USING TIME-SERIES MODELS TO EXPLAIN AND PREDICT STATE GUBERNATORIAL ELECTION OUTCOMES: AN APPLICATION TO OKLAHOMA

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In Oklahoma gubernatorial elections the candidate of the incumbent governor's party benefits from a healthy state economy, though national economic conditions have little influence. When the President is popular, Oklahoma voters support the gubernatorial candidate of the party not in the White House, evidencing anti-Washington sentiment. A regression model incorporating these influences, along with a control for party, successfully predicted the outcome of the 1998 gubernatorial election.

This article describes an application of time-series regression models to both explaining and predicting outcomes of state gubernatorial elections. The analysis is confined to one state and a limited number of cases, rather than pooling data from multiple states and multiple elections. The objective is to capture the unique characteristics of the single electoral unit, important when the goal is to explain and predict electoral outcomes in that unit, rather than to propose more general explanations applicable across electoral units.

The uniqueness of state political milieus is apparent from the marginal success of pooled time-series models in accounting for gubernatorial election outcomes. Even the comprehensive pioneering pooled models of Chubb (1998), which in included causal indicators and accounted for state differences with individual state dummy variables, explained only 65% of the variance at best (1988, 148). The pooled models' ability to identify winning candidates was limited, as well. As Chubb notes: ". . .gubernatorial elections display a healthy measure of unpredictability, the model 'picking' the winner incorrectly over 25% of the time" (1988, 149). Even though the pooled time-series approach has the obvious statistical advantages of increasing the number of cases for analysis, it has clear limitations as a tool with which to forecast gubernatorial election outcomes. These limitations appear also to extend to explanations for gubernatorial election outcomes in a single state.

In this study, therefore, a time-series model for a single state is developed which has both explanatory and predictive capabilities. The precedent for this approach to gubernatorial elections is meager. In one study individual state models of varying explanatory strength were developed, but were not designed for forecasting (Kenney 1983). Holbrook (1987), on the other hand, does make *ex post* forecasts from a time-series model, although the objective is not to forecast (and explain) state election outcomes, but rather the percentage of governorships won nationally by a party in one election year.

Ample precedent for time-series explanatory and predictive models for one electoral unit does exist, however, at the national level. Even with a limited number of cases, models of this type have been developed that can both explain and forecast presidential elections with a high degree of accuracy. (See Abramowitz 1996; Campbell 1996; Holbrook 1996; Lewis-Beck and Tien 1996; Norpoth 1996; Wlezien and Erikson 1996.)

The state chosen to demonstrate the application of a state-level time-series election model is Oklahoma. One reason for its selection is Oklahoma's poor showing in two well-known Presidential election forecasting models that pooled time-series data for all of the states (Rosenstone 1983; Campbell 1992). Errors for Oklahoma were among the models' largest, suggesting that this state's voting patterns may be particularly unique.

EXPLANATORY HYPOTHESES

Accordingly, in the pages that follow, a time-series model is developed to explain and predict the results of gubernatorial elections in Oklahoma, specifically the vote received by the candidate of the incumbent governor's party. The model is derived from alternative explanations of voting in gubernatorial elections tested by Atkeson and Partin (1995): the national referendum hypothesis and the economic voting hypothesis. The *national referendum* hypothesis suggests that "voters in subpresidential elections [such as state elections for governor] express their approval or disapproval of the sitting president and his policies with their vote" in those elections. Alternatively, the *economic voting* hypothesis suggests that "voters in these elections express support or dissent for the performance of the incumbent based upon how well the economy is doing" (1995, 99).

Both hypotheses treat elections as referenda. The national referendum hypothesis does so by assuming that gubernatorial elections are referenda on the sitting president. If state voters are pleased with the president's performance in office, they presumably will vote for the gubernatorial candidate of the president's party. If not, they vote for the opposition party candidate. Evidence supporting this hypothesis exists both in individual-level studies based on post-election surveys (Piereson 1975, Atkeson and Partin 1995) and in aggregate election-level research, as will be shown.

The most direct application of the economic voting hypothesis to gubernatorial elections treats those contests as referenda on the stewardship of the economy by the governor. If voters believe that the state's economy is performing well, they likely will vote for the candidate of the incumbent governor's party. If not, they will tend to vote for the opposition party's candidate. Early studies of the impact of economic conditions on gubernatorial elections, however, found the national economy to be the important economic influence. These studies tended to use aggregate data, with elections as the unit of analysis (Chubb 1998; Holbrook 1987; Kone and Winters 1993; Lewis-Beck and Rice 1992; Peltzman 1987). More recently, however, the linkage of state economic conditions to gubernatorial voting has appeared in the literature. In contrast to earlier work, most of these studies use survey data (Atkeson and Partin 1995; Carsey and Wright 1998; Partin 1995; Stein

1990; Svoboda 1995). Results of some studies point to both state and national economic influences (Leyden and Borrelli 1995; Niemi, Stanley, and Vogel 1995). Lowry, Alt, and Ferree (1998) found that when state economic performance exceeded that of the nation the result was positive for the candidate of the governor's party.

State voters, through their votes for governor, may be exercising both state and national accountability. Thus in this study the economic voting hypothesis is treated as a test of accountability of the governor for the health of the state economy, and then of the accountability of the president for the health of the national economy. Perhaps, as Stein (1990) argues, state voters, through their votes for or against the gubernatorial candidate of the president's party, may use gubernatorial elections as a means of holding the president accountable for the economic conditions which they experience. If so, the economic voting hypothesis then blends into the national referendum hypothesis.

INDICATORS TO TEST PROPOSED LINKAGES

In this section quantitative indicators are identified to operationalize concepts included in the hypotheses described above. Linkages among these indicators are proposed in the following supporting hypotheses.

NATIONAL REFERENDUM HYPOTHESIS

The indicator used to test the national referendum hypothesis is the Gallup Poll's presidential approval ratings. It is hypothesized that a positive relationship exists between the approval rating of the sitting president and the vote received by the gubernatorial candidate of the president's party. Public assessments of presidential job performance have been found significant in gubernatorial elections at both the individual and aggregate levels (Carsey and Wright 1998; Holbrook 1987; Niemi, Stanley and Vogel 1995; Svoboda 1995). Data in this study are responses to the Gallup Poll question: "Do you approve or disapprove of the way that [sitting president] is handling his job as president?" The approval ratings are for June of the gubernatorial election year.

It is assumed that when the sitting president's approval rating is high, the vote received by the gubernatorial candidate of the president's party is greater than when the president's rating is low. Because the dependent variable is the vote for the candidate of the party of the incumbent governor, it is necessary to adjust the presidential approval rating according to whether the party of the president and the party of the incumbent gubernatorial candidate are the same. Thus this interactive variable is used: June presidential approval rating multiplied by a dummy variable that denotes similarity of the party of the president and of the governor (1 = same party; -1 = opposite parties).

ECONOMIC VOTING HYPOTHESIS

The economic voting hypothesis is tested with indicators of both the state and national economies: state unemployment rate and national disposable personal income growth rate. As to the former, it is proposed that a negative relationship exists between the state unemployment rate and the vote for the candidate of the incumbent governor's party. This relationship is supported in the election research of Leyden and Borrelli (1995) and in survey findings of Svoboda (1995). However, the election studies of Kenney (1983) found state unemployment to be significantly linked to gubernatorial outcomes in only three of 14 states studied. Also on the negative side is a pooled study of reelection bids of sitting governors by Besley and Case (1995) who found this relationship to be insignificant.

This hypothesis assumes that when unemployment is high, evidencing economic problems in the state, the incumbent governor is likely to be blamed by the electorate. Accordingly, the candidate of that party is expected to perform poorly at the polls. Conversely, when the economy is strong and unemployment is low, the incumbent party candidate should benefit. Data are the average monthly unemployment rates for the state from July of the year prior to the election through June of the election year.

In testing the Economic Voting Hypothesis with national data, it is proposed that a positive relationship exists between growth in real U. S. disposable personal income and the vote for the gubernatorial candidate of the incumbent president's party. Supported by findings of Chubb (1988)

and Peltzman (1987) when using the national income indicator, this hypothesis assumes that state voters in gubernatorial elections hold the president accountable for the condition of the national economy. They do so by voting for the gubernatorial candidate of the president's party when national economic conditions are good, and by voting against that candidate when national economic conditions are poor. Data are an interactive variable: percent change in U.S. disposable personal income for the second quarter of the election year times a dummy variable which denotes whether or not the president and governor are of the same party (1 = same party; -1 = opposite parties).

DATA ANALYSIS

The time period of study begins with the 1962 election, when the first Republican became governor of Oklahoma, thereby effectively inaugurating a two-party era in that state's gubernatorial elections. The analysis continues through 1994 and thus includes nine elections. Data from that period are used to forecast the 1998 election. Following most Presidential election forecasting models, the dependent variable is the percentage of the two-party vote received by the candidate of the incumbent governor's party. To enhance comparability of data across the nine elections, independent candidates for governor are eliminated from the analysis, because in most elections no strong independents emerge.

In testing the hypothesized relationships two OLS regressions are computed, linking the dependent variable — share of the two-party vote received by the candidate of the incumbent governor's party — to two combinations of the independent variables:

EQUATION 1

The first regression includes four independent variables. These are the three described previously — presidential approval ratings, state unemployment rate, and national growth rate in per capita personal income — and a dummy variable for the party of the incumbent governor.

The latter is included as a control, given that earlier studies have found partisanship to be a significant influence in gubernatorial elections (Squire 1992; Svoboda 1995). In Oklahoma, where voters must indicate either a party affiliation or an independent designation when they register to vote, most voters are registered Democrats. This is a long-standing historical tradition in the state. During the period of this study voter registration margins favoring Democrats over Republicans and independents have ranged from 81-19-0 to 64-33-3, respectively (Oklahoma Election Board 1994). One would expect, therefore, to find historical voting patterns favoring Democratic candidates for governor. Elections in which the incumbent governor is a Democrat are scored "1", and "0" if the incumbent is a Republican.

Results of the first regression are reported in Table 1. Three variables are significant: the interactive presidential approval rating, state unemployment rate, and party of the incumbent governor. Contrary to expectations, however, the coefficient of the presidential approval interactive variable is negative (a result discussed below).

Growth in national per capita personal income is insignificant. This finding, coupled with the significance of the state unemployment rate, suggests that Oklahoma gubernatorial voting is influenced not by national economic conditions, but rather by conditions in the state economy. Oklahoma voters do not appear to hold the president accountable for the health of the national economy by voting for or against gubernatorial candidates of the president's party.

EQUATION 2

In a second regression national per capita personal income is omitted, given its insignificant contribution to the first equation. Included are state unemployment, the interactive presidential approval rating, and the party of the governor. Details of this equation also are reported in Table 1.

As evident from its adjusted R^2, this three-variable equation accounts for 94% of the variance in the gubernatorial vote for the nine elections. The state unemployment variable has the greatest impact on the equation, as evident from the magnitude of its standardized coefficient. The coefficient is negative, as expected, indicating that high

unemployment is detrimental for the candidate of the incumbent governor's party and that low unemployment works to that candidate's advantage. This linkage thus provides support for the Economic Voting Hypothesis and the presumption that voters holdgovernors accountable for state economic conditions. The incumbent party dummy variable is positive, confirming the historical Oklahoma election pattern favoring Democratic candidates for governor.

The presidential approval interactive variable has the second greatest effect on election outcomes. Its significant negative coefficient was unexpected, given that the National Referendum Hypothesis holds that it should be positive. Prior studies have found that when the president's approval rating is high, the gubernatorial candidate of the president's party benefits. But when this occurs in Oklahoma, the candidate of the president's party suffers at the polls. To rule out the possibility of unexpected control effects occurring within the equation, the bivariate correlation of the interactive presidential approval variable with the gubernatorial vote was calculated, independent of the equation. As in the regression, this correlation also is negative, -.69, and significant at the .04 level.

The explanation of presidential popularity negatively affecting the vote for gubernatorial candidates of the president's party in Oklahoma most likely lies in the deep-seated feelings of many Oklahomans of alienation from the federal government. Anti-Washington sentiment dates at least as far back as statehood in 1907 when the populist, segregationist, anti-corporation drafters of the Oklahoma constitution found much of their work rejected by Theodore Roosevelt (Scales and Goble 1982, 25). It is remarkable that opposition to the federal government today is sufficiently powerful to be detrimental for gubernatorial candidates of the president's party, though the phenomenon also appears in another indicator not included in this study. When the sitting president is of one party Oklahoma voters have chosen governors of the other party inall but two elections since 1954. A t-test verifies the significance of that relationship at the .04 level (t = 2.11).

In this regression a Durbin-Watson test for autocorrelation produced a value of 1.79. This score falls slightly into the inconclusive zone, a 1.87 being required for assurance of no autocorrelation. However, sincethis Durbin-Watson value is only .08 too low, it was decided to accept the equation. The possibility of multicollinearity was tested by

TABLE 1

REGRESSION OF VOTE FOR CANDIDATE
OF INCUMBENT GOVERNOR'S PARTY, 1962-1994

	Equation 1		Equation 2	
	unstd coeff	std coeff	unstd coeff	std coeff
Constant	72.237		72.354	
UNEMPL	-5.218**	-0.732	-5.241*	-.735
PRESAPP	-.113***	-0.651	-.111*	-.641
INCPARTY	6.924***	0.362	6.972**	.364
USINCOM	.110	.012		
F value	24.94		41.54	
Adjusted R^2	.92		.94	
Durbin-Watson	1.76		1.79	
Std error est	2.66		2.38	

  * sig. .001
 ** sig. .01
*** sig. .05

SOURCE: Author's calculations

UNEMPL= Oklahoma unemployment rate, July of year prior to election through June of election year, monthly average. (source: Oklahoma Employment Security Commission 1994)

INCPARTY = Party of the incumbent governor; dummy variable: 1 = Democrat, 0 = Republican

PRESAPP = President's June job approval rating (Gallup poll) times dummy variable for similarity of party of president and governor (1 = president and governor of same party; -1 = president and governor of opposite parties)(source: all Gallup sources listed in References)

USINCOM = percent change in real U.S. disposable personal income for second quarter of election year times dummy variable for similarity of party of president and governor (1 = president and governor of same party; -1 = president and governor of opposite parties)(source: U. S. Department of Commerce 1998)

regressing each independent variable on the remaining two independent variables. None of these regressions is significant, and the highest R^2 is .15. Thus multicollinearity is assumed not to exist (Lewis-Beck 1980, 60).

FORECASTING APPLICATION

The forecasting capability of the primary regression model (equation 2) was tested by attempting to predict the outcome of the 1998 gubernatorial election. Values for the respective variables were inserted into the equation: 4.14% for the average monthly state unemployment rate from July 1997 through June 1998 (U. S. Department of Labor 1998) [UNEMPLOY]; -60 for the presidential approval interactive variable (President Clinton's June 1998 approval rating [60%] times "-1", since Democratic Clinton and Republican incumbent Governor Keating are from opposing parties) (Gallup Organization 1998) [PRESAPP]; zero for the incumbent party variable [INCPARTY], since the incumbent party is Republican. Entering these data into the equation yields the following results:

'98 2-party vote for incumbent Keating
$$= 72.354 - 5.241 \text{ UNEMPLOY} - .111 \text{ PRESAPP} + 6.972 \text{ INCPARTY}$$

$$= 72.354 - 5.241 (4.14) - .111(-60) + 6.972 (0)$$
$$= 57.3\%$$

In the general election on 3 November 1998 Governor Frank Keating was reelected with 58.4% of the two-party vote. The regression forecast of 57.3% thus was off 1.1% from the actual result. This error is less than the average error for the historical data set, 1.5%. It also is well within the 95% confidence interval of +/-5.6%. Since all 1998 data were available by the fourth week of July (when June unemployment data were reported), it was possible to make this forecast 14 weeks before the general election.

CONCLUSION

In this study support is found for some proposed linkages, but not for others. The National Referendum Hypothesis appears not to be confirmed by Oklahoma gubernatorial elections, at least as measured by the interactive presidential approval ratings indicator. In fact, a statistically significant opposite relationship was discovered. From a methodological standpoint, this finding is evidence in favor of individual state election models that can capture such peculiarities unique to specific states. Oklahoma's inclusion in a pooled multi-state model, in which the interactive Presidential approval variable is likely to be positive, would have produced an inaccurate explanation and prediction of Oklahoma elections.

Oklahomans vote retrospectively on the basis of economic conditions, favoring the candidate of the incumbent governor's party when state economic indicators are positive. The Economic Voting Hypothesis is thereby confirmed, in that Oklahoma voters appear to hold the governor accountable for the health of the state's economy. But the Oklahoma electorate evidently does not similarly hold the president accountable for the state of the national economy by voting for or against gubernatorial candidates of the president's party.

Partisanship matters in Oklahoma elections for governor. The significant Democratic advantage in voter registration is reflected in the tendency of Oklahoma voters to elect Democratic gubernatorial candidates.

Support for the forecasting utility of the primary equation comes from its application in the 1998 Oklahoma gubernatorial election. The winner was predicted with considerable accuracy using data available more than three months before the election.

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