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ESTIMATING PRESIDENTIAL ELECTIONS: THE IMPORTANCE OF STATE FIXED EFFECTS AND THE ROLE OF NATIONAL VERSUS LOCAL INFORMATION

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Explaining the outcome of presidential elections is central to any model of American government. Previous researchers have found that economic conditions explain a substantial portion of the variation in vote outcomes. We make two contributions to this literature. First, we show that state partisan predisposition is the most important explanatory variable for the period 1972–1992. Several states are simply out of reach for one of the parties, no matter how favorable is the information about their candidate. Second, we find that national economic indicators have an effect on votes that is an order of magnitude larger than state-level aggregates. Presidents who try to curry favor with certain states through pork barrel projects are unlikely to be rewarded with large vote margins. Our model does a reasonable job forecasting the *state-level vote* for the 1996 election when the actual economic conditions are used as regressors. None the less we are skeptical that these type of models can accurately forecast the *Electoral College winner* because of the wide confidence intervals on each state's vote forecast and the potential error in predicted economic conditions.

1. INTRODUCTION

EXPLAINING THE outcome of presidential elections is central to any model of American government. The crucial element in such work is a determination of the factors which voters use when they choose between competing political parties. Since the seminal work of Fair (1978) and Meltzer and Vellrath (1975), researchers have found that economic conditions explain a substantial portion of the variation in presidential vote outcomes.

We make two contributions to this literature. First, we estimate the partisan predisposition of each state's electorate through the inclusion of fixed effects in a panel of elections. This allows us to capture the common-sense notion that economic conditions will not change the majority winner in states with strong partisan leanings such as Utah and the District of Columbia. In practice these fixed effects have tremendous explanatory power and omitting them is likely to bias the remaining regressors. Our measure is of interest independently of this work as an alternative to ADA score estimates of state partisan allegiance.

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The latter serves as an important input in a variety of political economic settings such as explanations of politician voting patterns (Levitt, 1996) or optimal campaign expenditure (Snyder, 1989). To our knowledge, Peltzman (1990) is the only previous work which estimates state fixed effects in presidential elections though Peltzman's parameters may be biased as we discuss below.

Our second contribution is assessing the relative importance of national and local information. Following the insight of Downs (1957), we presume voters cast their ballots based on their expected utility under each party. There are two reasons to expect that economic conditions play a role in this decision: (i) economic indicators reflect the voter's own economic situation, and (ii) voters use economic variables as a measure and forecast of incumbent party performance. A question we set out to answer is which level of aggregation, local or national, do voters more strongly consider. A priori, we cannot predict which will dominate. Local information more accurately reflects an individual's economic circumstances, the first mechanism. On the other hand, voters will use national information in their decision-making if they consider the president a steward of the national economy and do not hold him responsible for regional idiosyncracies.

We find that fixed effects explain a significant amount of the variation in state votes from 1972 through 1992. Interestingly, many more states seem inclined to vote for a Republican than a Democrat (in part due to the significant Republican wins in 1972 and 1984). When controlling for fixed effects, national income growth and unemployment play the largest role in swinging election outcomes. State income growth and inflation also matter, but their marginal effect on votes is an order of magnitude smaller. This is suggestive evidence that national economic factors play a more important role than local factors in presidential elections (in a separate set of regressions we find that national factors play a smaller role in gubernatorial and senatorial elections). In total economic and incumbency factors evaluated at their mean values swing less than 1% of the vote in presidential elections, so in most elections the state partisan leanings will determine the winner. We use our final specification to forecast the 1996 presidential election. Our model does a reasonable job forecasting the *state-level vote* when the actual economic conditions are used as regressors (using economic conditions predicted from the beginning of 1996 slightly increases the forecasting error). None the less we are skeptical that these type of models can accurately forecast the *Electoral College winner* for two reasons. First, there is a wide confidence interval on each state's vote forecast, so it is difficult to accurately predict the outcome in states without a strong partisan leaning. Second, the Electoral College system magnifies errors from economic predictions because each state awards all of its delegates to the plurality winner.

Previous work has not adequately addressed the main issues of this paper. Fair's analysis is conducted using national returns (see Fair, 1996). It is more

appropriate to consider state-level votes because presidential elections in fact comprise 51 separate elections under the Electoral College system. Using national returns is limiting because winning a majority of the popular vote can still result in losing the Electoral College, an event which occurred in the 1876 and 1888 elections. As an extreme example of how this could occur today, a candidate with a bare plurality in each of the 11 largest states would win the Electoral College even if he failed to gain a single popular vote elsewhere. In addition, looking at national returns greatly reduces the sample size which results in less precise parameter estimates.

Other authors consider state returns but do not fully exploit the longitudinal data or assess the relative importance of state and national information. Abrams and Butkiewicz (1995) and Blackley and Shepard (1994) examine only the 1992 election which precludes identification of fixed effects and may suffer from unusual year-specific factors (such as the presence of a strong third-party candidate). Alternatively, Meltzer and Vellrath (1975) use elections from 1960 to 1972 but inappropriately use the vote in the previous race to account for state partisanship: these outcomes are themselves a function of the prevailing economic conditions. Also, voters in their specification behave in a puzzling fashion as they do not attribute economic performance to the incumbent party. Pollard (1983) also pools several elections, but like Meltzer and Vellrath (1975) he uses an endogenous variable (statewide vote in congressional elections) to correct for partisan effects. None of these authors try to determine the relative importance of local and national information [the papers exclusively consider state-level economic indicators except Pollard (1983) who uses national inflation but does not consider a local alternative].

To our knowledge there are only two papers which perform a detailed analysis of state-level presidential elections. Crain et al. (1993) assume that state elections fluctuate due to both systematic and idiosyncratic components (the latter is a variant of state fixed effects). However, they do not explicitly model the systematic effect (it is simply the median state vote in a particular election) or link either element to economic factors or an incumbency advantage. Peltzman (1990) is the much closer to our work. He does estimate state fixed effects and compares the relative importance of state and national growth rates. However, Peltzman estimates separate specifications using economic regressors from each quarter of the incumbent's term (his objective is to test whether voters use all available information) and omits elections which he considers lopsided. Without a full specification or a full sample, both the state fixed effects and the growth parameters will be biased. In addition he does not list his fixed effects estimates, so we cannot evaluate their numerical significance nor can they be used in future work in the manner we suggested earlier.

The next section presents a simple model of voter choice which motivates our estimation strategy. A list and description of the data are relegated to an appendix. Section 3 shows how we build up to our final estimation specification and contains the 1996 election forecast. The final section summarizes and discusses policy implications of this work.

2. A MODEL OF VOTER CHOICE

We presume voters are concerned with their future economic status as well as the ideology of the governing party. A voter will cast his ballot for the candidate who will give him the highest expected utility. We will also presume that voters forecast their future economic status using some commonly available information. At election t voter i's difference in welfare between the incumbent and the challenger may be written as,

$$EU_{it}^{\text{incumbent}} - EU_{it}^{\text{challenger}} = h(\Omega_t) - \rho_{it}, \tag{1}$$

where $h(\Omega_t)$ is a voter's best forecast of the incumbent's relative performance given Ω_t, the commonly available information at the time of the election, and ρ_{it} is the challenger's relative ideological advantage. The voter selects the incumbent so long as his ideological disadvantage is not too large,

$$i \text{ votes for incumbent} \Leftrightarrow \rho_{it} < h(\Omega_t). \tag{2}$$

In practice we do not observe individual voters but do know something about the overall distribution of ideological preferences, ρ. Say that for any state, s, there is a single, time-invariant parameter, γ_s,[1] which parameterizes the distribution of preferences $F(\rho \mid \gamma_s)$.[2] One of our objectives will be to estimate a γ_s value for each state. Using (2), the incumbent's expected share of the state vote is,

$$EV_{st}^{\text{incumbent}} = F[h(\Omega_t) \mid \gamma_s]. \tag{3}$$

To derive an estimable voting function, we must assume functional forms for $F(\cdot)$ and $h(\cdot)$ and consider likely elements of Ω. Following Peltzman (1990), we presume voters evaluate incumbent performance based on how the economy performs relative to expectations. When the $h(\cdot)$ function is linear and economic expectations are time invariant, we can write,

$$\begin{aligned} h(\Omega_t) &= \beta(\Omega_t - E\Omega_t) \\ &\equiv \alpha + \beta\Omega_t, \end{aligned} \tag{4}$$

where $E\Omega_t$ is the expected value while α and β are parameters (which will be estimated). Since personal experience and economic conditions are likely to play a role in the voter's decision, we have argued that both regional and national indicators should matter. To be clear we will decompose a voter's information set into national (Ω^{national}) and localized (Ω_s^{local}) components. Then, assuming a linear form for $F(\cdot)$,[3] (3) may be written as,

$$V_{st}^{\text{incumbent}} = \alpha + \beta_1\Omega_t^{\text{national}} + \beta_2\Omega_{st}^{\text{local}} + \gamma_s + \varepsilon_{st}, \tag{5}$$

[1] γ_s may also reflect prior conditions which shape voter assessment of the candidates.

[2] Technically, we want increases in γ to represent first-order stochastic dominance:

$$\gamma_1 > \gamma_2 \Rightarrow F(\rho \mid \gamma_1) \leqslant F(\rho \mid \gamma_2) \quad \forall\rho.$$

[3] For $F[h(\Omega_t) \mid \gamma_s]$ to be linear in $h(\Omega_t)$, a necessary and sufficient condition is that $F(\cdot)$ is uniform. To have the parameter γ_s enter additively, the first-order stochastic dominance relation must be linear in γ_s. These are the same assumptions which Fair (1978) makes.

where the error term, ε_{st}, is assumed to be i.i.d. normal with variance σ^2.[4] Notice that this form allows us to test for the relative importance of national and local information sources. If only one influences voter decisions, then the other should have an insignificant parameter estimate.

3. ESTIMATION RESULTS

We now turn to estimating (5). Section 3.1 lists the potential regressors while section 3.2 shows how we winnow this group down to our final specification and discusses our estimates. Section 3.2 also has an application of our specification to gubernatorial and senatorial elections. Section 3.3 assesses our forecast of the 1996 presidential election. A full discussion of data sources and the descriptive statistics are contained in the Data Appendix.

3.1 Potential Regressors

We consider the Democrat's share of the two-party vote on the state level from 1972 through 1992. We choose this sample period for two reasons. First, we are skeptical of the accuracy of state economic measures prior to 1969.[5] Second, this is the longest period in which we are confident of a stable relationship between economic variables and elections. A longer sample period allows for more precise estimates but may introduce bias if the parameters in the vote mapping (5) vary over time. Our sample can be considered a relatively coherent "modern" period of presidential elections with no significant expansions in the voting population (the 26th Amendment which lowered the voting age to 18 went into effect with the 1972 election).

We will consider a wide range of possible regressors (Ω in the model) which may play a role in the two voter choice mechanisms, individual experience and overall conditions. Again both national and local aggregates will be examined. Strong national economic growth should increase the incumbent's vote share because it means that the overall economy is healthy. We consider two different national growth measures, per capita real gross domestic product growth (GDP) and per capita real personal income growth (PERINC), but will only discuss estimates for the latter because it is more readily comparable to our measure of state-level growth (see below). Moreover, these variables are highly collinear (correlation coefficient $= 0.914$ for our sample) and ultimately have similar parameter estimates.[6]

[4] Technically the normal distribution is inappropriate because vote outcomes are bound between zero and one. In practice this is of little importance since vote shares are rarely above 75% or below 25%. Still we will also consider the more appropriate logit distribution and relax the assumptions of no cross-sectional correlation and homoscedasticity in our final estimations.

[5] Our conclusions are based on discussions with various officials at the Bureau of Labor Statistics and the WEFA Group.

[6] Personal income and GDP are highly correlated because they are so closely defined. The chief differences are that GDP includes corporate profits and various business and social insurance taxes while personal income incorporates government transfers. We would thus expect personal income to be less volatile.

The second national variable is the unemployment rate (UE) which may proxy for national economic performance and, more importantly, reflect voters' job security. Higher rates result in greater voter anxiety and so should reduce incumbent votes. Our final national variable is inflation, which should have a negative effect on incumbent votes since it hurts those whose wages are unindexed and the elderly who rely largely on social security and interest income. We consider two measures, growth rates in the consumer price index (CPI) and the GDP deflator (GDPDEF), but will focus on the results for CPI because it more accurately reflects the prices voters face and because our state inflation measure is CPI based. Not surprisingly, the national inflation variables are highly collinear with a correlation coefficient of 0.994 for our sample.

As stated earlier, local economic aggregates allow us to capture the diversity of individuals' circumstances across states.[7] The local variables we use are the growth rate in state real per capita income (StINC), the state unemployment rate (StUE), and the growth rate of regional CPI for the four Census regions (StCPI).[8] One way to measure whether there is much inter-state variation in economic performance is to consider the range and standard deviation of local versus national variables: local variables exhibit more extreme maxima and minima as well as larger standard deviations. For example, state unemployment in an election year has a standard deviation and maximum that are twice as large as and a minimum that is one-half of the national average (see Table 3). Not surprisingly the national and state aggregates are not perfectly collinear (the unemployment terms have a correlation coefficient of 0.397).

We consider several variations of each national and local economic measure in our study by estimating parameters for the annualized level as well as the change of each variable over a one- through four-year time horizon. Levels presumably capture the current (or previous) economic conditions while changes reflect the direction in which the economy is headed.[9] Each variable will be numbered to represent lag length and "Δ" will denote a change: for example, ΔUE4 is the difference between the national unemployment rate in the election year and four years earlier.

The dependent variable for our analysis is the Democratic candidate's two-party vote share in a state, $V^{\text{Democrat}} \in [0, 1]$.[10] All of the economic variables

[7] Peltzman (1990) claims that state-specific fluctuations should not influence votes since they are largely due to commodity price and industrial distribution shocks, factors beyond the control of the president. But it is not unreasonable to suppose that voters credit regional variation to macro-policy, say from pork barrel spending in their state.

[8] The lack of state inflation indices forces us to use the less satisfactory regional level for inflation. Meltzer and Vellrath (1975) construct state inflation figures back to 1960. However, their figures are based on an ad hoc formula which highly weights SMSA prices. We choose instead to use the Bureau of Labor Statistics' published figures.

[9] Changes can also represent voter assessments relative to expectations as was suggested in (4). For example, using ΔPERINC4, the change in the personal income growth rate from four years ago, implicitly assumes that voters' expectation benchmark is the growth rate at the last election.

[10] This means we are awarding third-party votes to the two major parties in proportion to their relative vote totals. This assumption is standard in the literature (see Fair, 1996).

described above are interacted with a dummy (I) that takes the value of 1 when the current president is a Democrat and of −1 when a Republican holds the White House, implying that voters hold the incumbent party responsible for economic conditions. In addition, we include two other regressors: state dummies (StDUM) which account for variation in partisan leanings [γ_s in (5)] and a dummy (IRUN) that equals 1 if a Democrat runs for re-election, −1 if a Republican runs for re-election, and 0 if neither candidate is the incumbent. The latter variable allows us to quantify the relative electoral advantage enjoyed by incumbents. We also include home state dummies for the two parties (DEMHOME and REPHOME) in an auxiliary specification.

Finally, it is important to note some variables we do not include. We omit polling data because they likely reflect only historical economic information and do not provide an independent source of variation. We also exclude measures of government policy such as the level and distribution of discretionary spending. Presumably, these policies influence voters only through their effect on real economic conditions or perceived ideology. Finally, we choose not to include regressors for such election-specific factors as candidate personality and campaign spending. While these factors are likely to influence votes, including them would prevent us from using our estimates to forecast elections. Though we omit them in our main specification, we account for them in an auxiliary specification by including election dummies.

3.2 The Final Specification

Econometric theory provides little guidance in selecting which of our regressors belongs in the final specification of (5).[11] We initially used forward induction, sequentially adding the economic and incumbency variables and keeping only those that remained significant. Our best specification explained only about 30% of the variation in state votes. However, by adding state dummy variables to capture fixed effects, we were able to greatly improve the fit of the model. So we included StDUM and IRUN, which was also found to be significant, in the rest of the specifications we tried.

In the next stage, for each of the four lags, we grouped national unemployment with national growth and state unemployment with state growth, continually removing insignificant variables. The remaining unemployment and growth variables for each lag were grouped with inflation, again separately for state and national regressors, and we iteratively eliminated insignificant variables. The resulting state and national regressors were grouped by lag and those with little explanatory power removed. It was not possible to consider every permutation of the remaining variables because several were highly collinear: for example, national per capita income growth

[11] We have 48 possible economic regressors: any of four possible lags for levels and changes of national and state growth, unemployment, and inflation.

(PERINC) was significant for each lag. Instead we began with the most significant version of each measure and cycled through various substitutions. If a variable-lag was found to be insignificant, it was eliminated. If two or more lags of a given variable were significant, we put them in the equation together and then kept only the one that kept the anticipated sign and had the largest *t*-statistic.

This process yielded a small and coherent group of regressors. As a check, we added one-by-one all the other variable-lags into the equation to see if any were significant. We were able to eliminate all the supplemental variables because they took the incorrect sign and/or failed the *F*-test of significance. The one exception was ΔUE3 and ΔUE4, so we added the latter to our set of regressors.[12]

The OLS estimate of the final specification for state elections from 1972–1992 is repeated from column 2 of Table 1:[13]

$$
\begin{aligned}
V^{\text{Democrat}} = {} & 0.0300\ \underset{(16.83)}{\text{PERINC2}\times\text{I}} - 0.0108\ \underset{(-3.55)}{\text{UE2}\times\text{I}} - 0.0057\ \underset{(-2.93)}{\Delta\text{UE4}\times\text{I}} \\
& + 0.0039\ \underset{(2.93)}{\text{StINC2}\times\text{I}} - 0.0014\ \underset{(-0.70)}{\text{StCPI2}\times\text{I}} + 0.0344\ \underset{(4.71)}{\text{IRUN}} + \text{StDUM}
\end{aligned}
$$

$R^2 = 0.866$, $SE = 0.041$, $N = 306$, where *t*-statistics are in parentheses.[14] We were generally satisfied with the regression's fit. Our specification can explain 86.6% of the variation in votes and correctly picks the winning party in 86.2% of the states in 1992 (the fitted 1992 Electoral College gives the Democrats 388 votes while they actually received 370 votes). Perhaps more importantly, there are few outliers in the residuals. For example, none of the fitted vote shares for 1992 are off by more than 6% in absolute value from the actual outcome and the median absolute error is 1.8% (for the complete sample, the median absolute error is 2.2%).

In interpreting the estimates, it is clear that state fixed effects play a crucial role in explaining vote variation. Using an *F*-test, we can reject the null hypothesis that state dummies are insignificant: intuitively, this can be seen by comparing the R^2 values for the specifications with and without state dummies (columns 1 and 2 of Table 1). The fixed effects estimates, which represent the

[12] When both ΔUE3 and ΔUE4 were included only the latter remained significant.

[13] Although we selected this specification we could easily have substituted other lags of certain variables. The estimates are quite similar if we use StINC3 for StINC2, StCPI3 for StCPI2, and ΔUE3 for ΔUE4. Since the mean and range for these variables are quite similar (by construction), this selection is innocuous.

In addition, while the inflation term is insignificant we kept it in the list of regressors to make the results more readily comparable with the literature.

[14] While some of the regressors in the final specification are related, none are collinear. There is a plausible, independent channel by which each variable can influence votes. For example, PERINC2 likely represents overall concerns about the economy while UE2 reflects voter anxiety over their own job security.

TABLE 1 ESTIMATION OF EQUATION (5)

Regressor	OLS (I)	OLS (II)	FGLS (III)	Logit (IV)
PERINC2 × I	0.0327 (8.85)	0.0300 (16.83)	0.0315 (19.24)	0.1192 (16.33)
UE2 × I	−0.0088 (−1.42)	−0.0108 (−3.55)	−0.0106 (−4.50)	−0.0516 (−4.73)
ΔUE4 × I	−0.0046 (−1.15)	−0.0057 (−2.93)	0.0015 (0.89)	−0.0231 (−3.43)
StINC2 × I	−0.0009 (−0.34)	0.0039 (2.93)	0.0039 (2.87)	0.0192 (2.56)
StCPI2 × I	−0.0028 (−0.68)	−0.0014 (−0.70)	−0.0233 (−4.21)	0.0010 (0.13)
IRUN	0.0334 (2.21)	0.0344 (4.71)	–	0.1347 (5.15)
Constant	0.4516 (20.17)	–	–	–
StDUM	No	Yes	Yes	Yes
YRDUM	No	No	Yes	No
R^2	0.299	0.866	0.874	–
SE	0.086	0.041	0.040	0.041
N	306	306	306	306

Dependent variable: Democratic two-party vote share. Based on state observations from 1972–1992. State dummy estimates for (II) reported in Table 2. FGLS (III) includes three-year dummies (see footnote 19). (*t*-Statistics.)

Democrat vote share exclusive of economic and incumbency effects, confirm our expectations (see Table 2).[15] For example, the District of Columbia typically gives a Democrat 85.2% of its vote while Utah confers only 29.7%. Traditional battleground states give values close to 50%: Pennsylvania, for example, has a fixed effect of 47.7%. Interestingly, most states have a predisposition to vote for Republicans, i.e. their fixed effect parameter estimate is below 0.5. This result is partly due to the significant Republican margins in 1972 and 1984 though the accurate fit in the remaining elections suggests a persistent pro-Republican tilt. This result is also consistent with Fair (1996) whose constant (the national analogue to state fixed effects) indicates a noticeable Republican bias over a sample period dating back to 1916.

As for the economic parameters, clearly the most important, both in magnitude and statistical significance, is PERINC2. A 1.0% annualized increase in the real national per capita personal income growth rate in the two years preceding the election increases the incumbent's vote share by 3.0%. This value is significantly larger than that found by previous authors. Some possible explanations for the difference is that others look at state-level growth (Abrams and Butkiewicz, 1995) or a different sample period (Fair, 1996). The national unemployment rate averaged over two years (UE2) exerts nearly as important an effect on outcomes: a 1.0% increase reduces the incumbent vote share by 1.1%; a 1.0% increase in the unemployment rate over the course of the administration (ΔUE4) lowers the incumbent's vote share by 0.6%. This

[15] As we mentioned in the introduction, Peltzman (1990) is the only paper we are aware of which also estimates state fixed effects. However, there are reasons to believe his parameters are biased, and he never presents or interprets his state dummy estimates.

TABLE 2 STATE FIXED EFFECTS AND 1996 ELECTION FORECAST

State	Elect vote	$V96$	OLS FE	OLS forecast (predicted data) $V96^{pre}$	OLS forecast (predicted data) $[V_{min}, V_{max}]$	OLS forecast (actual data) $V96^{act}$	OLS forecast (actual data) $[V_{min}, V_{max}]$
AL	9	0.463	0.430	0.471	(0.439, 0.503)	0.489	(0.457, 0.521)
AK	3	0.396	0.365	0.402	(0.370, 0.434)	0.414	(0.382, 0.446)
AZ	8	0.512	0.373	0.423	(0.391, 0.455)	0.430	(0.398, 0.463)
AR	6	0.594	0.480	0.522	(0.490, 0.554)	0.540	(0.507, 0.572)
CA	54	0.572	0.464	0.509	(0.477, 0.541)	0.523	(0.491, 0.556)
CO	8	0.493	0.413	0.457	(0.425, 0.490)	0.474	(0.442, 0.506)
CT	8	0.603	0.452	0.493	(0.461, 0.525)	0.512	(0.480, 0.544)
DE	3	0.586	0.463	0.512	(0.480, 0.544)	0.525	(0.493, 0.557)
DC	3	0.903	0.852	0.893	(0.861, 0.925)	0.911	(0.878, 0.943)
FL	25	0.532	0.401	0.448	(0.416, 0.480)	0.461	(0.429, 0.493)
GA	13	0.494	0.466	0.509	(0.477, 0.541)	0.526	(0.493, 0.558)
HI	4	0.645	0.487	0.526	(0.494, 0.558)	0.536	(0.504, 0.568)
ID	4	0.392	0.329	0.370	(0.338, 0.402)	0.385	(0.352, 0.417)
IL	22	0.596	0.476	0.522	(0.489, 0.554)	0.536	(0.504, 0.569)
IN	12	0.469	0.407	0.453	(0.421, 0.485)	0.465	(0.433, 0.497)
IA	7	0.558	0.481	0.529	(0.497, 0.561)	0.543	(0.511, 0.575)
KS	6	0.399	0.391	0.436	(0.403, 0.468)	0.452	(0.420, 0.484)
KY	8	0.505	0.456	0.501	(0.469, 0.533)	0.514	(0.482, 0.546)
LA	9	0.566	0.440	0.488	(0.456, 0.520)	0.499	(0.466, 0.531)
ME	4	0.627	0.457	0.503	(0.471, 0.535)	0.514	(0.482, 0.546)
MD	10	0.587	0.492	0.535	(0.503, 0.567)	0.547	(0.514, 0.579)
MA	12	0.686	0.543	0.589	(0.557, 0.622)	0.606	(0.574, 0.638)
MI	18	0.573	0.464	0.509	(0.477, 0.541)	0.522	(0.490, 0.554)
MN	10	0.594	0.526	0.572	(0.540, 0.604)	0.588	(0.556, 0.620)
MS	7	0.473	0.406	0.450	(0.417, 0.482)	0.465	(0.432, 0.497)
MO	11	0.535	0.466	0.513	(0.480, 0.545)	0.526	(0.494, 0.559)
MT	3	0.483	0.430	0.473	(0.441, 0.505)	0.485	(0.453, 0.517)
NE	5	0.394	0.343	0.388	(0.355, 0.420)	0.406	(0.374, 0.438)
NV	4	0.505	0.392	0.436	(0.404, 0.468)	0.450	(0.418, 0.482)
NH	4	0.557	0.383	0.428	(0.396, 0.460)	0.442	(0.410, 0.474)
NJ	15	0.600	0.436	0.481	(0.449, 0.513)	0.494	(0.462, 0.526)
NM	5	0.541	0.446	0.492	(0.460, 0.525)	0.505	(0.472, 0.537)
NY	33	0.660	0.496	0.540	(0.508, 0.572)	0.555	(0.523, 0.587)
NC	14	0.475	0.440	0.482	(0.450, 0.514)	0.500	(0.467, 0.532)
ND	3	0.459	0.389	0.434	(0.402, 0.467)	0.455	(0.422, 0.487)
OH	21	0.536	0.448	0.496	(0.463, 0.528)	0.507	(0.475, 0.540)
OK	8	0.456	0.371	0.412	(0.380, 0.444)	0.427	(0.395, 0.459)
OR	7	0.547	0.486	0.534	(0.502, 0.566)	0.549	(0.516, 0.581)
PA	23	0.552	0.477	0.523	(0.490, 0.555)	0.537	(0.505, 0.569)
RI	4	0.691	0.538	0.585	(0.553, 0.617)	0.600	(0.568, 0.632)
SC	8	0.469	0.430	0.472	(0.440, 0.504)	0.487	(0.455, 0.520)
SD	3	0.481	0.436	0.482	(0.449, 0.514)	0.502	(0.470, 0.534)
TN	11	0.513	0.457	0.499	(0.467, 0.531)	0.514	(0.482, 0.546)
TX	32	0.473	0.422	0.466	(0.434, 0.498)	0.480	(0.448, 0.512)
UT	5	0.380	0.297	0.348	(0.315, 0.380)	0.359	(0.326, 0.391)
VT	3	0.631	0.460	0.504	(0.472, 0.536)	0.518	(0.486, 0.550)
VA	13	0.489	0.411	0.456	(0.423, 0.488)	0.468	(0.436, 0.500)

TABLE 2 *Continued*

State	Elect vote	$V96$	OLS FE	OLS forecast (predicted data) $V96^{pre}$	OLS forecast (predicted data) $[V_{min}, V_{max}]$	OLS forecast (actual data) $V96^{act}$	OLS forecast (actual data) $[V_{min}, V_{max}]$
WA	11	0.572	0.469	0.510	(0.478, 0.542)	0.527	(0.495, 0.559)
WV	5	0.584	0.502	0.548	(0.516, 0.581)	0.559	(0.527, 0.591)
WI	11	0.559	0.487	0.531	(0.499, 0.563)	0.546	(0.514, 0.578)
WY	3	0.423	0.352	0.394	(0.362, 0.426)	0.405	(0.372, 0.437)
		Actual outcome: Democrat 379, Republican 159		Point estimate: Democrat 282, Republican 256		Point estimate: Democrat 330, Republican 208	
Electoral College				50% confidence interval: Democrat 84, Republican 150, Too close to call 304		50% confidence interval: Democrat 157, Republican 110, Too close to call 271	

Elect Vote: Electoral College votes in 1996. $V96$: Actual Democrat two-party share in 1996 election. OLS FE: State fixed effects (from OLS estimates in Table 1, column II). $V96^{pre}$: Forecasted Democrat two-party share in 1996 election (predicted economic data). $V96^{act}$: Forecasted Democrat two-party share in 1996 election (actual economic data). $[V_{min}, V_{max}]$: 50% confidence interval for $V96^{pre/act}$ point estimate, $V96^{pre/act} \pm t_{0.75} \times se(V96^{pre/act})$.

suggests that job security influences voter perceptions confirming the findings of Blackley and Shepard (1994) but in contrast to Fair (1994).

Local economic variables also matter, but their parameters are much smaller.[16] A 1.0% increase in the real state per capita income growth rate in the two years preceding the election (StINC2) increases the incumbent's vote share by 0.4%. Similarly, a 1.0% higher regional inflation in the two years preceding the election (StCPI2) exerts a negative effect of only 0.1% on votes. Finally, if the incumbent runs for re-election (IRUN) he gets a vote share bonus of 3.4%.

These estimates suggest that both national and local information matter. However, only national conditions markedly influence vote percentages. For example, the average national economic conditions listed in Table 3 will shift 2.6% of the vote to the non-incumbent while the average state economic conditions swings only 0.2% of the vote to the non-incumbent.[17] In total, economic conditions and the incumbency advantage (the positive IRUN term) give the typical incumbent

[16] It is important to be careful when comparing parameters from national and state variables because the former vary only over time while the latter vary over both time and state. That is, we have only six different observations for our national variables while there are $51 \times 6 = 306$ observations for the state variables. None the less it is still valid to compare point estimates and *t*-statistics across these two kinds of variables.

[17] These numbers are a bit deceptive since there are offsetting positive parameters (income growth) and negative parameters (unemployment and inflation). Still, it is clear that the effect of similar terms, such as PERINC2 and StINC2, is greater at the national level.

a net increase in votes of only 0.6%. This means that partisan predisposition, not economic or incumbency effects, is the main determinant of state election outcomes.

It is important to show that the estimates are robust to a more general error structure. Blackley and Shepard (1994) and Abrams and Butkiewicz (1995) conjecture that there will be a heteroscedasticity problem due to random voter turnout.[18] In addition we might suspect there is cross-sectional correlation due to unobserved election-specific factors like candidate personality. We can deal with these issues by including election dummies[19] and by using feasible generalized least squares (FGLS). Compared to our original specification, only the state inflation term (more negative and now significant) and the change in unemployment (more positive and now insignificant) are noticeably influenced (column 3 of Table 1).[20] A second modification we consider is a logit model.[21] We are analyzing proportions data which is constrained to be in the unit interval; in principle, a linear probability model allows vote shares less than zero and greater than one. While the logit parameters are not directly comparable with OLS parameters, the same set of regressors are significant in both estimates (column 4 of Table 1).[22]

As a further check on our estimates, an anonymous referee suggested that we include the candidates' home state as regressors. Adding a home state dummy for each party (DEMHOME and REPHOME) did not noticeably change the

[18] The argument is based on an assumption that only some subset of voters actually cast ballots, and so the voter aggregation function in (3), $F(\cdot)$, is stochastic. When the pool of voters is small, the election outcome will largely be determined by the voter turnout process. Alternatively, in a big state the partial turnout problem is less important (due to the law of large numbers) and so there should be a closer connection between the regressors and the election outcome. In other words, the error term in the estimation equation (5) is heteroscedastic. We are quite skeptical of this claim. Our counter-argument is that small states typically have a more homogeneous electorate and so the randomness of who votes should be less important than for the heterogeneous big states. Furthermore, we could not reject a null of homoscedasticity using the Goldfeld–Quandt test.

[19] For every M national variables which we include we must exclude M election dummies or else there will be a linear dependence among the explanatory variables. Since we include three national variables (PERINC2, UE2, ΔUE4), we are only able to include election dummies for three of the six years in the sample.

[20] The inflation term is significant when time dummies are included both in OLS and FGLS. It turns out that the 1980 year dummy has a large, positive value, and so to fit the Democrat's poor showing in that election a stronger inflation effect is required (inflation is disproportionately higher in 1980 than in the other elections). We decided not to include year dummies in our main specification because there is little theoretical justification for doing so. In any event, this estimate does not invalidate our claim that local information is numerically less important because StCPI2 is again insignificant when both time dummies and *national* inflation are included.

[21] In our setting logit is equivalent to FGLS where the variance is in part based on the number of voters in each state. So this approach also corrects for the heteroscedasticity concerns just discussed.

[22] In a logit model, $\partial EV/\partial X = f(X\lambda)\lambda$, where EV is expected vote share, $f(\cdot)$ is the logistic density, X is the matrix of regressors, and λ is the vector of parameters. So we must multiply by the density (say, evaluated at mean regressor values) to get the familiar marginal effect of OLS. Performing this calculation yields parameters which are similar to those in OLS (though the state fixed effects are smaller and UE2 has a larger parameter in absolute value).

parameters on the economic or incumbency terms under either OLS or logit.[23] Only the Democrat home state dummy was significant, and so we decided not to include these variables in the final specification.[24]

An interesting exercise is to apply our final specification to gubernatorial and senatorial elections.[25] Because governors have little influence on national policy, we would presume that state economic conditions would be the dominating influence in gubernatorial elections. Senators are in an intermediate position between the president and governors, having some influence on national policy but also having some ability (and incentive) to steer federal projects to their home state. We anticipated that national and state economic conditions would have comparable roles in senatorial elections. Our actual regressions for the period 1980–1992[26] are generally consistent with these expectations. The OLS estimates for gubernatorial elections are (logit estimates are comparable),[27]

$$\begin{aligned} V_{\text{Gov}}^{\text{Democrat}} = {} & \underset{(0.67)}{0.0085\ \text{PERINC2} \times \text{I}} - \underset{(-1.83)}{0.0097\ \text{UE2} \times \text{I}} + \underset{(1.13)}{0.0046\,\Delta\text{UE4} \times \text{I}} \\ & + \underset{(2.00)}{0.0085\ \text{StINC2} \times \text{I}} + \underset{(0.67)}{0.0023\ \text{StCPI2} \times \text{I}} + \underset{(6.36)}{0.0960\ \text{IRUN}} + \text{StDUM} \end{aligned}$$

$R^2 = 0.565$, $SE = 0.087$, $N = 171$, and for senatorial elections,

$$\begin{aligned} V_{\text{Sen}}^{\text{Democrat}} = {} & \underset{(1.76)}{0.0139\ \text{PERINC2} \times \text{I}} - \underset{(-0.48)}{0.0019\ \text{UE2} \times \text{I}} + \underset{(0.47)}{0.0015\Delta\text{UE4} \times \text{I}} \\ & + \underset{(0.34)}{0.0011\ \text{StINC2} \times \text{I}} - \underset{(0.33)}{0.0007\ \text{StCPI2} \times \text{I}} + \underset{(4.39)}{0.0708\ \text{IRUN}} + \text{StDUM} \end{aligned}$$

[23] The OLS estimate when the home state dummies are included is,

$$\begin{aligned} V^{\text{Democrat}} = {} & \underset{(17.53)}{0.0297\ \text{PERINC2} \times \text{I}} - \underset{(-3.79)}{0.0110\ \text{UE2} \times \text{I}} - \underset{(-3.15)}{0.0058\ \Delta\text{UE4} \times \text{I}} \\ & + \underset{(3.54)}{0.0045\ \text{StINC2} \times \text{I}} - \underset{(-0.68)}{0.0013\ \text{StCPI2} \times \text{I}} + \underset{(4.96)}{0.0344\ \text{IRUN}} \\ & + \underset{(5.32)}{0.0969\ \text{DEMHOME}} - \underset{(-1.02)}{0.0209\ \text{REPHOME}} + \text{StDUM} \end{aligned}$$

$R^2 = 0.880$, $SE = 0.039$, $N = 306$.

[24] Including the candidates' home states does reduce forecasting error. For example, including home state dummies reduced our 1996 forecast error – discussed in section 3.3 – by roughly 2.5% in each of the candidate's home states (Arkansas and Kansas). However, the dummies have almost no effect on the overall median or mean forecasting error.

[25] We thank an anonymous referee for suggesting this application.

[26] We excluded the District of Columbia from both regressions because it does not have a senator or governor. In addition, we omitted Louisiana from the gubernatorial regression because of its peculiar runoff system (except for 1992 when the more traditional system was put in place). For the senatorial elections, we omitted the five cases where one party did not field a candidate (including these in the regression noticeably changes only some state fixed effects estimates). All of the election results (and the incumbency status variable) are based on *Congressional Quarterly's Guide to U.S. Elections* (1994).

[27] We get similar results when we exclude the states whose governors have only a two-year term: Arkansas (until 1986), New Hampshire, Rhode Island, and Vermont.

$R^2 = 0.693$, $SE = 0.082$, $N = 226$, where the incumbency variable, I, is defined with respect to the gubernatorial or senatorial election. National economic conditions have less explanatory power for these elections than they do for presidential elections: both the point estimates and the *t*-statistics are smaller, especially for national income growth. Alternatively, state income growth has a larger parameter for gubernatorial elections and a smaller parameter for senatorial elections, both relative to presidential elections.[28] These results are in contrast to Peltzman (1990) who finds that national income growth dominates state income growth for both senatorial and gubernatorial elections though we have already argued that his estimates may be biased.

3.3 1996 Election Forecasts

Table 2 contains forecasts for the state outcomes in the 1996 presidential election based on the final specification of section 3.2. We first forecasted using economic conditions predicted in May 1996 and then repeated the forecasts using the actual economic conditions (which only became available after the election). The Data Appendix discusses the sources of this information. For reference the mean values of the predicted economic variables are: $\text{PERINC2}^{\text{pred}} = 1.955$, $\text{UE2}^{\text{pred}} = 5.723$, $\Delta\text{UE4}^{\text{pred}} = -1.806$, $\text{StINC2}^{\text{pred}} = 1.910$, $\text{StCPI2}^{\text{pred}} = 2.996$; the actual mean values are: $\text{PERINC2}^{\text{act}} = 2.311$, $\text{UE2}^{\text{act}} = 5.694$, $\Delta\text{UE4}^{\text{act}} = -2.108$, $\text{StINC2}^{\text{act}} = 2.274$, $\text{StCPI2}^{\text{act}} = 2.919$.[29] Both the predicted and actual economic values represent favorable conditions with income growth above the average for the sample and unemployment and inflation below the average. Notice also that the predicted economic conditions were too pessimistic with the predicted PERINC2 over one-third of a percentage point below the actual level.

The state election forecasts using these data and the OLS parameters (from Table 1, column 2) are listed in Table 2. The appropriate metric for assessing these results is the absolute value of the forecast error, the difference between the actual and forecasted vote share. The median absolute error is 0.035 using the predicted economic conditions and 0.026 using the actual economic conditions. This is an acceptable degree of precision considering the in-sample median absolute error is 0.022. When we repeat the forecasting exercise using the logit parameters, the median absolute error is about 1% higher: 0.049 using the predicted conditions and 0.039 using the actual conditions (forecasts

[28] The state fixed effects have a similar partisan slant as with those in the presidential regression but they are not as extreme valued. For example, Utah, which has an OLS fixed effect of 0.297 in presidential elections, has a fixed effect of 0.455 for gubernatorial elections and of 0.400 for senatorial elections. One explanation for this contraction is that state parties are able to tailor their policies to match their state's ideological tilt, and so governors and senators from the minority party have greater electoral success than a presidential candidate.

[29] Also, IRUN = 1 and I = 1 since there is a Democrat incumbent who is running again.

omitted).[30] Another way of assessing the model's forecast is to re-estimate the parameters when the actual 1996 data are included. The parameters from the augmented sample regression were quite close to the original values though regional inflation has a larger negative effect.[31] The stability of the estimates is further evidence that we have a reasonable model of the voting process.

The model was less successful at forecasting the 1996 Electoral College. When we use the actual economic conditions and the OLS parameters, Table 2 shows that we forecast 330 votes for the Democrats while they actually received 379 votes (we correctly predict the winner in 43 of the 51 elections). However, when we use the predicted economic conditions the Democrats are forecasted to win 282 Electoral votes, a bare majority (here we correctly predict the winner of 40 states). The results with logit are even worse, with the Democrats forecasted to get 293 Electoral votes using the actual economic data and only 157 votes using the predicted economic data (forecasts omitted). These results illustrate why we are skeptical of forecasts of the Electoral College winner. Our four sets of forecasts – using the actual and predicted data and the OLS and logit parameters – have quite close point estimates. The forecasted vote share for a given state typically differs by less than four percentage points across the different specifications. However, because several elections are in the neighborhood of 50%, these small differences can result in a very different set of state winners and hence a different Electoral College outcome. For example, using OLS and the actual economic conditions the forecasted Democrat vote share in California is 0.523; using logit and the predicted data the vote share is less than three percentage points lower (0.496), but now the Electoral votes are awarded to the Republicans. Another way to see this point is to form a confidence interval around the point estimates. When we allow for even a narrow 50% confidence band (which gives a mean range of ± 0.032 around the OLS point estimate), we cannot predict the winner in over half of the states (see Table 2). That is, even small shifts in the economic regressors (such as an error in the predicted conditions) can change the plurality winner of a particular state and may therefore change the Electoral College winner.[32]

[30] Again, the FGLS estimates from Table 1 cannot be used for forecasting since that specification includes year dummies.

[31] The OLS estimates for the sample 1972–1996 are:

$$\begin{aligned} V^{\text{Democrat}} = {} & \underset{(17.27)}{0.0306\ \text{PERINC2} \times \text{I}} - \underset{(-4.06)}{0.0063\ \text{UE2} \times \text{I}} - \underset{(-2.70)}{0.0052\ \Delta\text{UE4} \times \text{I}} \\ & + \underset{(2.97)}{0.0038\ \text{StINC2} \times \text{I}} - \underset{(-4.50)}{0.0045 -\ \text{StCPI2} \times \text{I}} + \underset{(4.49)}{0.0287\ \text{IRUN}} + \text{StDUM} \end{aligned}$$

$R^2 = 0.870$, $SE = 0.041$, $N = 357$. The state fixed effect estimates remain quite similar to those listed in Table 2. Also, the logit estimates for the augmented sample are close to those found for the original sample.

[32] For example, using the predicted economic conditions the logit and OLS forecasts differ by an average of only 0.014 per state, and yet we have seen they have markedly different Electoral vote counts.

In light of the wide confidence intervals and the historical inaccuracy of economic predictions, we do not believe it is warranted to use our estimates to make long-range forecasts[33] of the Electoral College. However, we are confident in using our estimates to forecast which states will be closely contested battlegrounds and which are sure victories for one party or the other.

4. CONCLUSION

In this paper we found that state partisan alignment plays a crucial role in presidential elections. Several states are simply out of reach for one of the parties, no matter how favorable is the information about their candidate. And while both national and local economic indicators influence the election outcomes, only national growth and unemployment rates significantly shift vote shares. This suggests previous work on state-level returns which exclusively consider state economic aggregates may be seriously misspecified. Our estimates did a reasonable job forecasting the Democrat's 1996 vote shares in individual states but was less successful at forecasting the Electoral College outcome. Given the large errors in long-range predictions of economic conditions, we are skeptical of using our estimates (or those from similar models) to forecast the overall winner of a presidential election.

Our work suggests that there is little scope to engage in political business cycles. Since lags of two and even four years matter, voters use economic conditions for the whole term in their evaluation of the incumbent. So while both growth and unemployment have large coefficients, it is unlikely that government spending can maintain extraordinary values for the required period. This result confirms Peltzman's (1990) conclusion that voters are non-myopic: information from the incumbent's whole term, even from his first two years in office, has an effect on vote totals. Finally, since voters are not significantly swayed by local economic conditions, incumbents are unlikely to curry favor with pork barrel spending targeted at particular states.

DATA APPENDIX

We obtained our annual data from the following sources. State real per capita income (StINC) were provided by WEFA Group (1995) and are in turn based on Bureau of Economic Analysis figures. State unemployment rates (StUE) also come from WEFA (1995) with the original numbers from the Bureau of Labor Statistics. National unemployment (UE), real per capita personal income (PERINC), and GDP growth (GDP), the GDP deflator (GDPDEF) and national CPI (CPI) are all from *Statistical Abstract of the United States* (various years). Regional CPI (StCPI) figures were provided by the Bureau of Labor

[33] By a long-range forecast, we mean over a year prior to the election.

TABLE 3 DESCRIPTIVE STATISTICS

Variable	Mean	Standard deviation	Maximum	Minimum
V^{Democrat}	0.448	0.102	0.903	0.201
PERINC2	1.762	1.526	3.704	−0.782
UE2	6.958	1.066	8.550	5.750
ΔUE4	0.633	1.537	2.100	−2.000
StINC2	1.586	2.109	13.240	−9.310
StCPI2	5.812	3.334	13.220	3.250
PERINC1	2.863	2.362	6.182	−0.175
UE1	6.800	0.903	7.700	5.500
CPI1	5.656	3.626	13.499	3.010
StINC1	2.699	2.970	14.670	−13.350
StCPI1	5.642	3.704	14.740	2.710
StUE1	6.477	1.973	14.960	2.010

Based on annual observations from 1972–1992. Definitions and sources for all variables are contained in the text.

Statistics (1995). One point should be made concerning the IRUN variable. Following Fair's (1996) lead, we do not consider Ford as an incumbent in 1976 because he had not been elected on a national ticket and certainly was different from other incumbents. Finally, state vote outcomes come from *Congressional Quarterly's Guide to U.S. Elections* (1994).

For our 1996 election forecasts, the predicted real income growth and unemployment rates are calculated from figures supplied to us by WEFA (1996) while the predicted regional inflation rates are based on an extrapolation of the Bureau of Labor Statistics' (1996) monthly values (as of May 1996, the BLS did not publish year-end inflation predictions). For the actual economic conditions, real income growth is based on the Bureau of Economic Analysis's (1997) nominal figures (we used the BEA's personal consumption expenditure index to convert to real dollars). The unemployment and regional inflation rate are from the Bureau of Labor Statistics (1997).

Descriptive statistics for all variables in the final regression, as well as a selection of other regressors we considered, are contained in Table 3.

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