R^2	0.75
Adj. R^2	0.70
D.W.	2.41

*** Significant at p<.01, two-tailed test.
** Significant at p<.05, two-tailed test.

electorally speaking, to the incumbents. (For similar findings, see Niskanen, 1975, Niskanen, 1979, Peltzman, 1990, and Peltzman, 1992). Also, when the economy is doing well the governing party reaps electoral rewards. Finally, the longer they have occupied the White House, i.e., the more extended their "reign," the lower the incumbents' vote. However, contrary to what some believe (see, e.g., Campbell, 1996), whether the president himself is running for reelection makes no difference. As we have shown elsewhere (Cuzán and Bundrick, 1999, Cuzán and Bundrick, 2000), this is because incumbency is confounded with FISCAL. Statistically, what accounts for the electoral success of sitting presidents is the fact that most of them have pursued a cutback fiscal policy. Thus, when fiscal policy is controlled for, the alleged advantages of presidential incumbency evaporate.[2]

That first-term presidents tend to be fiscally cautious is consistent with the logic of our model. If, as assumed, an objective of the governing party is to retain control of the White House; and if, as hypothesized, fiscal expansion is hazardous to incumbent reelection, one would expect a new administration to be fiscally restrained. After one or two reelections, the incumbents, feeling more secure, would tend to push the fiscal-electoral envelope, probing how much more they could spend while keeping their lease on the White House. Yet, in previous efforts we failed to find over the entire data series a relationship between election outcome and fiscal policy during the subsequent term (Cuzán and Heggen, 1984, Cuzán and Bundrick, 1996). However, a pattern consistent with expectations emerges if we focus not on election outcome, but on terms, and on the period beginning with 1932. That year federal spending relative to GNP broke out of the 2-3 percent range within which it had been confined (except during World War I) for most of the period ending in 1928, eventually to climb to about 23 percent by the early 1980s (see **APPENDIX 2. Data: 1880-1996**).

As **TABLE 3. Fiscal Policy by Terms in Office: 1932-1996** shows, all but one of the first-term presidents pursued a cutback policy. By a better than a two-to-one ratio, however, presidents in the second or later term of their party's reign implemented an expansionary policy. Since 1932, then, first-term administrations tend to hold the line on spending while those coming later in their party's reign are prone to let go of the budgetary reins. Thus, the period during which F experienced something like what Ashby (1960, 90) calls "step-function" increases in value shows characteristics that are

[2]1. Parenthetically, not only president, but a host of other variables also proved to be statistically insignificant when included as a fifth variable in the model. These are: unemployment, a misery index obtained by adding inflation and unemployment, an interaction term of inflation and growth, deficit spending as a percent of the budget, the outcome of the previous mid-term election for the president's party, the president party's representation in the House of Representatives, and war years, as specified by either Fair (1996) or Niskanen (1975). Neither did we find evidence of a non-linear relationship between GROWTH or INFLATION and VOTE, nor that FISCAL is a function of GROWTH. Finally, inspection of the residuals reveals a random distribution, suggesting that the model is not misspecified

consistent with the operation of a feedback mechanism, a feature to be explored in the computer simulations presented in the next section.

TABLE 3. Fiscal Policy by Terms in Office: 1932-1996

	TERM		
FISCAL POLICY	1st	2nd or later	Total
Cut-back	6	3	9
Expansionary	1	7	8
Total	7	10	17

Statistically significant at = .05 level, using Fisher's Exact Test of Independence.

COMPUTER SIMULATIONS

The simulation approach presented here has its roots in the field of water resources systems engineering. This is a discipline in which the interactive complexities of the hydrological system, where natural processes interact which human management and stochastic data, preclude simplistic, explicitly deterministic solutions (Mays, 1997). Mathematical simulation has been used in water resources engineering for approximately thirty years. Here we apply simulation techniques developed in that field to the political model presented in the previous section.

System simulation is a sequential process. At every step, each of the model's predictor variables is estimated. A "correct" sequence is not always obvious. There is unavoidable arbitrariness involved in the choice of steps. Process in a hydrological model generally starts with rainfall, proceeds through a specified series of abstractions (interception, infiltration, detention, etc.), then passes through a series of hydraulic determinations (overland flow, channel wave routing, etc). Flow then may be subject to physical and operational reservoir rules (evaporation, seepage, release for downstream users, etc.) and finally to apportionment to competitive water needs, the order of satisfaction perhaps set by location, perhaps by law. Watershed runoff may be the final dependent variable in the hydrological model.

Similarly, a simulation of our presidential election model is built in steps. It is assumed that, at the beginning of every term, fiscal policy (FISCAL) is set contingent on the results of the past election (as reflected by TERMS). Economic growth (g3) and inflation (p15) are added in steps two and three, respectively. The percent of the two-party vote going to the incumbents at the end of term election (VOTE2) is the ultimate dependent variable. Fiscal and electoral parameters were estimated in a step-wise sequence leading up to a full model fitting the historical data. This could be sequenced in a number of ways. We experimented with several versions. Initially, in the first step we estimated FISCAL as a function of TERMS, then GROWTH (g3) as a function of FISCAL and

TERMS, and INFLATION (p15) as a function of the other three. (The variable PRESIDENT, statistically not significant in the model, was omitted.) Of these steps, only the first has a basis in the historical record and then only since 1932. Apart from that, there are no statistically significant correlations among these four independent variables. Thus, in a different simulation structure, we tried a different design, one where only FISCAL is estimated as a function of TERMS, but GROWTH and INFLATION are randomized, i.e., externalized.

In neither hydrology nor our model does a simulation process predict exact sequences, but both approaches illustrate the statistical family of probable outcomes. The investigator may be interested in just the mean or mode. What is the average water yield? What is the average vote or average number of consecutive terms for the incumbents? Or, the investigator may be interested in the rarer, but possible, statistical tails. In hydrology, what is the probability that a spillway is overtopped? In politics, what is the likelihood that the incumbents will hold on to the White House for five consecutive terms? Neither 40 years of streamflow nor 30 elections will tell the story. A simulated "sample" of 1,000 observations reveals a distribution that is closer to our model's and, hopefully, to reality.

As noted above, we experimented with several simulations of the political model presented in **TABLE 2. OLS Estimates of VOTE2: 1880-1996**. The simulations were run as two pairs, A and B, reproducing the 1880-1996 and the 1932-1996 historical pattern, respectively. The difference within the members of each pair is that, in A1 and B1, GROWTH and INFLATION are endogenous while in A2 and B2 they are treated as exogenous variables. Simulation specifications, and their similarities and differences, are summarized in **APPENDIX 1. Simulation Structures**.

The historical and simulated variable means and variances are shown in **TABLE 4. Historical and Simulated Variable Means, All Structures**. As would be expected, the mean and variance of all values in Simulations A1 and B1 track those of the historical data a bit closer than those of A2 and B2, where, as noted earlier, growth and inflation are randomized. Interestingly, the means for VOTE2 in all simulations is within less than one percent point of the historical value (52.0). So all simulations coincide almost exactly with history in the final result, the measure of incumbent electoral support. Similarly, by and large, save two important exceptions noted below, the several simulation structures produced consistent results.

Simulating American Presidential Elections
TABLE 4. Historical and Simulated Variable Means, All Structures

	Simulations				History	
	Type A1		Type A2		1880-1996	
Variable	Mean	Variance	Mean	Variance	Mean	Variance
FISCAL	-0.14	0.981	-0.096	0.992	-0.133	1.016
GROWTH	0.347	34.568	0.277	34.35	0.327	33.33
INFLATION	3.714	12.491	4.010	11.949	3.906	11.546
TERMS	2.259	1.838	3.015	6.071	2.167	2.006
VOTE2	52.199	42.830	52.158	31.101	52.373	38.464

	Simulations				History	
	Type B1		Type B2		1932-1996	
Variable	Mean	Variance	Mean	Variance	Mean	Variance
FISCAL	-0.020	1.001	-0.04	0.999	-.06	1.06
GROWTH	1.67	34.79	0.023	32.211	1.86	32.33
INFLATION	4.487	8.562	3.841	12.326	4.328	7.25
TERMS	2.179	1.268	2.159	1.419	2.059	1.43
VOTE2	52.433	43.593	51.682	32.719	52.806	42.04

TABLE 5. Simulation A1: Mean Values, All Variables displays the results for Simulation A1, the very first structure tried. 1,000 simulated elections yielded a total of 374 reigns, a reign being a set of consecutive terms. Note that the mean values for FISCAL, GROWTH (g3) and INFLATION (p15) in each of the cells mirror their respective historical impact on VOTE2. That is, on average, administrations that pursued a cutback policy and presided over a growing economy with low inflation were reelected, and those that pursued an expansionary policy and were plagued by negative growth and high inflation were defeated. Note, also, that, among reigns of more than one term, the general tendency is for the mean value of VOTE to decline with every term. These patterns were replicated in all other simulations, with one interesting exception. In Simulations A2, B1, and B2, a few cells where GROWTH trumped FISCAL were observed. That is, strong growth--usually in the order of 3.0 or higher--was conducive to reelection despite a policy of fiscal expansion. Every one of these instances occurred among reigns of five or more terms, which comprise 15 percent or less of

TABLE 5. Simulation A1: Mean Values, All Variables

REIGN		TERM						N	%
1		1	2	3	4	5	6		
	FISCAL	0.76						115	31
	G3	-4.76							
	P15	5.97							
	VOTE	46.43							
2	FISCAL	-0.43	0.63					80	21
	G3	1.94	-3.43						
	P15	3.33	5.92						
	VOTE	56.43	45.96						
3	FISCAL	-0.32	-0.26	0.39				76	20
	G3	2.2	2.77	-3.05					
	P15	3.61	2.99	6.07					
	VOTE	56.23	55.71	45.18					
4	FISCAL	-0.57	-0.65	-0.57	0.43			46	12
	G3	2.12	2.65	3.69	-1.67				
	P15	2.48	2.92	2.50	5.61				
	VOTE	57.66	56.25	55.26	44.16				
5	FISCAL	-0.42	-0.58	-0.79	-0.84	0.32		38	10
	G3	2.91	2.97	2.59	4.15	-1.80			
	P15	3.11	3.23	2.24	3.07	4.30			
	VOTE	57.16	56.17	55.07	54.47	44.59			
6	FISCAL	-0.33	-0.67	-0.50	-0.83	-1.0	0.50	12	3
	G3	3.46	2.01	3.36	4.87	5.06	0.31		
	P15	3.72	4.88	2.91	2.03	1.84	5.61		
	VOTE	56.87	54.98	56.08	55.71	54.14	43.48		
ALL								374	100

the total in every simulation, i.e., they are found at the tail end of the distribution. In that range, a very robust economy will override fiscal expansion, allowing reelection.

TABLE 6. Percent Breakdown of Reigns by Number of Terms compares the distribution of reigns by the number of terms across all four simulations and history. All simulations match the historical record, there being no instance of a statistically significant difference between any of the simulated results, on the one hand, and history, on the other. In all simulations, as well as in history, fewer than 10 percent of all reigns are longer than five terms. The mode falls between one and two terms, and the average approximates three terms.

TABLE 6. Percent Breakdown of Reigns by Number of Terms

	Simulations				History[1]
Reigns	A1	A2	B1	B2	
One-termers	31	41	19	21	31
Two-termers	21	19	28	31	31
Three-termers	20	18	27	26	15
Four-termers	12	8	18	15	8
Five-termers	10	6	7	5	8
Cumulative	94	92	99	98	93
Mode	1 term	1 term	2 terms	2 terms	1.5 terms
Average Reign	2.7	3.1	2.7	2.6	2.6
N =	374	323	366	379	13
Fisher's Exact Test[2] (two-tailed)	0.96	0.86	0.25	0.43	

Notes:
1. Through 1992 only. The current reign, presently presided by Mr. Clinton, being on-going and hence of indeterminate length, is excluded.
2. The values in the bottom row refer to the probability that the distribution of reigns in the respective simulation is no different than that of history. In no case can the null hypothesis be rejected.

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An important difference between Type A and Type B simulations is that, in the latter, both one- and six-or-more termers comprise a smaller percent of all reigns. Recall that the steps in Type B simulations are based on a regression model using the 1932-1996 data. This is a period where, as shown in **TABLE 3. Fiscal Policy by Terms in Office: 1932-1996**, a feedback effect from TERMS to FISCAL is observed. That is, first-termers tend to pursue a policy of fiscal cutback, and second or later termers one of fiscal expansion.

The difference in fiscal behavior between Type A and Type B simulations is demonstrated in **TABLE 7. Mean Values of All Variables During the Last Term of a Reign**. The mean values of all variables *during the last term* of each simulated reign, and in history, are compared through reigns of five terms. Note that, in Type B simulations, the mean value of FISCAL rises dramatically across reigns (peaking in the third and fifth terms), indicating a tendency for fiscal policy to be restrained during the first term but more expansive with each additional term in office. No such tendency is observed in either the Type A simulations or the historical record. Nor is there anything like a dramatic change in the mean value of GROWTH or INFLATION with TERMS in any of the simulations or in history. Consequently, in Type B simulations, which replicate historical behavior apparent only since 1932, fiscal policy dynamically molds the shape of the reigns distribution. New presidents implement fiscal cutbacks, and hence are reelected in large numbers. But by the second or third term of their party's reign, presidents switch policy, in the direction of fiscal expansion, and are increasingly likely to do this with every additional term in office. As a result, only a handful of Type B incumbents make it past the fifth term.

CONCLUSIONS

From the foregoing simulation exercise, we draw several conclusions. First, and most significant, is that the simulations of our presidential elections model exhibit negative feedback loops akin to those familiar to economists, biologists, and engineers (Richardson 1991). One loop runs from TERMS to VOTE. Every additional term in office erodes incumbent support, no matter how well the president behaves fiscally or how well the economy performs. Type B simulations include a second feedback loop running from TERMS to FISCAL to VOTE2 (see **Figure 1. Feedback Loops in Fiscal-Electoral System (Type B)**.) The longer incumbents remain in office, the more likely they are to switch to an expansionary fiscal policy. Absent exceptionally good economic growth, this almost invariably guarantees electoral defeat. It appears, then, that TERMS militates against reelection in two ways. Firstly, by causing voter "fatigue" with the governing party. And secondly, by inducing the incumbents to increase spending, which in turn leads the electorate to turn them out of office. While the former effect is well established in the literature, to the best of our knowledge we are the first to identify the operation of a second negative feedback loop, one linking terms in office to fiscal expansion leading to electoral defeat.

Simulating American Presidential Elections
TABLE 7. Mean Values of All Variables During the Last Term of a Reign

Length of reign	Variable	Models				History[1]
		A1	A2	B1	B2	
One-termers	FISCAL	0.76	0.34	0.19	0.06	0.75
	G3	-4.55	-1.88	-3.16	-4.61	-4.08
	P15	5.97	4.68	4.69	4.62	3.55
	VOTE	46.43	45.57	47.15	46.60	47.75
Two-termers	FISCAL	0.63	0.53	0.25	0.25	1.0
	G3	-3.43	-3.37	-2.87	-3.76	-0.83
	P15	5.92	4.93	5.04	4.31	7.42
	VOTE	45.96	45.71	46.56	46.16	46.1
Three-termers	FISCAL	0.39	0.38	0.44	0.60	1.0
	G3	-3.05	-2.70	-2.46	-2.80	-7.05
	P15	6.07	4.74	4.65	5.16	5.2
	VOTE	45.18	46.59	47.95	49.85	44
Four-termers	FISCAL	0.43	0.41	0.45	0.45	-1.0
	G3	-1.67	-3.95	-2.51	-1.68	4.16
	P15	5.61	5.20	5.33	3.88	2.17
	VOTE	44.16	47.89	44.12	45.64	55
Five-termers	FISCAL	0.32	0.22	0.83	0.58	1.0
	G3	-1.80	-3.87	-3.35	0.91	0.91
	P15	4.30	4.76	5.55	4.61	2.256
	VOTE	44.59	46.77	41.51	45.25	45

Notes:
1. Through 1992 only. The current reign, presently presided by Mr. Clinton, being on-going and hence of indeterminate length, is excluded. Please note that, in history, there's only one reign each of four and five terms. Also, in the 1912 election, which put an end to the only four-term reign in history, the incumbent vote split between President Taft and T. R. Roosevelt. Following Fair (1994), the votes of the two candidates are added, but of course Taft lost to Wilson.

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Abstracting from economic conditions, the two feedback loops suggest a fiscal-electoral cycle, something which Lewis-Beck and Rice (1985, 16) had expected to find, but did not. Assume that in their first term in the White House the incumbents adopt a cutback fiscal policy. This gets them reelected. In their second term, they have the choice of sticking to that policy or switching to an expansionary policy. Assume, for the moment, that they stay the fiscal course in the second and subsequent terms. With every additional term in office, their margin of victory becomes smaller and smaller, so that, even if the governing party sticks to a cut-back policy term after term, its candidate eventually loses an election. Typically, however, incumbents do not restrain their spending indefinitely. Rather, by their second or third term they are highly likely to switch policy in the direction of fiscal expansion, which costs them reelection, and the cycle begins anew.

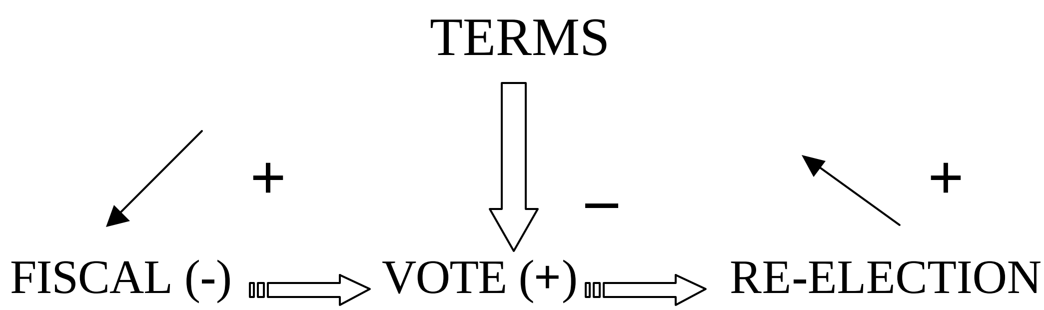

Figure 1. Feedback Loops in Fiscal-Electoral System (Type B)

Thus, the combined effect of these two negative feedback loops is to limit the length of reigns. As we have seen, in all models over 80 percent are ended on the fourth election, and over 90 percent on the fifth. In fact, in Type B simulations, which exhibit both feedback loops, the population of reigns is nearly extinct after five terms. A periodic turnover in the White House, then, is to be expected. What would be extremely rare (we are tempted to say "unnatural") is for a reign to extend beyond six terms. With presidential elections held every four years, that means that, in the nature of things, a quarter century of continuing occupation of the White House by members of the same party is practically impossible. At a minimum, the incumbents will be voted out at least once per generation. Of course, on average, turnover is two to three times more frequent than that.

These findings suggest a tentative (not to say speculative) set of inferences about behavioral differences between democracies and dictatorships. First, it seems to us that incumbency lasting three or more decades is virtually unsustainable by electoral methods. That a party or head of government holds on to power that long amounts, *ipso facto*, to dictatorship. Should the incumbents in such a regime, having had a change of heart, hold a free election and the opposition manage to coalesce in a united front, the latter would win in a landslide. The electoral tidal wave that swept the Polish communists out of office in 1989 (they won only 1 out of 100 contested Senate seats) is an extreme and dramatic case in point. Relatedly, the findings supportive of our assumption that presidents are expenditure-maximizers whose propensity to spend is checked by the desire for reelection leads to another theoretical inference. Only a government which does not have to face voters periodically is free to increase spending at will. In other words, only under a dictatorship strong enough to repress all opposition is it possible to expand the size of government until it absorbs most of the economy, as some communist regimes were able to do for several decades.

These speculations bring us back full circle to our earliest efforts at interdisciplinary collaboration between political science and engineering (Heggen and Cuzán, 1981, Cuzán and Heggen, 1982). They point to an area of future investigation through computer simulation of our model: the behavior of fiscal policy, economic performance, and coercion in long-lasting dictatorships. What, if anything, do long-lived dictatorships have in common with the five- or six-term reigns reported on in this paper? How much electoral support can be inferred from the combined effect of fiscal policy, economic growth, inflation, and the incumbent's time in office in regimes which have been insulated from the voters? How much of the lack of electoral support can be made up by coercion, and what measurable forms does such coercion take?

On the basis of this exercise, we are optimistic about the uses of simulation in political research. Much of political science analyzes phenomena where the N is small (see Ragin, 1987). A simulation allows the investigator artificially to expand the "sample" while retaining the statistical structure of the original data. This in turn permits the identification of patterns which would otherwise have gone unnoticed. This alone is ample justification for promoting simulation of models as an analytic tool in political science.

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APPENDIX 1. Simulation Structures

The simulation progresses through 1000 four-year (presidential term) time steps. One political party is randomly assigned to be in its first term of power at the initiation of the first time step. FISCAL is estimated based on a linear regression as a historical function of TERMS. "Historical" here indicates actual performance, 1880-1996 or 1932-1996, depending upon the model being simulated. A random perturbation, ERROR, is then added to the FISCAL estimate. ERROR describes the spread (variance) of historical data about the best-fit regression line. In this and each subsequent ERROR simulation, a computer generated random number of mean 0 and variance 1 is appropriately scaled to reflect the historical variance.

Next, G3 is estimated based on TERMS and FISCAL. Again an appropriate ERROR is applied to the result, reflecting historical variance about a linear approximation. In a sequential manner, P15 is now estimated from TERMS, FISCAL and G3. Then VOTE2 is estimated from TERMS, FISCAL, G3 and P15. The time step now advances one four-year increment. If VOTE2 exceeds 50 percent, the incumbent party remains in power with TERMS incremented by 1. If VOTE2 does not exceed 50 percent, the opposition party ascends with TERMS reset to 1. The entire sequence is repeated 1000 times, the large number employed to smooth the summary statistics.

I. SIMULATION SPECIFICATIONS, STEPS 1-4

Simulation A1

All coefficients estimated over the entire historical data series, 1880-1996.

Step 1: FISCAL = -0.0464 + (-0.0401)TERMS + N(0,1.05), where N(x,y) is a normalized random error of mean equal to 0 and variance equal to 1.05. In keeping with the binary nature of FISCAL (see **TABLE 1. Variable Definitions and Measurements)**, in this step the value of FISCAL was converted to one for any fraction greater than zero, and to minus one for any fraction less than zero. The same procedure was followed in the other three simulations.

Step 2: G3=0.0309 + (-1.5377)FISCAL + (0.0418)TERMS + N (0, 33.21).

Step 3: P15=4.0995 + (0.6962)FISCAL + (-0.0243)TERMS + (-0.1584)G3 + N (0, 11).

Step 4: Full regression model:

VOTE2=57.1374 + (-2.5784)FISCAL + (-1.5596)TERMS + (0.4627)G3 + (-0.4796)P15 +
N (0, 11.65).

Simulation B1

All coefficients estimated over 1932-1996 period.

Step 1: FISCAL = -0.8718 + (0.3949)TERMS + N (0, 0.891).

Step 2: G3=3.8667+(-0.7974)FISCAL+(-0.9983)TERMS+ N (0, 33.51).

Step 3: P15=3.4840+(-0.0096)FISCAL + (0.4766)TERMS + (-0.0740)G3 + N (0, 8.153).

Step 4: Full Regression Model:
VOTE2= 55.982 + (-1.6051)FISCAL + (-1.6849)TERMS + (0.6361)G3 + (-0.2271)P15 + N (0, 13.297).

Simulation A2
All coefficients are estimated over entire historical data series, 1880-1996.
Step 1: FISCAL = -0.0464 + (-0.0401)TERMS + N (0, 1.05).
Step 2: G3= 0.33 + N (0, 33.293).
Step 3: P15= 3.9 + N (0, 11.546).
Step 4: Full Regression Model:
VOTE2=57.1374 + (-2.5784)FISCAL + (-1.5596)TERMS + (0.4627)G3+ (-0.4796)P15 + N (0, 11.65).

Simulation B2
Coefficients in steps 1-4 are estimated over 1932-1996 period. In steps 2 and 3, the mean and variance of G3 and P15, respectively, over the entire data series are entered.
Step 1: FISCAL = -0.8718 + (0.3949)TERMS + N (0, 0.891).
Step 2: G3= 0.33 + N (0, 33.293).
Step 3: P15= 3.9 + N (0, 11.546).
Step 4: Full Regression Model:
VOTE2= 55.982 + (-1.6051)FISCAL + (-1.6849)TERMS + (0.6361)G3 + (-0.2271)P15 +N (0, 13.297).

II. SUMMARY OF SIMILARITIES AND DIFFERENCES IN SPECIFICATIONS

Simulation structure	Functional Relationships				Time Period
	Step 1	Step 2	Step 3	Step 4	
A1	X	X	X	X	1880-1996 X
B1	X	X	X	X	1932-1996 Y
A2	X	Y	Y	X	1880-1996 X
B2	X	Y	Y	X	1932-1996 Y

Note: Under "functional relationships," simulations sharing an X or a Y have identical procedures in that step, although the time period over which the coefficients are calculated may be different.

APPENDIX 2. Data: 1880-1996
(For variable definitions, see TABLE 1. Variable Definitions and Measurements)

Year	F	F’	F’’	FIS	G3	P15	PRES	T	VOTE
1880	2.5	-26	-15	-1	3.879	1.974	0	5	50
1884	2.3	-8	18	-1	1.589	1.055	0	6	49.8
1888	2.5	9	17	1	-5.553	0.604	1	1	50
1892	2.7	8	-1	1	2.763	2.274	1	1	48
1896	2.9	7	-1	1	-10.024	3.410	0	1	48
1900	2.9	0	-6	-1	-1.425	2.548	1	1	53
1904	2.7	-7	-7	-1	-2.421	1.442	1	2	60
1908	2.6	-4	3	-1	-6.281	1.879	0	3	54
1912	2.0	-23	-19	-1	4.164	2.172	1	4	55
1916	2.8	40	63	1	2.229	4.252	1	1	52
1920	6.7	139	99	1	-11.463	16.535	0	2	36
1924	3.5	-48	-187	-1	-3.872	5.161	1	1	58
1928	3.0	-11	37	-1	4.623	0.183	0	2	59
1932	9.2	207	218	1	-15.574	6.657	1	3	41
1936	11.0	20	-187	-1	12.625	3.387	1	1	62
1940	11.6	5	-15	-1	2.420	0.553	1	2	55
1944	44.3	281	276	1	2.910	6.432	1	3	54
1948	14.9	-66	-347	-1	3.105	10.369	1	4	52
1952	20.7	39	105	1	0.910	2.256	0	5	45
1956	17.1	-17	-56	-1	-1.479	2.132	1	1	58
1960	18.4	8	25	1	0.020	2.299	0	2	49.9
1964	18.6	1	-7	-1	4.950	1.201	1	1	61
1968	20.8	12	11	1	4.712	3.160	0	2	49.6
1972	20.9	0	-12	-1	5.716	4.762	1	1	62
1976	22.6	8	8	1	3.411	7.604	1	2	48.9
1980	21.6	-4	-12	-1	-3.512	7.947	1	1	45
1984	22.6	5	9	1	5.722	5.296	1	1	59
1988	21.1	-6	-11	-1	2.174	3.392	0	2	54

1992	22.1	5	11	1	1.478	3.834	1	3	47
1996	20.2	-9	-14	-1	2.000	2.300	1	1	55

Calculated from the following sources. *Historical Statistics of the United States. Colonial Times to 1970*, (Washington, D.C.: 1975); M. Slade Kendrick, *A Century and a Half of Federal Expenditures* (New York: National Bureau of Economic Research, Inc., 1955); *The National Income and Product Accounts of the United States, 1929-1982,* (Washington, D.C.: 1986); Joint Economic Committee, *Economic Indicators* (various years through 1997); U.S. Department of Commerce publications: *Statistical Abstract of the United States* (Washington, D.C.: various years through 1996); Ray C. Fair, *The Effect of Economic Events on Votes for President: 1992 Update*, Cowles Foundation Discussion Paper No. 1084 (New Haven, CT: Cowles Foundation for Research in Economics at Yale University, October 1994); Ray C. Fair, *Presidential Vote--1996* [on line], available http://fairmodel.econ.yale.edu/vote/vote.htm.