Measuring State Electoral Competition and its Effect on Public Policy

William D. Berry
Florida State University
wberry@fsu.edu

Belinda Creel Davis
Louisiana State University
davisbe@lsu.edu

Lanny W. Martin
Rice University
lmartin@rice.edu

Charles J. Barrilleaux
Florida State University
charles.barrilleaux@fsu.edu

Paper prepared for presentation at the 2007 State Politics and Policy Conference, Austin, TX, February 2007.

Theories of representation in the American states often focus on the competitiveness of elections as a crucial determinant of the quality of governance, with enumerable scholars positing that the threat of electoral competition motivates elected state officials to choose different policies than they would choose in the absence of such a threat (e.g., Dawson and Robinson 1963; Plotnick and Winters 1985; Erikson, Wright and McIver 1993; Brown 1995; Barrilleaux, Holbrook and Langer 2002). Given the voluminous literature hypothesizing that the level of competition influences state policy choices, it is no surprise that a number of measures of the competitiveness of state elections have been devised over the past half-century. In this paper, we confront weaknesses in existing indicators and present a measure that we believe is better suited for testing propositions about the effects of electoral competition on governance. Our basic strategy is to estimate the level of electoral threat experienced by individual legislators, and then aggregate the level of threat for legislators to the state level. We assess the reliability and validity of our measure, and then revisit a set of recent studies of the effect of electoral competition on state policy, substituting our measure of competition for that used in the original study.

Measures of electoral competition in the states have typically been based on information about (*i*) the strength of parties in government, or (*ii*) the competitiveness of a state's elections. The earliest efforts sought to develop taxonomies of state party systems – distinguishing among categories of states ranging from one-party to two-party – based on information about the relative strength of a state's major parties (e.g., Ranney and Kendall 1954; Schlesinger 1955; Golembiewski 1958; Dawson and Robinson 1963; Hofferbert 1964; Ranney 1965). The "industry standard" that emerged from this work is the eponymous Ranney (1965) index. It is measured over about a decade and is the average of four variables: the proportion of Democratic vote for gubernatorial races, the proportion of lower house seats held by Democrats, the proportion of upper house seats held by Democrats, and the proportion of the time the governorship and the state legislature is controlled by Democrats. This "unfolded" index ranges from 0, representing total Republican domination, to 1, representing complete Democratic control, with .50 indicating a perfectly competitive system. The index is then "folded" to remove information about partisanship, with .50 indicating a complete lack of competition (either complete Democratic or complete

Republican control) and 1.00 representing perfect competition (Patterson and Caldeira 1983). It is this folded indicator that we refer to as the "Ranney index."

Holbrook and Van Dunk [hereafter H&VD] (1993, 961) identify a critical weakness in the Ranney index: that it is "based largely on aggregate party balance in state government, not on election results." Theories about the effect of electoral competition are generally motivated by an assumption about how elected officials are likely to behave when they fear they may lose the next election versus when they believe their reelection is secure. When theories about the effects of electoral competition on policymaking hinge on the behavior of officeholders and not on parties, competition measures that focus on party balance are inappropriate and their use will produce inaccurate and possibly misleading results (Barrilleaux 1997).

Some initial attempts to measure electoral competition using election results rather than by party balance emerged from research on state legislative politics. Tidmarch, Lonergan and Sciortino (1986) devised measures of the competitiveness of elections in a handful of states during the 1970s. Weber, Tucker and Brace (1991) measured the marginality of state legislators in a subset of states. Then, H&VD made a dramatic leap forward by constructing an index measuring electoral competition in *all* American states over the period 1982-86, based on outcomes of individual state legislative elections.[1] In particular, the index is 100 minus the average of four variables: (*i*) the mean percentage (across all general legislative elections during the period) of the vote received by the winning candidate, (*ii*) the average margin of victory by the winning candidate, (*iii*) the percentage of seats that are "safe" (i.e., won with at least 55% of the vote), and (*iv*) the percentage of seats that are uncontested. Despite significant advantages of H&VD's index over Ranney's party balance measure, several important weaknesses remain.

First, because of complications in measuring the component variables for multimember free-for-all (MMFFA) districts, H&VD ignore these districts when constructing their index. But a substantial

[1] Since the publication of H&VD's article, Holbrook has produced an annual version of the index measured for each year in the period 1971-1992 (see Barrilleaux, Holbrook and Langer 2002).

number of state legislators are selected in MMFFA districts.[2] H&VD develop a separate measure of electoral competition within a state's MMFFA districts (the average number of candidates competing), and find that the correlation between their two indicators of electoral competition (across all states that use MMFFA districts) is .87. Based on this, they claim (p. 961) that "competition in non-MMFFA districts reflects the level of competition in MMFFA districts in states that use both…," which implies that excluding MMFFA districts does not bias their index. But the number of candidates running in a MMFFA district does not adequately reflect the strength of competition within a district; there can be many candidates receiving very small vote shares, and a count of such candidates would give a deceptive indication of competition. Thus, a good measure of state electoral competition should incorporate information about election outcomes in MMFFA districts. Our measure does so by capitalizing on an indicator of "victory margin" that accurately reflects the level of electoral competition experienced by legislators in all types of districts (including MMFFA); this indicator is based on a legislator's margin of victory *over the losing candidate in the district with the most support*, and thus shows how close the legislator came to losing her seat.

More fundamentally, although there is no doubt that each of the four components of H&VD's index is related to the level of electoral competition in a state, these four variable are combined into index in an ad hoc fashion – an unweighted average – without theoretical justification, and the four variables fail to reflect the range of factors determining the degree to which state legislators feel threatened by electoral competition. One of the components is the average share of the vote won by winning legislative candidates, but two others are closely related to this share: (*i*) the average margin of victory by the winning candidate, and (*ii*) the percentage of seats that are safe. Indeed, across elections in which only the two major parties field a candidate, margin of victory and winning vote share are *perfectly* correlated. While the presence of minor party candidates in some districts makes it so that *average winning vote*

---

[2] During the years for which we measure state electoral competition (1971-2003), 22% of state legislators were elected in MMFFA districts. [This is based on the observations in Carsey and Berry's (2007) data set.]

share and *average victory margin* are not perfectly correlated, the two are undoubtedly very highly related.[3] In a sense, the inclusion of both these components in the index is the near functional equivalent of one of the components being weighted "double" in the index. Furthermore, since a "safe" seat is indicated by a winning percentage of 55% or more, *whether a seat is "safe"* is actually an exact transformation of *winning vote share* via dichotomization at 55%.[4] In effect, then, *average winning vote share* is (loosely speaking) triple counted in the index. Note that we do not contend that it is wrong to adopt a measurement strategy that makes *average winning vote share* the primary determinant of the level of electoral competition in state, since this is certainly a very important factor. But including *vote share* and two variables that are close transformations of *vote share* in an additive index makes it so that the precise relationship of vote share to the final index is determined in an ad-hoc and unclear fashion. It would be better to rely on an explicit theory about the relationship between *vote share* and level of electoral competition to motivate a choice about just how information about *vote share* should be incorporated into an indicator of competition. Our measure of electoral competition rests on such a theory.

By including *average victory margin* in their additive index of competition, H&VD implicitly assume that *margin* is linearly related to the strength of electoral competition, when it is more reasonable to assume that a constant difference in *margin* reflects a variable difference in strength of competition, depending on the position on the *margin* scale. For example, consider two shifts in *margin* of 10%. The difference in the competitiveness of an election won by a margin of 0.1% and one won by a margin of 10.1% is substantial. [Indeed, in the H&VD index, the former victory margin indicates a near-maximally competitive race while the latter prompts scoring as a "safe" seat for the incumbent.] But the competitiveness difference associated with a shift from a margin of 50% to one of 60% is probably quite

[3] In the sample of state legislators used in our empirical analysis, the two variables are correlated at .92.

[4] In our sample of legislators, *whether a seat is safe* has a correlation of .76 with *winning vote share*.

small; in either case, the winner experienced no serious competition.[5] Our measure of state electoral competition will reflect the nonlinear relationship between *margin* and strength of competition.

By combining *percentage of seats that are uncontested* with the three other components closely related to *average winning vote share* in contested elections, H&VD impose an implicit (and inadequately clarified) assumption about the relative implications of (*i*) an incumbent legislator being uncontested, and (*ii*) the legislator being contested and winning by a particular margin. One view is that an uncontested election can be conceived as equivalent to one in which the winning candidate received 100% of the votes. But one can also argue that a *huge* margin of victory reflects an even greater level of incumbent electoral domination than an uncontested race (in which the incumbent's true electoral strength remains untested). Our indicator of state electoral competition is based on an explicit assumption about what vote shares indicate greater competition than running uncontested and what shares indicate less. Based on empirical evidence about the impact of an incumbent's previous margin of victory on the probability that he will be reelected, our measure of state electoral competition assumes that a legislator who runs unopposed experiences the same level of competitive threat as a legislator who is contested and wins by a margin of about 51% (i.e., winning a two-person race 75.5% to 24.5%).[6]

Most importantly, H&VD ignore other factors that influence the competitiveness of elections beyond the four components in their index. The goal is to construct an indicator of state electoral competition that reflects the degree to which an elected official in the state perceives that she is at risk of losing the next election. Thus, to accurately measure strength of electoral competition, one must consider the variety of factors that influence the likelihood that a state official will be able to win reelection. For

[5] One might argue that by averaging *average victory margin* with the *percentage of elections won with at least 55% of the vote*, H&VD's ultimate index reflects the fact that an increase in *victory margin* implies a greater reduction in strength of competition when starting from a small margin than when starting from a large margin. But it is preferable to construct a measure of electoral competition that allows for nonlinearity in the relationship between *margin* and strength of competition in a way that makes the nature of the nonlinearity clear, and does not involve an abrupt change in the relationship at an arbitrary cut point based on 55% of the vote.

[6] This calculation is based on coefficient estimates of logit equation # below, and holds (approximately) when the other variables in the equation are fixed at a wide range of values.

example, consider an incumbent Republican state legislator facing reelection the following year. If a currently popular Republican president is expected to run for reelection at the same time, the anticipated coattail effect should make the state legislator more optimistic about the next election than if the same legislator were running in an off-year election and therefore not subject to coattails. A valid measure of state electoral competitiveness must reflect the effect of presidential coattails – as well as the impacts of other variables that influence the likelihood that an incumbent state legislator will win reelection.

Our Strategy for Measuring Electoral Competition and Studying Its Impact on State Policy

We seek to construct an indicator of electoral competition in the American states for use as an independent variable in a model explaining state policy outputs. Assume that the ultimate state-level model of interest is

$$E(Policy_{s,t}) = \beta_0 + \beta(Comp_{s,t}) + \Sigma\beta_j X_{j,s,t} \qquad [1]$$

where $Policy_{s,t}$ denotes the policy of state *s* in year *t*, $Comp_{s,t}$ denotes the strength of electoral competition in state *s* in year *t*, and the Xs (1, 2,…, j) are other exogenous determinants of state policy. We concur with H&VD that state electoral competition cannot validly be measured using indicators of the degree to which the control of state government institutions is shared by the major parties, and must instead reflect information about the elections in which state officials compete. Our strategy is to estimate the level of electoral threat experienced by individual state legislators using information about their election outcomes, and then aggregate the level of threat for legislators to the state level.[7] More formally, we define state electoral competition by

$$Comp_{s,t} = \text{Mean}_{\text{over all state legislators in state } s}(ElectoralThreat_{i,t}) \qquad [2]$$

where $ElectoralThreat_{i,t}$ denotes the level of electoral threat experienced by legislator *i*.

We give more precision to this formulation by defining the electoral threat experienced by a legislator as her *perceived probability of losing the next election*. If she believes that she is nearly certain

[7] Once threat measures for individual legislators are constructed, they can be aggregated to construct electoral competition scores for chambers and party delegations as well.

to win, the level of threat should be scored as very low. In contrast, if she fears there is a strong possibility that she may lose, the level of threat should be high. Conceivably, if one were trying to measure electoral competition in just a few states at a single point in time, one could interview legislators and ask them to assess their chances of losing their next election. But we seek to measure state electoral competition in all states over many years, and thus, a survey design is infeasible. Our alternative approach is to estimate legislators' perceived probability of losing from their election outcomes and other information available about the context in which they compete. H&VD, in effect, identify two critical factors for estimating a legislator's perceived probability of losing his next election: (*i*) whether he was contested in his previous race, and if he was, (*ii*) his margin of victory/vote share in that election. We use whether a legislator's previous election was contested and her previous margin of victory as well, but we expand the information well beyond this.

Given our definition of electoral threat, we can re-state the definition in [2] more precisely as

$$Comp_{s,t} = \text{Mean}_{\text{over all state legislators in state } s}(PcvdProbLoseNext_{i,t}) \qquad [3]$$

where $PcvdProbLoseNext_{i,t}$ denotes state legislator *i*'s perception (at time *t*) of his probability of losing the next election. Assuming we can estimate $PcvdProbLoseNext_{i,t}$ for each state legislator, we can aggregate these estimates across legislators in a state to produce an indicator of state electoral competition, which in turn can be used as an independent variable in equation 1 to estimate our model of ultimate interest. But we would face a statistical problem when estimating equation 1 due to the fact that electoral competition is itself estimated rather than observed. If we simply use our point estimates of state electoral competition as an independent variable in equation 1, we are implicitly assuming that electoral competition is observed perfectly. In truth, however, we have an estimate for electoral competition with some amount of measurement error. The statistical challenge when estimating equation 1 is doing so in a way that takes into account our uncertainty about states' true levels of electoral competition. We overcome this problem by using statistical simulation.

Assume that the true process determining the probability of a state legislator losing the current election – $ProbLoseCurr_{i,t}$ – with contemporaneously measured independent variables can be specified by the following equation:

$$\text{True Model: } ProbLoseCurr_{i,t} = f(Known_{i,t}, Forecastable_{i,t}) \quad [4]$$

In this equation, $Known_{i,t}$ is a set of variables, the values of which at time *t* are known with near certainty throughout the incumbent's term prior to year *t* (e.g., the legislator's margin of victory in his previous election); and $Forecastable_{i,t}$ is a set of variables the values of which at time *t* the legislator can forecast in advance with varying degrees of success, but not predicted perfectly (e.g., economic conditions).

Of course, this true model is unknown. However, we develop a logit model – a slightly modified version of a model developed by Berry, Berkman and Schneiderman (2000) – which we assume specifies the true model – equation 4 – accurately:

$$\text{Our Model: } Lose_{i,t} \sim \text{Bernoulli}(ProbLoseCurr_{i,t}) \quad [5]$$

$$ProbLoseCurr_{i,t} = 1 / \{1 + \exp[-(\Sigma\, \beta_K Known^{(PS)}_{i,t} + \Sigma\, \beta_F Forecastable^{(PS)}_{i,t})]\}$$

The unit of analysis is the incumbent American state legislator, *i*, competing in an election in year *t*. $Lose_{i,t}$ equals 1 if an incumbent loses re-election and 0 if she does not. $Known^{(PS)}_{i,t}$ is a set of variables, the values of which at time *t* are known throughout the incumbent's term prior to year *t*. $Forecastable^{(PS)}_{i,t}$ is a set of variables the values of which at time *t* the legislator cannot predict perfectly in advance. [Note that we use the labels $Known^{(PS)}_{i,t}$ and $Forecastable^{(PS)}_{i,t}$ in this equation – instead of $Known_{i,t}$ and $Forecastable_{i,t}$ as in equation 4 – to indicate that the variables in the true model [4] may be different than the variables in our model [5]. Indeed, the variables must be different since our model is bound to exclude some influences on *ProbLoseCurr*, but – by definition – the true model does not exclude any determinants of this variable.]

Finally, we assume that legislators have their own "model" for predicting the probability of losing an imminent election based on contemporaneous conditions – a model that is the same for all legislators and reflects their shared "conventional wisdom":

$$\text{Legislators' Model: } PcvdProbLoseCurr_{i,t} = g(Known^{(Leg)}_{i,t}, Forecastable^{(Leg)}_{i,t}) \quad [6]$$

In this equation, $PcvdProbLoseCurr_{i,t}$ denotes state legislator *i*'s perception at time *t* of his probability of losing an imminent election[8]; $Known^{(Leg)}_{i,t}$ is a set of variables, the values of which at time *t* are known throughout the incumbent's term prior to year *t*; and $Forecastable^{(Leg)}_{i,t}$ is a set of variables the values of which at time *t* the legislator cannot predict perfectly in advance.[9]

We assume that, at each point during their term, legislators use model 6 along with known future values of the variables in $Known^{(Leg)}$ and anticipated future values of variables in $Forecastable^{(Leg)}$ at the time of the next election to determine their perceived probability of losing the next election, $PcvdProbLoseNext_{i,t}$. Our plan is to construct a point estimate of the strength of electoral competition in state *s* in year *t*, $Comp_{s,t}$, by estimating each state legislator's perceived probability of losing the next election ($PcvdProbLoseNext_{i,t}$) at the time of the year they are most likely to adopt new policy – which we define operationally as the second quarter[10] – and averaging these values across legislators in state *s*. We also seek to place a confidence interval around this point estimate of $Comp_{s,t}$ that accurately reflects the uncertainty resulting from our inability to observe directly legislators' perceived probabilities of losing. Estimated values of $Comp_{s,t}$ for states can then be used to estimate the parameters of our model of ultimate interest – equation 1 – along with confidence intervals that reflect our measurement uncertainty, using the statistical simulation software, CLARIFY (King, Tomz and Wittenberg 2000; Tomz, Wittenberg and King 2003).

Central to a proper accounting of uncertainty is an assessment about how accurately legislators are able to estimate their probability of losing their next election using model 6. We must consider (*i*) how well legislators can estimate their probability of losing an imminent election based on

---

[8] We are not arguing that a state legislator is able to articulate a numerical estimate of her probability of losing an election, but she should have an informed qualitative impression of her vulnerability that is comparable to an estimated probability.

[9] Note that equation 6 includes no stochastic error component because we assume that legislators share a conventional wisdom that makes it so that two legislators facing the exact same conditions and circumstances would perceive the same probability of losing.

[10] Data constraints require that the time period for which we estimate *PcvdProbLoseNext* be a calendar quarter. In most states, the last few weeks of a legislative session – the period in which most legislation is passed – occurs in the second quarter (April, May, June).

contemporaneously observed conditions (i.e., how closely their perceived probability of losing – $PcvdProbLoseCurr_{i,t}$ in equation 6 – approximates their true probability of losing – $ProbLoseCurr_{i,t}$ in equation 4), and (*ii*) how accurately they can predict the values at the time of their next election of the variables in the set $Forecastable^{(Leg)}_{i,t}$, i.e., the right-side variables in equation 6 that are not known with certainty in advance of the election.

Assume that when an election is imminent, each legislator is able to predict with perfect accuracy the true probability that he will lose the election. This is equivalent to assuming that the legislators' model for determining her perceived probability of losing an election (equation 6) is equivalent to the true model determining the probability of losing (equation 4). The premise underlying this assumption is that legislators – having won at least one election, and likely having considerably more experience in politics prior to running for the legislature – know all the variables influencing the outcomes of their elections (i.e., the variables in $Known_{i,t}$ and $Forecastable_{i,t}$ in equation 4). Moreover, as participants in their own elections, they know the current values of all these variables. Note that if this assumption is met, then if we estimate equation 5 and use the MLEs to calculate predicted values of $ProbLoseCurr_{i,t}$ for legislators, our uncertainty about these values as estimates of $ProbLoseCurr_{i,t}$ (the dependent variable in the true model) would be identical to our uncertainty about these values as estimates of $PcvdProbLoseCurr_{i,t}$ (the dependent variable in the legislators' model). Thus, to place a confidence interval around an estimate of $PcvdProbLoseCurr_{i,t}$ (legislator *i*'s perceived probability of losing), we would need only construct a confidence interval for the predicted value for legislator *i* of $ProbLoseCurr_{i,t}$ (the dependent variable in the true model and our econometric specification of it in equation 5). The statistical simulation software, CLARIFY, permits the construction of such confidence intervals.

Clearly, assuming that legislators can predict perfectly the true probability of winning an imminent election exaggerates their true predictive power. But if their power is weaker and their predictions are more consistent with those from our logit model of electoral success (equation 5), an estimate of a legislator's probability of losing an imminent election based on our logit model is likely to be more accurate as an estimate of the legislator's perception of this probability than as an estimate of the true probability, implying that we would have a better estimate of a legislator's perceived probability of losing than our results indicate. Therefore, when these estimates of a legislator's perceived probability of losing an imminent election are used to construct a measure of state electoral competition, which in turn is used to estimate the effect of competition on state policy using equation 1, we should wind up with an estimated effect that is more accurate than we claim it to be.

Thus far, we have considered only uncertainty in our estimates of legislators' perceived probabilities of losing an imminent election based on contemporaneously measured variables. Since our ultimate objective is to study the effect of electoral competition on state policy, and legislators do not generally pass legislation on the eve of elections (as legislative sessions tend to be completed by mid-year), we must construct a measure of a legislator's perceived probability of losing the next election at some time, *t*, during a legislative session. Thus, another form of uncertainty is introduced by virtue of the fact that when we use equation 5 to predict legislators' perceived probabilities of winning the next election, we must employ estimates of the values legislators *anticipate* at time *t* the independent variables will assume at the time of the next election, and for some variables (e.g., economic conditions) these estimates are themselves uncertain.

When analyzing this form of uncertainty, we consider the two sets of variables in equation 6 – $Known^{(Leg)}$ and $Forecastable^{(Leg)}$ – separately. Future values of variables in $Known^{(Leg)}$ are clear to legislators any time during their term, and if we also know these values, we can use these known values when predicting legislators' perceived probabilities of winning the next election, thereby adding no additional uncertainty to our parameter estimates for the ultimate model of interest specifying the effect of state electoral competition on state policy (i.e., equation 1).

Consider, however, variables in $Forecastable^{(Leg)}$ (e.g., economic conditions). We assume that they fall into two categories. The first – which we designate $WeaklyForecastable^{(Leg)}$ – consists of variables the future values of which are sufficiently unpredictable to make it so that legislators simply resort to an assumption that the variable will regress to its mean over the recent past.[11] Yet legislators undoubtedly vary in their conceptions of what constitutes the "recent past." Thus, for each of these variables, we assume that legislator *i* at time *t* conceives of the recent past as the period beginning y_i years prior to time *t* and ending at time *t*, where y_i is a random value drawn from some distribution of period lengths (to be described below).

The second category of variables in $Forecastable^{(Leg)}$ – which we call $StronglyForecastable^{(Leg)}$ – consists of variables for which legislators can reasonably expect to do better than assuming that the variable will regress to its mean. For each variable in $StronglyForecastable^{(Leg)}$, F, we assume that legislators rely on a "model" – reflecting their shared conventional wisdom – to generate an expected value of F at the time of the next election [denoted $E(F_{i,t+})$] as a function of set of independent variables, $Z^{(Leg)}{}_{i,t}$, reflecting current (i.e., at time *t*) and past conditions:

$$\text{Legislators' Model: } E(F_{i,t+}) = h(Z^{(Leg)})_{i,t}\ , \qquad [7]$$

Although we assume that legislators are able to predict perfectly their probability of winning an imminent election, we assume that legislators have no greater ability to predict future values of variables in $Forecastable^{(Leg)}$ than do we as political scientists. (Below, we will designate the specific variables we assume to be in *Forecastable* and make the case that this assumption does, in fact, hold for each variable in the set.) Thus, for each variable, P, in $StronglyForecastable^{(Leg)}$, we specify our own regression model predicting future values of P,

$$\text{Our Model: } E(F_{i,t+}) = \alpha_0 + \Sigma\ \alpha Z^{(PS)}{}_{i,t}\ , \qquad [8]$$

Then when using CLARIFY to estimate state electoral competition, and its effect on state policy, we estimate equation 8 using OLS, and assume that the estimated conditional distribution of the expected value of $F_{i,t+}$ given the values of the independent variables is the same distribution as the one from which legislators (implicitly) "draw" when predicting the future value, $F_{i,t+}$.

---

[11] Operationally, the variables in *WeaklyForecastable* are ones for which our best efforts to produce a model predicting future values of the variable with a set of independent variables reflecting current and past conditions failed to yield a model with an R-square value in excess of .10.

To summarize, our ultimate interest is studying the effect of state electoral competition on state policy by estimating a model taking the form of equation 1. The fact that we cannot observe the level of electoral competition in states directly, and must estimate these values, leads us to rely on statistical simulation to estimate equation 1. We specify and estimate a model in the form of equation 5, which predicts the probability that a legislator will lose an election with contemporaneously observed independent variables. Then we divide the independent variables in this model into the sets *Known* and *Forecastable,* and for the latter set we specify and estimate models taking the form of equation 8, which are then used to derive estimates of their predicted future values. Given the coefficient estimates for our version of equation 5, future values for *Known* variables, and *projected* future values for *Forecastable* variables, we are able to estimate, for each year between 1971 and 2003, a state legislator's perceived probability of losing her next election for nearly all American state legislators in office in that year. Treating these estimates of the perceived probability of losing the next election as indicators of the level of electoral threat, we average these values across states to construct an indicator of state electoral competition that is grounded in an individual-level model of the factors influencing the level of electoral threat experienced by a legislator. This indicator can be used along with statistical simulation software to estimate our equation of ultimate interest specifying an effect of electoral competition on state policy. The resulting confidence intervals for the parameters of this equation will reflect both the traditional estimation uncertainty one experiences even with perfect measures of all concepts, and the additional uncertainty resulting from our reliance on estimates of state electoral competition that are imperfect.

A Model of the Electoral Success of Incumbent State Legislators

The first step in constructing our measure of state electoral competition is to specify a model (in the form of equation 5) predicting the probability that a major-party state legislator seeking reelection will lose as a function of independent variables that can be contemporaneously observed. We employ a slightly modified version of a model developed by Berry, Berkman and Schneiderman [BB&S] (2000). This model includes two variables reflecting the kind of information on which the H&VD measure of electoral competition is based: whether a legislator was contested in her previous election, and if she was, her margin of victory in that race. However, the model also includes other variables that BB&S find have substantial effects on the probability that a legislator will lose an election: economic conditions, presidential coattails, legislative professionalism, term length and district type (how many legislators represent a district).

More specifically, our model takes the form

$$\Pr(Lose_{i,t}) = f(ContestPrev, Margin, PresElecYr, OwnPartyPresVote\%, Profess, EconCondit, Term2Yr, SMDist, PostDist, NotPresParty, \text{set of unit dummies for states}) \quad [9]$$[12]

ContestPrev indicates whether a legislator had an opponent in the previous election; and if he did, the margin of victory in that race is denoted *Margin*. Two variables are used to specify presidential coattail effects: *PresElecYr* (which equals 1 in a presidential election year and 0 otherwise) and *OwnPartyPresVote%* (which equals 0 if there is no presidential election, and if there is, the percentage of the two-party presidential vote won by the legislator's party in the state). The other independent variables are the level of professionalism of the legislators' body (*Profess*), national economic conditions (*EconCondit*), term length [two vs. four years] (*Term2Yr*), district type [measured in three categories – single-member, MMFFA and post – using *SMDist* (which equals 1 for a single-member district and 0 otherwise), and *PostDist* (which equals 1 for a post election and 0 otherwise)], whether a legislator is from the party opposing the president (*NotPresParty*), and unit dummies for each state. The model assumes a variety of interactions, most involving legislative professionalism and reflecting the hypothesis that a high level of professionalism buffers legislators from the effects of external political and economic forces (presidential coattails and national economic conditions). We refer readers to BB&S's (2000) paper for a detailed presentation and defense of the model, and precise operational definitions of each variable.[13]

---

[12] BB&S's dichotomous dependent variable is denoted *Win*, and equals 1 for a victory rather than a loss.

[13] To facilitate a comparison of BB&S's model to our own, we use identical variable labels.

We make two changes from the BB&S model. One is to simplify by restricting the coattail effects specified to presidential, and excluding gubernatorial and senatorial coattails. This change was motivated by two considerations. First, BB&S find senatorial and gubernatorial coattail effects to be much weaker than presidential. Second, we suspect that vote shares by gubernatorial and senatorial candidates in future elections (like presidential election vote shares) should be in the *Forecastable* category, yet given the small number of senatorial and gubernatorial elections in each state, it is impossible to test any model we would specify for predicting these values. Our other modification of BB&S's model is to exclude redistricting effects, which the authors specify via the inclusion of variables indicating whether it is the first election following a state-wide redistricting, and if one of the major parties has "complete control" over the redistricting process. Again, there are two considerations. First, the authors find that the redistricting effect is relatively small.[14] Second, the values of variables specifying the redistricting effect in their model should not be viewed as known throughout a legislator's term (and thus in the set, $Known^{(PS)}$), yet it is unclear how we would construct a model taking the form of equation 8 that would forecast the values these variables will assume at the time of the next election because we do not know for any specific state how much time it will take after a decennial census year for redistricting to be accomplished, which parties will control the institutions of government in the year that redistricting is completed, and whether a court will overrule the redistricting plan formulated by the legislature and governor. Despite these two changes, the fit of our model is only slightly lower than that of the published BB&S model. A logit estimation of the original model produces a pseudo R^2 of .176,[15] while our revised logit model yields .170 (Judge et al. 1988, 794); and the percentage of cases correctly predicted drops just by 0.7 (from 93.5 to 92.8).

[14] They conclude that when other variables in the model are fixed at central values, members of a party with complete control over redistricting (control of both houses of the legislature and the governor's office, and no court interference) have a .029 greater probability of winning in the first election following the redistricting than legislators from the opposition party.

[15] BB&S estimated this model using probit (rather than logit), which yielded a pseudo R^2 a bit lower: .167.

The logit coefficient estimates for our model are presented in the Appendix.[16] One finding of special interest concerns the estimated impact of *margin of victory in a legislator's previous race* (*Margin*) on the probability of losing the next election. In the introduction, we criticized H&VD's implicit assumption that margin of victory is linearly related to state electoral competition, and asserted that a constant difference in victory margin actually reflects a smaller difference in strength of competition as the size of the margin increases. Figure 1 presents the estimated relationship (based on the logit estimates in the Appendix) between margin of victory in the previous election and the predicted probability of losing an election (when remaining independent variables are fixed at central values). Consistent with our assertion, the strength of the impact of *Margin* on the probability of losing declines as *Margin* increases. Because the indicator of state electoral competition we construct is based on the logit model generating Figure 1, our measurement technique reflects this nonlinear relationship between margin of victory and strength of competition.

Determining Future Values of Variables Not Known with Certainty in Advance

Values of most variables in our model of electoral success (equation 9) *at the time of the next election* are known by legislators with certainty throughout their term, and thus belong in the $Known^{(PS)}$ set: (*i*) term length (*Term2Yr*), (*ii*) district type (*SMDist* and *PostDist*), (*iii*) whether a legislator's election is simultaneous with a presidential election (*PresElecYr*), (i*v*) whether the legislator had an opponent in the previous election (*ContestPrev*), and if she did, (*v*) her margin of victory in that race (*Margin*). Thus, when using our logit model to estimate a legislator's perceived probability of losing the next election, we simply "plug in" for these variables the actual values they will assume at the time of the next election.

---

[16] Given King and Zeng's (2001) argument that logit can substantially underestimate the probability of rare events, and the fact that only 7.3% of the cases in our estimation sample have *Lose* values of 1, we also estimated the model with rare events (RE) logit. However, we discovered that logit and RE logit predicted probabilities differ by only trivial amounts for observations in our sample. The highest estimated perceived probability of losing for a legislator in our sample (based on logit) is .797. A random sample of five cases each from those with probabilities in the ranges [.00, .10), [.10, .20), [.20, .30),…, [.70, .797] showed that logit and RE logit probabilities always differed by less than .004. Since with the computer we used for estimation, it took over 30 seconds to calculate a predicted probability for a single case using RE logit, and since we had over 229,432 probabilities (one for each observed legislator-year) to compute, we based our measures of state electoral competition on logit results.

Furthermore, while the level of professionalism of state legislatures does change over time, there is unlikely to be significant change in periods of less than four years.[17] Therefore, for all practical purposes, it is safe to assume that at any point during their term, incumbents expect the level of professionalism of their legislature to be about the same at the time of their next election. For this reason, legislative professionalism is also treated as $Known^{(PS)}$, and it is fixed at the actual value of professionalism in the year the prediction is being made when using our logit model to estimate perceived probabilities of losing the next election.

This leaves several variables in equation 9 the values of which at the time of a legislator's next election cannot reasonably be assumed to be known with certainty throughout the legislator's term: (*i*) national economic conditions (*EconCondit*), (*ii*) the statewide vote shares of the major parties' presidential candidates (which are needed to compute *OwnPartyPresVote%* in order to specify the coattail effect), and (*iii*) the party of the president (which is needed to compute both *NotPresParty* – in order to specify the differing effect of economic conditions on legislators of the President's party and the opposition party – and *OwnPartyPresVote%*). In the next sections, we delineate for each of these variables whether they are deemed to be in *StronglyForecastable* or *WeaklyForecastable*, and present specific models for forecasting their future values.

Predicting Future Values of National Economic Conditions

Our indicator of national economic conditions (*EconCondit*), the percentage change in real income per capita over the previous year, should be treated as *StronglyForecastable* if economic conditions at the time of the next election can be predicted by legislators with at least some degree of accuracy based on current and past economic conditions, and *WeaklyForecastable* if future values are nearly completely unrelated to current and past conditions. We started with the working assumption that national economic conditions *are* predictable over periods up to four years in the future, and attempted to construct a predictive model. Using quarterly data about economic conditions from 1958 to 1988, we

[17] Indeed, pooling annual observations for all states between 1975 and 1990, the correlation between our indicator of professionalism and the indicator lagged four years is .90.

regressed our measure of (year *t*) national economic conditions [measured in the fourth quarter, i.e., at general election time] on (*i*) economic conditions in the second quarter [i.e., when most state legislatures are in session] of year *t*-*k*, (*ii*) short-term change in economic conditions (over a period ending in the second quarter of year *t*-*k*), and (*iii*) mean economic conditions over a period ending in the second quarter of year *t*-*k*, for *k* equals 0, 1, 2, and 3:

$$E(EconCondit_{t}) = \alpha + \alpha_1 EconCondit_{t-k} + \alpha_2 ChangeCondit_{t-k} + \alpha_3 MeanCondit_{t-k} \qquad [10]$$

The fit of these regressions tells us the degree to which current economic conditions (measured in the second quarter of a year) and past economic conditions provide sufficient information for predicting economic conditions with some degree of accuracy at election time later in that year (*k* = 0), and at election time during each of the following three years (*k* = 1, 2 and 3).

The choices of the periods over which to measure *short-term change in economic conditions* and *mean economic conditions* are somewhat arbitrary. For this reason, we conducted a sensitivity analysis, varying the period for which *change* is measured over the values 6, 9 and 12 months, and the period for which *mean economic conditions* is measured over the values 4, 6 and 8 years. Using all possible combinations of these values yielded nine separate regressions for each value of *k*. The results offer clear evidence that current and past economic conditions allow a reasonable prediction of economic conditions at election time later in that year, but not in any of the succeeding years. For the nine regressions in which economic conditions were regressed on conditions earlier in the same year (i.e., *k* = 0), the average adjusted-R^2 was a healthy .64 (with a range from .61 to .66), suggesting that economic conditions at election time later in the same year should be conceived as *StronglyForecastable*. The best fitting of the nine regressions involved a *mean* over 8 years and *change* over 6 months; and we use the coefficient estimates for this regression to calculate economic conditions expected later in the same year: using CLARIFY, we assume that legislators predicting future economic conditions draw a value from the simulated distribution of the expected value of the dependent variable of equation 10, given the specified values for the independent variables.

However, when economic conditions were regressed on conditions in the previous year (k = 1), conditions two years ago (k = 2), or conditions three years ago (k = 3), the adjusted-R^2s were uniformly near zero. Across the nine regressions for each value of k, they averaged .05 (k = 1), –.14 (k = 2) and –.08 (k = 3). This indicates that if the next election occurs during the next calendar year or later, economic conditions during the next election are virtually unpredictable as a function of current conditions, and should be viewed as *WeaklyForecastable*. Therefore, when using our logit equation to predict the probability that a legislator will lose the next election when this election will occur in any of the following three years, we presume that politicians assume that economic conditions will regress to its mean over the recent past. The period over which this mean is calculated varies across legislators; in particular our simulation assumes that this period (the number of quarters) is drawn randomly from the symmetric distribution in Figure 2 (with minimum 2 years, maximum 8 years and a central tendency of 6 years).

Predicting Future Presidential Coattails

We must recognize that some legislators (i.e., those with four-year terms who always run in off-year elections) never experience a presidential coattail effect, some are always subject to coattails (i.e., legislators with four-year terms coinciding with that of the President), and some rotate between being subject to coattails and not being affected by coattails (i.e., legislators with two-year terms). Our logit model assumes that when a state legislator is running at the same time a presidential race is contested, the greater the statewide vote percentage won by the presidential candidate of the legislator's party, the greater his probability of reelection. Can the state vote share of the presidential candidate of the legislator's party in a future election be predicted with a reasonable degree of accuracy based on current and past conditions, and therefore be treated as *StronglyForecastable*, rather than *WeaklyForecastable*? There are two factors to consider when answering this question: the extent to which the party of the president at the time of the next election can be foreseen, and the degree to which the vote shares of the major parties in the presidential race can be anticipated. In this section we consider the second factor, delaying consideration of the first factor to the section that follows.

We find that when the incumbent president won the previous election and is eligible to run again,[18] state votes shares of the presidential candidates can be forecast with some degree of accuracy, regardless of whether the prediction is made in the year of the election, or one, two or three years before.[19] In particular, for all years, *t*, between 1972 and 2000, we regressed the percentage of a state's vote received by the incumbent president (in year *t*) on (*i*) the percentage of the vote won by the same person in the previous presidential election (in year *t*-4), (*ii*) the mean percentage of the vote won by the candidate of the incumbent's party in recent presidential elections (in years *t*-4, *t*-8,…), (*iii*) presidential approval in the second quarter of year *t-k*, (*iv*) short-term change in presidential approval (over a period ending in the first second of year *t-k*), (*v*) mean presidential approval over a president's term (beginning in the first quarter of his presidency and ending in the second quarter of year *t-k*), and (*vi*) a set of state dummy variables, for *k* equals 0, 1, 2, and 3:

$$E(PresVote\%_{t}) = \gamma_0 + \gamma_1 PresVote\%_{t-4} + \gamma_2 MeanPresVote\%_{t} + \gamma_3 Approval_{t-k}$$
$$+ \gamma_4 ChangeApproval_{t-k} + \gamma_5 MeanApproval_{t-k} + \Sigma\gamma_{6j} State\ Dummies_{j} \qquad [11]$$

Because the periods for measuring *mean vote percentage* and *short-term change in approval* are to a degree arbitrary, we estimated this regression model using three different values for both variables: *mean vote percentage* over the last 2, 3 and 4 elections, and *short-term change in approval* over 6, 9 and 12 months. This yielded 9 regressions for each value of *k* (0, 1, 2 and 3). The average adjusted-R^2 for the 9 regressions ranged from .46 to .88 across all four values of *k*, confirming that the vote share of the candidates in the next presidential election should be treated as *StronglyForecastable* (rather than *WeaklyForecastable*) when the incumbent president won the previous election and is eligible to run again, regardless of when the next presidential election will be held. One of the 9 specifications (*mean vote percentage* over 4 elections and *change in approval* over 9 months) stood out as consistently generating a high level of fit across all four values of *k*. This 4/9 combination produced an adjusted-R^2 of .82 when *k*

[18] During our period of analysis, most cases failing to satisfy this condition involve a second term president barred from seeking reelection, but the Ford years also fail to meet this condition, since Ford assumed the presidency without being elected.

[19] We presume that state legislators assessing their chances of losing their next election always assume that if the current president is eligible to run for reelection, he will do so.

= 0, .81 when $k = 1$, .63 when $k = 2$, and .71 when $k = 3$. Thus, we use the coefficient estimates for this regression to calculate expected party shares of the state presidential vote at the time of a legislator's next election; we assume that legislators predicting future presidential election vote shares draw a value from the simulated distribution of the estimated expected value of the dependent variable of equation 11, given the specified values for the independent variables.

In contrast, when it certain that the next presidential election will not involve the winning candidate from the previous election, we assume that the shares of votes received by the presidential candidates in the next election are *WeaklyForecastable* regardless of the amount of time until the next election, and thus that state legislators assume these vote shares will regress to the mean vote shares received by the parties' presidential candidates. However, the period over which this mean is calculated is assumed to vary across legislators; specifically, we assume that the mean is computed over the previous E elections, where E is randomly drawn from a uniform distribution with 3 values: 2, 3 and 4.

Predicting the Party of the President at the Time of the Next Election

We must also consider the extent to which the party of the president at the time of the next election can be foreseen. The simplest case is when, as of the second quarter of the year, the legislator's next election will occur during the president's current term in office. In this situation, the legislator can predict with certainty the party of president at the time of her election, i.e., the variable *NotPresParty* in equation 9 can be assume to be in the set $Known^{(Leg)}$. However, when the president's tem will be over by the time of a legislator's next election, the party of the president cannot be forecast with certainty.

Thus, a second case to consider is when, as of the second quarter of the year, (*i*) the current president's term will end before a legislator's next election, but (*ii*) the incumbent president won the previous election and is eligible to run again. Here we assume that the variable *NotPresParty* is *StronglyForecastable*. In particular, we assume that the legislator predicts the party of the president at the time of her next election by relying on the same model she uses to estimate the future *state* vote share of an incumbent president (i.e., equation 11): in effect, she draws a value from the simulated distribution of the estimated expected value of the dependent variable of equation 11, given the values for the independent variables *observed at the national level* rather than the state level. This yields a predicted outcome (based on national vote shares) of the future presidential election. Comparing this value to 50% indicates which party is predicted to win.[20]

A third situation is when, as of the second quarter of the year, (*i*) the current president's term will be over at the time of a legislator's next election, and (*ii*) either the incumbent president did not win the previous election (i.e., Ford in 1976) or the incumbent is not eligible to run again. In this context, the information available to predict the party of the president at the time of the next election is scant, and thus we assume that the variable *NotPresParty* is *WeaklyForecastable*. We presume that legislators will assume that the national share of the vote received by the party of the president in office at the time of the next election will regress to its mean vote share over the previous E elections, where E is the same value randomly drawn from a uniform distribution with values 2, 3 and 4 when predicting state vote shares above. Once again, this generates a predicted national vote share, and in turn, a predicted winning party.

Implementing Our Statistical Simulation Approach

We employ data recently collected by Carsey and Berry (2007), which contains election returns for all state legislative elections in the United States between 1970 and 2003. Our ultimate goal is to estimate equation 1 – a state-level model of the impact of electoral competition on some state policy choice – so as to accurately reflect the uncertainty due to our need to rely on an indirect proxy to measure electoral competition. Our estimation procedure has four steps: (1) for each legislator, estimate expected future values (at the time of a legislator's next election) of the variables in *Forecastable*, (2) estimate the parameters of the logit equation predicting a legislator' probability of losing an election with contemporaneously observed variables (equation 9), and use the parameter estimates along with the estimates of future values obtained in step 1 to estimate each legislator's predicted probability of losing his *next* election, (3) estimate electoral competition in each state-year by averaging legislators' predicted

[20] This methodology ignores the Electoral College and assumes that the winner of a presidential election is the major party candidate receiving the most popular votes. Although this is not always true, it is reasonable to assume that a legislator would project the likely winner of a future presidential election by trying to project which candidate will win the popular vote.

probabilities of losing their next election – from step 3 – across the state's legislators, and finally,(4) estimate our state-level model of the effect of electoral competition on state policy using the competition measure constructed in step 3. We conduct all empirical analysis using Stata, and relying for some analysis on the statistical simulation macros in CLARIFY (King, Tomz and Wittenberg 2000).[21]

Step 1: Estimating Expected Future Values of the Variables in *Forecastable*.

For each state legislator in office during the period 1970-2003, we estimate in the second quarter of each year in which he served, his expected values at the time his next election of three *Forecastable* variables in logit equation 9: *EconCondit* (national economic conditions), *NotPresParty* (whether a legislator is from the party opposing the president), and *OwnPartyPresVote%* (0 if there is no presidential election, and if there is, the percentage of the-two party presidential vote won by the legislator's party in the state). This involves using CLARIFY to estimate equation 10 (predicting national economic conditions in the fourth quarter of an election year from variables observed at earlier time points) and equation 11 (predicting the percentage of a state's vote received by an incumbent president seeking reelection from variables measured at earlier time points). When this step is completed, for each legislator in each year she has served, and each of the three variables (*EconCondit*, *NotPresParty* and *OwnPartyPresVote%*), we have 1,000 values from a simulated distribution for the expected future value of the variable at the time of her next election.

Step 2: Estimating the Parameters of the Logit Equation Predicting a Legislator's Probability of Losing an Election with Contemporaneously Observed Variables, and Using these Parameter Estimates to Predict a Legislator's Anticipated Probability of Losing His *Next* Election

Relying on the same data set employed by Berry, Berkman and Schneiderman (2000), we estimate the parameters of equation 9 using logit. Then, for each legislator in each year in which he served (during the period 1970-2003), we use the logit parameter estimates along with values for the

---

[21] Statistical simulation relies on repeated random draws from a probability distribution to learn about its characteristics. Our procedure involves generating simulated distributions for (*i*) the expected future value of variables in *Forecastable*, (*ii*) a legislator's predicted probability of winning her next election, (*iii*) electoral competition in a state-year, and then, ultimately (*iv*) a parameter estimate expressing the effect of state electoral competition on state policy in a model taking the form of equation 1.

independent variables to derive 1,000 values from a simulated distribution for his anticipated probability of losing his *next* election. In constructing these distributions of predicted probabilities, for each independent variable in *Known*, we plug in it is known value; for each independent variable for which the future value is uncertain (*EconCondit*, *NotPresParty* and *OwnPartyPresVote%*), we randomly draw a value from the distribution created in Step 1 in each of the 1,000 repetitions.

Step 3: <u>Estimating Electoral Competition in a State-Year by Averaging a Legislator's Predicted Probability of Losing His Next Election Across the State's Legislators</u>

For each state-year between 1970 and 2003, we average a legislator's anticipated probability of losing her next election over all legislators in the state to yield an estimate of state electoral competition, $Comp_{s,t}$. For each state-year, we do this by randomly drawing for each legislator one of the 1,000 predicted probabilities of losing generated in Step 2, and taking the mean of these values to produce one estimate of state electoral competition. Repeating this procedure 1,000 times yields a distribution of 1,000 values of $Comp_{s,t}$ for each state-year.

In each state-year, the mean of this distribution serves as point estimate of state electoral competition, which we denote (for state *s* in year *t*) $COMPETITION_{s,t}$. We also average the probabilities of a legislator losing over the members of the lower and upper chambers of a legislature to produce chamber-level measures of electoral competition, which we denote $HOUSE\_COMP_{s,t}$ and $SEN\_COMP_{s,t}$, and over the Democratic and Republican delegations in both the lower and upper houses of state legislatures to construct separate measures of electoral competition for each party in each chamber – denoted $HOUSE\_DEM\_COMP_{s,t}$, $HOUSE\_REP\_COMP_{s,t}$, $SEN\_ DEM\_COMP_{s,t}$, and $SEN\_REP\_COMP_{s,t}$. While the means of the distributions of electoral competition scores constitute the best point estimate of electoral competition in a state-year, the variance of the distributions provides information about the uncertainty present in our proxy measure. This uncertainty is critical information in the final step of our empirical procedure.

<u>Step 4: Estimating the State-Level Model of the Effect of Electoral Competition on State Policy</u>

Assuming we have specified a version of equation 1 – modeling the impact of electoral competition on state policy – we can use CLARIFY to estimate this equation, repeating the estimation 1,000 times to generate a distribution for the parameter estimate for electoral competition. Since there is uncertainty about the true value of state electoral competition in each year, when estimating equation 1, for each state-year we would not use the same value of $Comp_{s,t}$ in all 1,000 repetitions. Rather, to determine the value of $Comp_{s,t}$ for each observation in each repetition, we would randomly choose a value from the distribution for $Comp_{s,t}$ created in Step 3. This procedure would yield 1,000 estimates of the parameter for state electoral competition (as well as for each of the other parameters of equation 1). The mean of the distribution of the 1,000 estimates can be conceived as a point estimate of the coefficient for electoral competition in equation 1, and the 5^{th} and 95^{th} percentile values of the distribution can be viewed as the endpoints of a 95% confidence interval for the parameter.

Outline of Remaining Sections

I. Empirical characteristics of our point estimates of state electoral competition for state-years between 1970 and 2003, as well as competition scores for individual chambers, and for party delegations within chambers.

II. Assessment of the quality (reliability and validity) of our measure of state electoral competition. This will include a comparison of our measure with both the Ranney and H & VD indexes.

III. Replications of several published studies assessing the effect of state electoral competition on state policy, substituting our new measure and relying on our statistical simulation approach to model estimation.

IV. An appendix describing Stata code that we will make available that will permit researchers to merge their own data set – containing other state-level variables – with our electoral competition data, and then use our recommended statistical simulation procedure to estimate a model including state electoral competition among the independent variables.

Barrilleaux, Charles, Thomas Holbrook and Laura Langer. 2002. “Electoral Competition, Legislative Balance, and American State Welfare Policy.” *American Journal of Political Science* 46 (April): 415-27.

Berry, William, Michael Berkman and Stuart Schneiderman. “Legislative Professionalism and Incumbent Reelection: The Development of Institutional Boundaries.” *American Political Science Review* 94 (December):859-74.

Brown, Robert D. 1995. “Party Cleavages and Welfare Effort in the American States.” *American Political Science Review* 89 (January): 23-33.

Carsey, Thomas M. and William D. Berry, “State Legislative Election Returns in the United States, 1968-2003” (data set).

Dawson, Richard and James Robinson, 1963. “Interparty Competition, Economic Variables and Welfare Policies in the American States.” *Journal of Politics* 25(May):265-89.

Erikson, Robert, Gerald Wright and John McIver. 1993. *Statehouse Democracy*. NY: Cambridge.

Golembiewski, Robert T. 1958. “A Taxonomic Approach to State Political Party Strength.” *Western Political Quarterly* 11: 494-513.

Hofferbert, Richard I. 1964. “Classification of American State Party Systems.” *Journal of Politics* 26 (August):550-567.

Holbrook, Thomas M. and Emily Van Dunk. 1993. “Electoral Competition in the American States.” *American Political Science Review* 87(December): 955-62.

King, Gary, Michael Tomz and Jason Wittenberg. 2000. “Making the Most of Statistical Analyses: Improving Interpretation and Presentation.” *American Journal of Political Science* 44:341-55.

King, Gary and Langche Zeng. 2001. “Logistic Regression in Rare Events Data.” *Political Analysis* 9(2): 137-63.

Patterson, Samuel C. and Gregory Caldeira. 1984. “The Etiology of Partisan Competition.” *American Political Science Review* 78 (September): 691-707.

Plotnick, Robert D. and Richard F. Winters. 1985. “A Polico-economic Theory of Income

Redistribution." *American Political Science Review* 79 (September): 458-73.

Ranney, Austin. 1965. "Parties in State Politics." In Herbert Jacob and Kenneth N. Vines, eds. *Politics in the American States: A Comparative Analysis.* Boston: Little, Brown.

Ranney, Austin and Wilmoore Kendall. 1954. "The American Party Systems." *American Political Science Review* 48 (June): 477-85.

Schlesinger, Joseph. 1955. "A Two-Dimensional Scheme for Classifying the States According to Degree of Inter-Party Competition." *American Political Science Review* 49 (December):1120-28.

Tidmarch, Charles M., Edward Lonergan and John Sciortino. 1986. "Interparty Competition in the U.S. States: Legislative Elections, 1970-78." *Legislative Studies Quarterly* 11:353-74.

Tomz, Michael, Jason Wittenberg and Gary King. 2003. "Clarify: Software for Interpreting and Presenting Statistical Results," version 2.1.

Weber, Ronald E., Harvey J. Tucker and Paul Brace. 1991. "Vanishing Marginals in State Legislative Elections." *Legislative Studies Quarterly* 16 (May):29-47.

Figure 1. Estimated Relationship Between a Legislator's Previous Margin of Victory and the Probability that He will Lose an Election

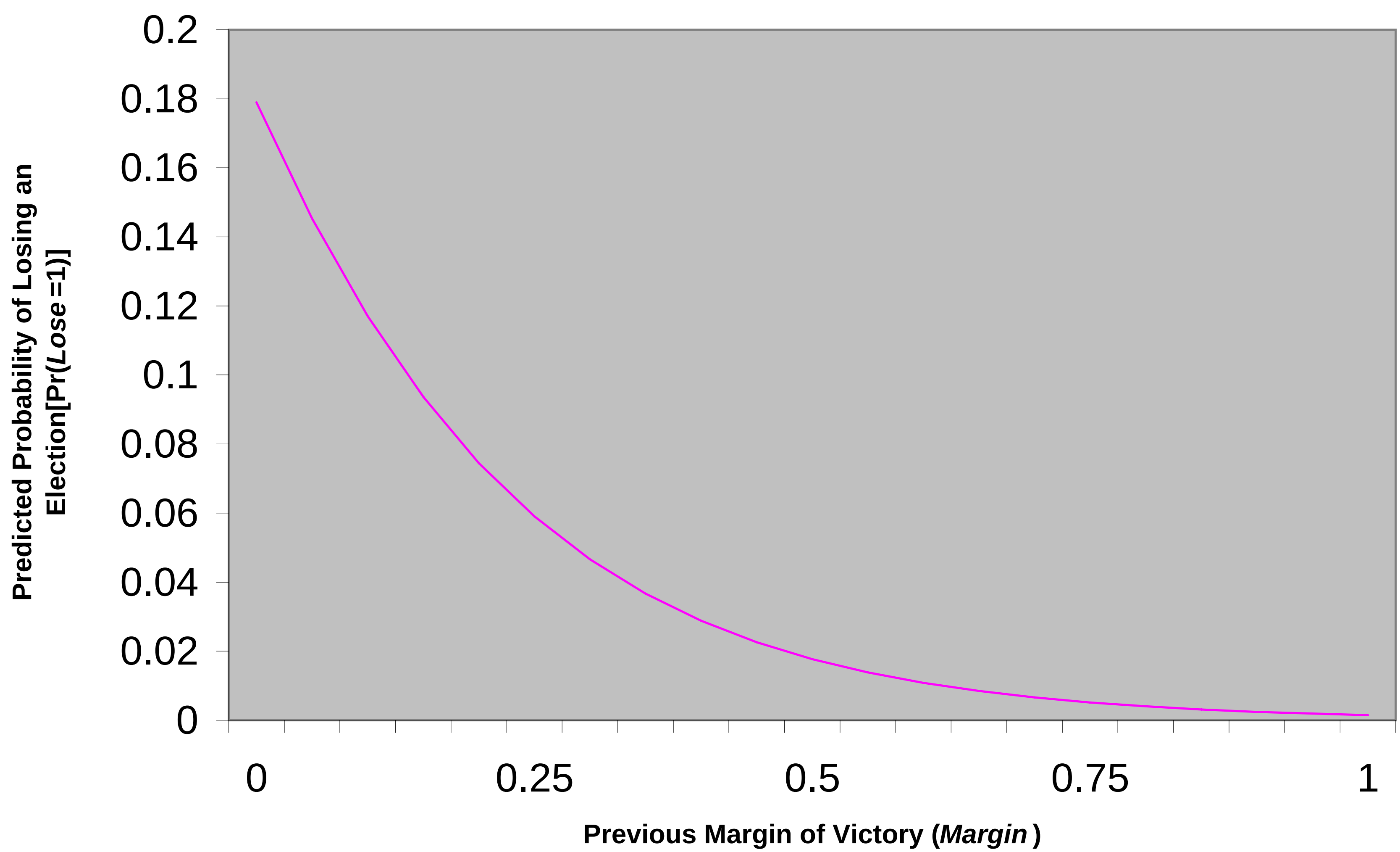
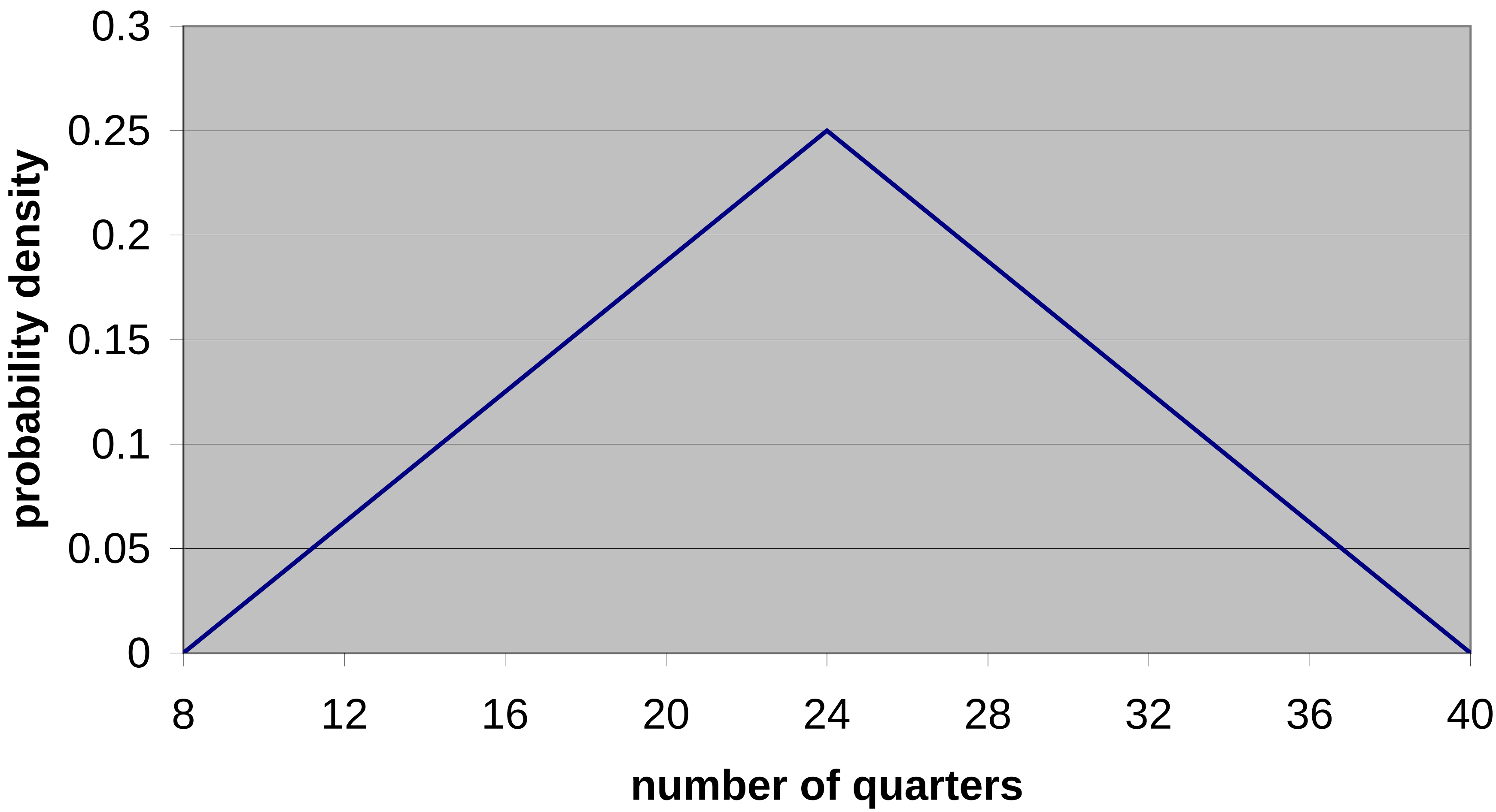


Figure 2. Probability Distribution for Number of Quarters Over Which a Legislator Averages Economic Conditions When Predicting that Economic Conditions in Future Years Will Regress to its Mean Over the Recent Past



Appendix

Logit Coefficient Estimates for Equation 9

Independent Variable	Coefficient Estimate	Standard Error	Z
Term2Yr	0.47	0.06	7.29
SMDist	-0.26	0.07	-3.75
PostDist	-0.21	0.13	-1.65
ContestPrev	-2.60	0.10	-26.34
ContestPrev x *Margin*	5.00	0.21	23.60
Profess	2.24	0.96	2.33
Contest Prev x *Margin* x *Profess*	2.73	1.72	1.59
PresElecYr	-1.47	0.19	-7.86
OwnPartyPresVote%	0.031	0.004	8.36
OwnPartyPresVote% x *Profess*	-0.079	0.044	-1.80
EconCondit	1.05	0.13	8.14
Profess x *EconCondit*	0.70	1.18	0.59
NotPresParty	1.74	0.12	14.79
NotPresParty x *EconCondit*	-2.23	0.22	-10.11
NotPresParty x *Profess*	0.33	1.09	0.31
NotPresParty x *EconCondit* x *Profess*	0.98	2.09	0.47
PresElecYr x *Profess*	3.95	2.19	1.80
Number of Cases	42,820		
-2(Log-likelihood ratio)	3795.57		
Pseudo R-square	0.170		

Note: Results were obtainbed using the logit procedure in Stata (version 7.0). Coefficient estimates for state dummy variables are excluded to save space.