

**Retrospective Voting in Single Function Elections:  
School Boards and Student Achievement**

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## **Abstract**

For too long, research on retrospective voting has fixated on how economic trends impact incumbents' electoral prospects in national and state elections. Hundreds of thousands of elections in the United States occur at the local level and have little to do with unemployment or inflation rates. This paper focuses on the most prevalent: school boards. Specifically, it examines whether voters hold school board members accountable for the performance of their schools. The 2000 elections reveal considerable evidence that voters evaluate school board members on the basis of student learning trends. During the 2002 school board elections, however, when voter turnout declined by half, test scores did not influence incumbents' electoral fortunes.

Do voters reward elected officials for a job well done? Or do voters' ballot selections primarily reflect candidates' policy positions? Few questions in political science have attracted more scholarly attention. Indeed, the literature on retrospective voting – the proposition that citizens examine whether the state of the world has improved under a politician's watch, and vote accordingly – ranks among the most sophisticated within the social sciences (for reviews, see (Fiorina 1997; Kiewiet and Rivers 1984; Lewis-Beck and Stegmaier 2000; Monroe 1979).

Two features of the empirical literature on retrospective voting stand out. First, presidents, members of Congress, and (occasionally) governors are its sole protagonists, while local politicians are regularly overlooked. Second, the bulk of the literature remains fixated on developments in the domestic economy. Though federal and state politicians may expend considerable resources addressing issues that have no obvious relationship with the economy, the empirical literature on retrospective voting supposes that a voter's decision to support or oppose an incumbent's reelection efforts ultimately rides upon recent changes in inflation and unemployment rates.

Nothing about the theory of retrospective voting, however, requires that empirical explorations rest on these two foundations (Downs 1957; Fiorina 1981; Key 1966). There is, further, good reason for departing from them both. The vast majority of elections in the United States occur at the local level, and many pit candidates with policy positions that concern a small number of well defined functions. While presidents and members of Congress attend to a dizzying array of public policies, sheriffs, district attorneys, highway superintendents, and school board members oversee considerably simpler policy universes that revolve around public safety, criminal conviction rates, traffic, and student learning,

respectively. Given the sheer number of elections that involve a well-defined set of corresponding public services, local elections present obvious, though curiously unexplored, opportunities to test claims about retrospective voting.

In this paper, we examine whether average voters hold school board members accountable for the performance of their schools. Specifically, we assess whether voters punish or reward incumbent school board members on the basis of changes in student learning (as measured by standardized tests) in local and district schools. We also scrutinize elite-level behaviors, assessing the impact of student learning trends on incumbents' decisions to seek reelection and potential challengers' decisions to contest them. Our findings from the 2000 election in South Carolina are striking, and confirm much that is found in the economic voting literature. From the initial decision to run to the final vote tallies, we observe a robust relationship between student learning and incumbents' electoral fortunes. Moreover, effects appear to be asymmetric – while gains in student learning do not always trigger a positive response from the electorate, declines regularly evoke a negative one.

Some scholars have recently argued that retrospective voting occurs principally among low-information voters, or “floating voters,” who constitute a disproportionate share of the electorate during presidential elections (Zaller 2004). If true, then local elections held during off-years, which assuredly attract greater proportions of high-information voters, may reveal less evidence of retrospective voting. Indeed, in the 2002 school board elections, when turnout dropped to half that observed in 2000, we find scant evidence that voters held members responsible for changes in test scores. The differences in the 2000 and 2002

elections, we suggest, underscore the importance of high turnout for retrospective voting in particular, and democratic accountability more generally.

We proceed as follows. The first section reviews the literatures on retrospective voting and school governance. The second identifies forces that contribute to, and detract from, retrospective voting in school board elections. The third introduces new data from school board elections in South Carolina and tests whether changes in student tests scores systematically affect the probability that incumbent school board members seek reelection, the probability that they face competitors when they do, and the percentage of the electorate that supports their candidacy. Doing so, this section illustrates ways in which theories of retrospective voting can be tested in new electoral settings using alternative assessments of an incumbent's past performance. The fourth section concludes, relating the findings from South Carolina to the literatures on retrospective voting and school governance while highlighting the array of new research possibilities that this line of inquiry opens.

## **Section I: The Retrospective Voting Literature**

For decades, scholars have examined the ways in which incumbents' electoral fortunes rise and fall with their constituents' material well being. By placing minimal informational burdens upon voters, while also recognizing incumbents' attempts to advertise a record of success, retrospective voting puts forward a simple, and powerful, voting heuristic: voters support incumbents whose tenures are marked by improvements in the state of the world, and they oppose those who have overseen declines. Since V.O. Key posited in 1966 the electorate's "role [of] an appraiser of past events, past performance, and past

actions,” scholars have amassed an awesome volume of empirical research on retrospective voting. Three enduring debates within this literature are especially relevant here.

The first concerns the salience of different economic indicators in voting decisions. Should incumbents worry most about unemployment, inflation, earnings, or the gross domestic product? And to the extent that tradeoffs among them are unavoidable, should incumbents seek some optimal balance? While many of the early studies focused on real per capita income (Bloom and Price 1975; Hibbing and Alford 1982; Kramer 1971; Tufte 1978), some suggested that unemployment rates and changes in per capita real GNP powerfully determine electoral support for incumbents (Fair 1978; Hibbs, Rivers, and Vasilatos 1982; Kernell 1978), while others have recommended national unemployment and price inflation as the key determinants of voting behavior (Meltzer and Vellrath 1975; Monroe 1978; Norpoth 1984). Lewis-Beck and Staigmaier conclude that “the savvy modeler, given the choice of only one predictor [of elections], would do well to select an economic variable. Which one? The answer varies from country to country. It could be unemployment, inflation, or growth” (2001, 211).<sup>1</sup>

Having selected a feature of the domestic economy, it remains unclear whether voters reflect upon their own condition, or society’s more generally, when evaluating an incumbent. In a growing economy, will citizens who have lost their jobs (or who have had their wages cut, or who have witnessed their stock portfolio decline in value) nonetheless support the incumbent? Or will citizens who meet personal misfortune instinctively punish the incumbent? To the extent that there is consensus on the matter, most scholars suggest that collective (or sociotropic) considerations dominate pocketbook (or egotropic) concerns

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<sup>1</sup> A handful of retrospective voting studies examine non-economic indicators. See, for example, (Fiorina, Abrams, and Pope 2003)

(Alvarez and Nagler 1998; Kiewiet 1983; Kinder, Adams, and Gronke 1989; Markus 1992).

The issue, however, remains far from settled, as other scholars have detected evidence of pocketbook voting (Brown and Woods 1991; Romero and Stambough 1996).

Finally, it remains in dispute whether the preponderance of evidence for retrospective voting emerges from models of voting returns or of elite-level behaviors. Work on “strategic politicians,” for instance, suggests that incumbents who oversee strong economies have a higher probability of facing either uncontested elections or elections with weak challengers, while incumbents who serve during times of economic downturn face relatively stronger challengers (Jacobson 1989; Jacobson and Kernell 1983; Jacobson and Kernell 1990). To the extent that political elites anticipate possibilities for retrospective voting, models that estimate the effect of economic trends on the probabilities that incumbents either seek re-election or face challengers may generate larger effects than models that focus exclusively on actual voting returns.

To advance these debates, important areas of research remain unexplored. While the empirical literature on retrospective voting remains stuck on state and national elections, local elections are almost totally ignored. By our count, fully 94 percent of articles on voting behavior published between 1980 and 2000 in five top political science journals focused on presidential and congressional elections, another 6 percent considered state elections, and less than one percent examined local elections, none of which concerned retrospective voting.<sup>2</sup> But while over 99 percent of published articles concern elections at the state and

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<sup>2</sup> Between 1980 and 2000, 212 articles were published on presidential elections, 135 on congressional elections, 23 on state elections, and 2 on local election. An additional 30 articles were written about both congressional and presidential elections; 15 articles were written on both national and state elections; 3 on both national and local elections; and 1 on both state and local elections. Figures are based on searches of articles with the word “election” in either the title or abstract in the *American Political Science Review*, *American Journal of Political Science*, *Journal of Politics*, *Political Behavior*, and *Public Opinion Quarterly*.

national levels of government, fully 98 percent of elected officials are in local governments.<sup>3</sup> As the next section illustrates, local elections generally, and school boards in particular, provide unique opportunities for testing claims about retrospective voting.

## **Section II: Retrospective Voting in School Board Elections**

One of the central difficulties of linking unemployment figures, GDP trends, and such to voting patterns at the state and national levels is that presidents, members of Congress, and governors also assume responsibility for issue areas that are only tangentially related to the economy—crime, the environment, traffic, security, race relations, health. The observed link between economic performance and incumbent reelection rates should attenuate in direct proportion to the frequency with which voters pay attention to recent developments in these areas. The point here is not that economic considerations are orthogonal to an incumbent’s electoral prospects, much less that retrospective voting does not occur. Rather, it is that voters surely monitor more than just the economy when selecting state and national representatives, an empirical fact that exacerbates difficulties of identification and measurement in economic voting models.

In the context of many local elections, these problems evaporate as issue spaces collapse. The job responsibilities of school board members, comptroller generals, county assessors, superintendents of highways, tax collectors, sheriffs, registers of deeds, hospital district directors, public defenders, park commissioners, rural ambulance service directors, drainage district commissioners, soil and water conservative supervisors, watershed

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<sup>3</sup> According to the *1992 Census of Governments*, there are 543 elected officials at the national level, 18,828 at the state level, and 487,796 locally. 1992 was the last year in which such data were collected. The *Census of Government* provides data on the number of elected officials, not the number of elections. Because some officials are jointly elected (e.g. president and vice president, governor and lieutenant governor), the two are not synonymous.

improvement district trustees, transit directors, and auditors (to name but a few!)<sup>4</sup> are reasonably well defined—certainly more so than mayors or city council members, much less governors, Senators, or presidents. As such, voters should have an easier time, all else equal, evaluating these incumbents' performances. And as the job of retrospective voting eases, possibilities of detecting effects in voting models should improve.

School boards are the most ubiquitous governing institution in the nation, and oversee local governments' most important duty: educating children. As such, they represent an obvious starting point for testing claims about retrospective voting in single-function local elections. To begin, we note that a successful tenure on school boards ultimately reduces to demonstrated improvements in student learning. Though board members do many things that do not directly impact the daily lives of students (negotiating teacher contracts, writing budgets, procuring new school sites, and selling old ones), much of their work immediately affects the content and quality of student learning (modifying curriculums, establishing academic standards, deciding whether to accept federal aid for specific educational programs, prescribing textbooks, writing disciplinary codes, and hiring superintendents). All board activities, what is more, presumably contribute to the everyday functioning of schools, and hence are in the service of students. To the extent that these activities collectively succeed, student learning should improve.<sup>5</sup>

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<sup>4</sup> At the local level, multi-function elections include county executives, mayors, city council members, judges, and other miscellaneous governing bodies; single function elections are for school board members, superintendents of schools, assessors, attorneys, auditors, county clerks, clerks, clerks of the court, constables, coroners, sheriffs, policy chiefs, recorders, collectors, treasurers, road and highway commissioners, surveyors, and elected officials for "special districts" (air transportation, cemeteries, school buildings, fire protection, health, hospitals, industrial development, mortgage credit, highways, housing and communities, drainage, libraries, natural resources, parks and facilities, flood control, irrigation, public welfare, sewerage, solid waste management, reclamation, water transport, solid and water conservation, water supply utilities, electric power utilities, gas supply utilities, mass transit, and sewerage and water).

<sup>5</sup> According to one national survey, student achievement ranks second only to financial concerns as school board members' highest priority; moreover, the vast majority of members claim to have devoted increased

For two reasons, voters should hold school board members responsible for the performance of local schools. First, voter discontent with schools should be directed primarily at board members. The teachers and principals who inhabit the daily lives of students, and who may have a greater impact on their education, are shielded from electoral pressures. And while mayors, governors, state legislators, members of Congress, and presidents all influence education outcomes, so too do they oversee a wide range of other policy domains. Hence, even if board members materially affect student learning only at the margins, on Election Day they ought to face the full brunt of voter discontent when student performance slips, just as they reap the preponderance of credit when it improves. Second, because most board elections are non-partisan, party identification does not rival retrospective evaluations of incumbents as a basis for voting behavior. Voters, therefore, ought to place disproportionate weight on evaluations of board members' competency, as measured by the performance of local schools.<sup>6</sup>

Admittedly, in comparison to what they know about the records of state and federal officials, voters possess relatively little information about the performances of local incumbents. Nonetheless, within the context of school boards, there is good reason to believe that many voters know as much about the quality of their local public schools as they do about inflationary and unemployment trends. For one thing, they live amongst the schools that board members oversee. By observing their own children, or those of friends and neighbors, voters have ample opportunities to learn about the quality of educational services rendered at local elementary and high schools. In the last several years, furthermore, schools

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amounts of attention to test scores during their tenures, and to regularly hold open forums for parents and community members to discuss achievement trends and goals (Hess 2002).

<sup>6</sup> A number of scholars have noted differences in voting behavior, and the availability of voting cues, in partisan and nonpartisan elections. See, for example, (Dubois 1984).

have administered regular assessments and standardized tests with rising frequency, furnishing additional information about student learning. Typically, their results are publicized through a wide array of outlets: district websites, local television, newspapers, and perhaps most important, parents. And under the recently enacted No Child Left Behind Act, public schools nationwide are required to notify parents every year about the performance standards of their schools, further strengthening informational networks within and between communities.

It is hardly a foregone conclusion, however, that board members' reelection prospects will rise and fall with average citizens' retrospective judgments of their performance in office. For one thing, parents and average citizens may not play much of a role in determining the composition of most boards. If Terry Moe is correct that unions dominate local elections, then vested stakeholders in the public school system (teachers and other district employees) ultimately determine who stays on, and who leaves, school boards (Moe forthcoming). Members' electoral fortunes, as such, may only depend upon their ability to improve the compensation and working conditions of public school employees. Indeed, if these elections are defined by low overall turnout, cronyism, and union interference, the reelection of incumbents may have little if anything to do with student learning.

Retrospective voting in school board elections may be limited for other reasons as well. While board members may perceive widespread competition (Hess 2002), as a factual matter any competent individual who is willing to serve for little or no compensation may secure a seat. Board turnover may reflect members' disinterest and poor working conditions more than a wrathful electorate banishing incompetents any time student learning declines. Ultimately, a willingness to serve may be the only real prerequisite for joining a school

board. If true, then school board elections are mere formalities, whereby willing servants declare their candidacy, and the electorate gratefully ushers them into office.

Finally, and perhaps most obviously, student learning may not be at the forefront of citizens' minds when they enter the voting booth and choose from a slate of school board members. To the extent that they do reflect upon the performance of schools, voters may be preoccupied with issues of safety, or the football team's record, or the convenience of the busing system, or the attractiveness of the buildings. In principle, and at base, the function of schools is to promote and enhance student learning. Voters, however, may not hold school boards strictly to this charge. And if not, then school board elections may be nearly as complex as the national and state elections that have been the focus of the extant retrospective voting literature.

Ultimately, these are empirical questions. If, in fact, board elections are competitive and voters hold members responsible for the academic performance of schools, then changes in student achievement should correlate positively with incumbents' reelection fortunes. On the other hand, if unions rig election outcomes, if most races are non-competitive, or if voters do not pay any attention to student learning, then null findings should emerge. Combining school- and district-level trends on standardized exams with school board election returns in South Carolina, we now investigate these possibilities.

### **Section III: South Carolina**

The challenges of gathering and organizing electoral returns from counties and districts constitutes the primary, and most immediate, obstacle to expanding the retrospective voting literature's empirical scope to include local elections. Because it is the only state to centrally collect precinct-level election data for local school board races, we focus on South

Carolina; everywhere else local election data must be collected from individual counties. Furthermore, South Carolina recently instituted a statewide standardized student achievement test, making school-level data publicly available. This combination of readily available electoral and achievement data make South Carolina an ideal, and temporarily unique, testing ground for theories of retrospective voting in single function, local elections.

In most respects, South Carolina elections and school boards do not appear especially exceptional. Only four of the state's forty-six counties provide for partisan school board elections;<sup>7</sup> approximately 20 percent of school board members receive no compensation, while the remainder receive a salary, per diem payments, or reimbursement for their expenses; and 84 percent of districts hold elections contemporaneously with the general election in November, while the rest hold them in March, April, or May. Perhaps most consequentially, the State has among the weakest teachers unions in the country. When conducting equivalent analyses in states with stronger unions, which presumably punish and reward board members for their treatment of teachers rather than student test score trends, the observed relationship between student learning and incumbents' electoral fortunes may attenuate.

### *Election Data*

South Carolina is divided into 85 school districts. Over 90 percent of school boards have between five and nine members, while the largest board (Beaufort) has eleven. Of these 85 districts, 39 held school board elections in 2000. We collected precinct-level election returns for all school board races and then computed the vote share, by precinct, for each

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<sup>7</sup> A bill passed in May 2003 required Charleston board members to begin running in partisan elections, but for the time period we analyze (through the November 2002 election), the district's elections remained non-partisan.

incumbent running in a competitive election.<sup>8</sup> Thus, our units of observation are unique incumbent-by-precinct combinations.<sup>9</sup> Because each incumbent runs in more than one precinct, and because each precinct may host more than one school board race, we have multiple observations of most incumbents and precincts.<sup>10</sup> Specifically, in 2000 we have 67 incumbents running in 396 precincts, composing a total of 960 observations on incumbent vote share.

### *Student Achievement Data*

Student achievement data were obtained through the South Carolina Department of Education.<sup>11</sup> Since 1999, South Carolina has administered the Palmetto Achievement Challenge Tests to students in grades 3 to 8. These tests, based on the South Carolina Curriculum Standards, are given in both English and Math. We averaged the English and

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<sup>8</sup> School board members are elected at-large in 32 districts, by “constituent district” (or ward) in 38, and 15 districts use a combination of both methods. Some of the at-large and combination districts allow for “multiple-winner” elections, in which voters are allowed to vote for more than one candidate. For example, where three at-large seats are open, voters will be allowed to vote for three candidates, and the top three vote-getters will win seats on the school board. Computing an incumbent’s vote share was straightforward in districts where each voter is allowed only one vote, but more complex in the multiple-winner districts. For multiple-winner contests, we computed vote share as the number of votes the incumbent received divided by the maximum number of votes she could have received. Because voters can select each candidate only once, the maximum number of votes any candidate can receive is equal to the number of voters. Note that this method also yields consistent results in single-member elections, where vote share can also be expressed as the number of votes received divided by the number of voters. We pool observations from the two types of elections and perform sensitivity analysis to assess whether results are influenced by institutional variation. In vote share models, we never reject the null hypothesis that the slopes on the test score variables in single- and multiple-seat elections are equivalent.

<sup>9</sup> In the vote share models below, we do use aggregate data to test theories of individual level voting behavior, as has often been done in the retrospective voting literature. Because we are not trying to estimate the behavior of specific groups within precincts -- say, Democrats or Republicans, the highly educated or poorly educated -- many of the concerns about ecological inference do not apply to the vote share models. Indeed it is difficult to imagine how the basic results of the vote share models can be explained away as ecological fallacies. In the models of an incumbent’s decision to run or the probability of facing competition, moreover, we do observe individual level behavior -- and hence we need not worry about problems of ecological inference in these instances.

<sup>10</sup> Below we discuss how standard errors are adjusted to account for the resulting dependence among observations.

<sup>11</sup> We gratefully acknowledge Mr. Jim Felker at the South Carolina Department of Education for providing 1999 and 2000 achievement data files that were not publicly accessible.

Math scores to arrive at a composite score for each school,<sup>12</sup> and then computed district-level and precinct-level average composite scores.<sup>13</sup> The precinct-level percentile scores indicate the performance of the schools nearest the polling place, and hence those schools most likely to be attended by a voter's children or those of a neighbor; district-level scores indicate the overall performance of all schools in the district. To test claims about egotropic and sociotropic voting, we estimated models with both precinct-level and district-level scores.

From the outset, we note one important limitation of these data. As analysts, we only observe standardized test scores, while school board incumbents, challengers, and voters have ready access to considerably richer information about student learning trends. As long as test scores correlate positively with other measures of student learning, then it is not necessary that we have access to all information available to the residents of South Carolina. Additionally, voters need not observe the test scores if they have other, possibly better,

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<sup>12</sup> A priori, there are no theoretical reasons to expect that retrospective voters will be particularly sensitive to student performance on either the reading or math portion of the exam. Consequently, to assess student performance, we take the average of the two.

<sup>13</sup> PACT results are reported both as "scale scores" and as "performance levels." Scale scores are determined independently for each grade and subject. The South Carolina Department of Education (SC DOE) set the average scale score at 100 times the grade level, with a range of 128 scale score points around this average – e.g., the initial average score for grade 3 is 300, the range is 236 to 364, and the standard deviation is 16. In developing performance measures, we began by computing school-level scale scores. Because scores for each grade were on different scales, we first converted them into within-grade statewide percentile rankings. For each school, we then averaged these percentile scores across grades, weighting by enrollment in each grade. These steps were conducted separately for English and Math scores, and then the two were averaged to produce a composite school-level percentile score. We then calculated a score for each voting precinct, representing the average of nearby schools. Specifically, for each precinct, we computed the average score of all the schools in the same zip code as the polling place. (Attempts to match schools and precincts based on geocodes did not prove more successful than zip code matching because a large number (nearly half) of the addresses in our database could not be geocoded to a level beneath the zip code.) For zip codes with only one school, that school's performance measures served as the zip code's values. For zip codes in which more than one school was located, we averaged across the schools, weighting by enrollment. For zip codes where no schools were in operation, we imputed the achievement of schools in the nearest zip code with at least one school. Distance between zip codes was calculated using the "Great Circle" formula, measuring distance between zip code latitude/longitude centroids. We used zip code latitudes and longitudes as published by the U.S. Census Bureau from the U.S. Postal Service (USPS) City-State file (November, 1999). Geographic coordinates were determined using an internal TIGER database; when the zip code could not be located in the TIGER database, the coordinates of the county centroid were used instead. The result is a precinct-level percentile score. The district-level test score is based on the same underlying school-level percentile scores, and we simply average over all the schools in the district, weighted by enrollment.

information about achievement trends. Our analysis does not assume that test scores are perfect measures of student performance, nor that all voters are perfectly informed about test scores. But to the extent that standardized tests overlook some aspects of student learning, then they may appear unrelated to board members' electoral fortunes, even though many voters hold incumbents accountable for their performances in office. If bias exists, as such, it most probably reduces the chances of detecting evidence of retrospective voting.

### *Model Specification*

We estimate vote share models by Least Squares, according to the following model specification:

$$V_{ipd} = \alpha + \Delta T_{pd}\theta + \Delta T_d\phi + X_d\beta + Z_{ipd}\psi + \varepsilon_{ipd} + \eta_{pd} + \omega_d, \quad (1)$$

where the subscript  $i$  denotes an individual incumbent,  $p$  the election precinct, and  $d$  the school district. Thus,  $V_{ipd}$  represents the vote share that incumbent  $i$  received in precinct  $p$  of district  $d$ . Each incumbent may be observed multiple times, once for each precinct in which she is running; and each precinct also may be observed multiple times, once for each incumbent running in the precinct.  $\Delta T_{pd}$  represents the change in precinct-level test scores over the year preceding the election, while  $\Delta T_d$  represents the corresponding change in district-level test scores.<sup>14</sup>  $X_d$  is a vector of characteristics of the school district, to be explained below.  $Z_{ipd}$  is an incumbent's lagged vote share and is included to control for

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<sup>14</sup> In addition to percentile point changes (i.e., 2000 percentile score minus 1999 percentile score), we also estimated models based on percentage change in the percentile scores (i.e., [2000 score – 1999 score]/1999 score). Throughout, virtually identical findings are observed.

unobserved characteristics.<sup>15</sup>  $\theta$ ,  $\phi$ ,  $\beta$ , and  $\psi$  are regression coefficients, while  $\alpha$  is a constant. Finally,  $\varepsilon_{ipd}$ ,  $\eta_{pd}$ , and  $\omega_d$  are error terms for, respectively, incumbents, precincts, and districts. Because observations for the same incumbent across precincts, and for multiple incumbents in the same school district, are not independent, we allow for clustering of the standard errors by school district.<sup>16</sup>

### *Results*

Our analysis first focuses on the 2000 South Carolina school board elections.<sup>17</sup> In this year, 67 incumbents from 37 school boards ran for reelection in competitive races. Of these 67 incumbents, 50 were reelected, and the median vote share for all incumbents was 58 percent.<sup>18</sup> Table 1 presents the regression results for incumbent vote share. The first column shows the simplest model, with only precinct-level and district-level test score changes on the right-hand side of the equation, and 2000 vote shares on the left. Only precinct-level test score change is significant in this model, with the expected positive coefficient indicating that incumbents won more votes where test scores showed improvements.<sup>19</sup> That district-level scores were not significant suggests that voters were behaving egotropically – or

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<sup>15</sup> Models that also control for standard SES measures (race, age, gender) and party (as measured by the presidential vote) generate virtually identical results. To keep the discussion as simple as possible, the more parsimonious models are reported here.

<sup>16</sup> This clustering allows for both types of error dependence, as all observations for a given incumbent are within one school district. For discussion on the topic, see (Wooldridge 2002)

<sup>17</sup> The PACT test was first administered in 1999, so 2000 is the first cycle of school board elections after test scores became available.

<sup>18</sup> By comparison, in the U.S. House of Representatives, 98 percent of incumbents who ran for reelection in 2000 won, as did 80 percent of incumbents who ran for the U.S. Senate.

<sup>19</sup> When including only district- or precinct-level test score changes in the models, virtually identical results are observed. In addition, models that considered precinct deviations from district means generated comparable results. However, when including both annual test score trends and precinct deviations in the same model, only the trends come up statistically significant.

perhaps more accurately, “egocentrically”<sup>20</sup> – focusing on the performance of their own local schools more than the broader district.

The second column of Table 1 shows the results from models that control for lagged incumbent vote share (i.e., the 2000 incumbent’s vote returns in the same precinct in 1996), test score levels, and measures of school expenditures. The lagged vote share should capture unobserved aspects of an incumbent’s quality, such as name recognition, experience, endorsements, and fundraising capacity. Not surprisingly, its coefficient is highly significant and positive, indicating that candidates who did well in 1996 also garnered more votes in 2000. Levels of test scores, on the other hand, are nowhere near significant, consistent with the prediction from the retrospective voting literature that rational citizens will base their assessment of incumbents on *changes* during their tenure rather than the absolute *level* of performance. Finally, to account for the possibility that races are more competitive in higher-spending districts, and that voters may punish board members for marginal increases in their taxes, we control for levels and changes in per-pupil expenditures. Neither of these variables, however, significantly affect incumbent vote shares.<sup>21</sup>

Importantly, test score changes are robust to the inclusion of these additional variables. The coefficients reported in column 2, our preferred specification, indicate that a movement from the 25<sup>th</sup> to the 75<sup>th</sup> percentile of test score change – that is, moving from a loss of 4 percentile points to a gain of 3.8 percentile points between 1999 and 2000 – is associated with an increase of three percentage points in an incumbent’s vote share. Similarly, a movement from the 10<sup>th</sup> to the 90<sup>th</sup> percentile of test score change is associated with an increase of 4.8 percentage points in an incumbent’s vote share. With average

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<sup>20</sup> Strict egotropic voting would consider only the performance of one’s own children, which we do not observe.

<sup>21</sup> Models that account for test score changes and levels as a function of dollars spent on students generate virtually identical results as those presented below.

incumbent vote share at 58 percent, these estimates suggest that a major swing in test scores can erode as much as two-thirds of an incumbent’s margin of victory.<sup>22</sup>

The results reported in Table 1 reflect the experience of incumbents running in competitive elections. Many incumbents, however, either did not run for reelection or ran unopposed. Specifically, of the 157 incumbent board members in 39 school districts who were up for election in 2000, 112 sought reelection,<sup>23</sup> 45 of whom did not face a challenger. As a result, the 67 incumbents reflected in the results of Table 2 represent less than half of the incumbents whose seats were in play in 2000. Because these candidates presumably were not randomly selected into competitive elections, test scores may have influenced electoral outcomes beyond the observed vote shares. Indeed, if board members anticipate citizens’ voting behavior – and the existing work on “strategic politicians” suggests that they may well – then incumbents in districts with declining test scores should be less likely to seek reelection, and more likely to face competition when they do run. If either of these effects is present, then results shown in Table 2 *underestimate* the effect of test score change on incumbents’ electoral prospects.

To estimate the effect of test score trends on an incumbent’s decision to run, and then to estimate the probability of facing competition for those who do run, we estimate the following two logistic regressions:

$$\Pr(Run_{id}) = \alpha + \Delta T_d \phi + X_d \beta + Z_{id} \psi + \varepsilon_{id} + \omega_d \quad (2)$$

and

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<sup>22</sup> Virtually identical results for all coefficients are observed when estimating the probability that an incumbent won a majority of the votes in each precinct in a competitive race, rather than the margin by which an incumbent won. In addition, weighting the observations by the number of votes cast in the precinct yields nearly identical results.

<sup>23</sup> Here too, turnover in school boards appears larger than that in Congress. In 2000, 93 percent of incumbents in the House, and 85 percent of incumbents in the Senate, sought reelection.

$$\Pr(\text{Comp}_{id} | \text{Run}_{id}) = \alpha + \Delta T_d \phi + X_d \beta + Z_{id} \psi + \varepsilon_{id} + \omega_d, \quad (3)$$

where notation is the same as in (1). In contrast to the vote share models, we do not have precinct-level observations here because when candidates run, they run in all precincts in the district. We do, however, allow for clustering of standard errors within school districts.

Table 2 presents the results of the first logistic regression model. As in Table 1, the model controls for test score levels, incumbents' lagged vote share, and measures of per-pupil expenditures; in addition, we include a dummy variable indicating whether board members received remuneration for their service.<sup>24</sup> Test score changes continue to attain statistical significance and remain in the expected direction: incumbents appear disinclined to seek reelection when their district's test scores drop. This result may indicate that incumbents bow out in anticipation of voter reprisals for poor performance or that serving in a declining district is less rewarding for board members. The point estimates in column 1 indicate that a movement from the 75<sup>th</sup> to the 25<sup>th</sup> percentile in test score change is associated with a drop of 13 percentage points in the probability that the incumbent will seek reelection (from 84 to 71 percent, holding other variables at their median).<sup>25</sup>

The results also indicate that incumbents are significantly less likely to seek reelection when the office does not compensate its members. In addition, incumbents are less likely to seek reelection in areas where per-pupil expenditures have increased, perhaps because they anticipate a tax revolt at the polls. Neither test score levels nor lagged vote

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<sup>24</sup> We also estimated models that controlled for whether a race was partisan. All of the main effects presented in table 3 hold up when this additional control variable is include. Further, incumbents appear less likely to run for reelection in partisan races. But as only three districts in our sample (accounting for 11 incumbents) faced partisan elections, we are reluctant to make much of this result.

<sup>25</sup> Assuredly, other factors than those presented here affect incumbents' decisions to run for re-election, e.g. the partisan make-up of the incumbent and her board, whether or not the incumbent has children in the public schools, whether or not the incumbent holds a full time job. It is difficult to think of any, though, that should be correlated with changes in test scores, mitigating concerns about omitted variable bias. Much the same logic applies to models estimated in subsequent tables.

shares are significant, indicating that incumbents in higher performing districts and incumbents who did especially well in past elections are no more likely to run for office.

If declining test scores discourage incumbents from seeking reelection, the retrospective voting literature suggests just the opposite in the case of competition: falling test scores should bring out more challengers—either because potential office-seekers believe that their chances of winning the election are higher when test scores have fallen, or because disgruntled citizens (or, more probably, parents) feel compelled to run for office when schools lag. To test this hypothesis for incumbents seeking reelection, we ran a logistic regression where the dependent variable is coded 1 if the incumbent faced at least one challenger, and zero if she ran unopposed. In addition to the three variables introduced in column 1 of Table 2, we add the number of registered voters in the district, with the expectation that larger districts have a bigger pool of potential candidates, and therefore should be more likely to host contested elections.<sup>26</sup>

Test score changes, once again, are highly significant, this time negatively associated with the probability of competition. The point estimates from column 2 suggest that a movement from the 75<sup>th</sup> to the 25<sup>th</sup> percentile in test score change is associated with an 18 percentage point increase in the probability of facing a challenger (from 44 to 62 percent, holding other variables at their median). All of the control variables, meanwhile, appear insignificant with the exception of whether a position is paid. As one might expect, challengers are more willing to take on an incumbent board member when victory assures them some kind of financial remuneration.

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<sup>26</sup> The number of seats on the school board does not vary proportionately with enrollment, so larger districts have more potential candidates per seat. For instance, school board size ranged from 5 to 11 seats, while school district enrollment ranged from 600 to 27,000.

Thus far we have measured competition as a binary outcome, but in fact a given incumbent may face more than one challenger. In order to capture this dimension of electoral competition, we compute a *competitiveness index* that measures the number of excess challengers per open seat.<sup>27</sup> Column 3 of Table 2 presents the results of an OLS regression of the competition index on the same set of predictor variables. With three exceptions, the results are consistent with the previous logistic regression models: both lagged candidate vote share and the number of registered voters are significant and in the expected direction; the estimated impact of whether a position is paid, meanwhile, falls below standard thresholds of statistical significance. Most importantly, though, test score changes remain negatively related to electoral competition, indicating that however competition is measured, candidates who presided over declines in district performance were more likely to face challengers.<sup>28</sup>

In summary, we have identified three major effects of test score change on school board elections. First, incumbents are significantly less likely to seek reelection when test scores have declined on their watch, either due to anticipated voter retaliation or frustration with serving in a faltering district. Second, those incumbents who do run are significantly more likely to be challenged at the polls if they have presided over a test score drop. Third, those incumbents who run in competitive elections receive a significantly lower share of the

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<sup>27</sup> The formula for the *competitiveness index* is  $\frac{(\#challengers - (\#seats - \#incumbents))}{\#seats}$ . Among the 112 incumbents running for reelection in 2000, the index ranges from zero, where a candidate runs unopposed, to 3.33, an instance in which three seats were up for election and 13 candidates were running, 11 of whom were challengers.

<sup>28</sup> For multiple winner elections, there are some cases in which two incumbents run with only one competitor. To test whether this influences our results, we ran two sensitivity checks. First, we ran a version of the model in which we included a dummy variable for multiple-winner elections. This variable had a significant, positive effect on competitiveness, indicating that multiple-winner elections were more likely to attract at least one competitor. Test score change remained significantly negative in this equation. Second, we ran a version of the model that excluded multiple-winner elections. Again, test score change remained significant and negative.

vote where test scores have fallen. Because test scores influence the chances that an incumbent runs in a competitive election – essentially deterring the worst performers from running and rewarding the best with an uncontested seat – the results reported in Table 1 should be considered *lower bound* estimates of the effects of test scores on incumbents' electoral fortunes.<sup>29</sup>

### *Sensitivity Analyses in 2000*

To test the robustness of our results, we perform two sensitivity analyses. The first concerns the functional form of the relationship between test score changes and the three dependent variables identified in the preceding section. Within the retrospective voting literature, a number of scholars have observed asymmetric effects of changes in economic conditions on incumbents' electoral fortunes (see, e.g., Hansen 1999). While voters regularly punish presidents and members of Congress when the economy deteriorates, they do not consistently reward them for growth or prosperity. We extend these analyses by examining the possibility that voters penalize declines in test scores more significantly than they reward

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<sup>29</sup> Several considerations dissuaded us from attempting to estimate a Heckman-type selection model in this case. First, we would require at least one identifying variable that strongly affects the chances of observing an incumbent in a competitive election but is unrelated to incumbent vote share. Given that selection depends on both an incumbent's and a challenger's decision to run, we would require a factor that simultaneously (a) is positively (negatively) correlated with the probability of an incumbent seeking reelection, (b) is positively (negatively) correlated with the probability of a challenger entering the race, and (c) is unrelated to the incumbent's ultimate vote share. We have not been able to uncover such an identifying variable. Second, the two stages of the model (selection and outcome) are observed for different units of analysis. That is, we observe the selection into a competitive race for individual incumbents, whereas we observe vote share at the precinct level, with multiple observations per incumbent. Thus, proper estimation of the standard errors for the corresponding selection model would be a challenge. Given these obstacles, the first being paramount, we do not estimate a Heckman-type selection model. Rather, we acknowledge that our estimates of the effects of test score change on vote share and on the probability of facing competition are likely to be lower bounds of the true effects.

test score gains. To do so, we use regression splines on test score change, setting a single knot at zero.<sup>30</sup>

The results are presented in Table 3, where the three columns show the results of, respectively, a logit model that estimates the probability of seeking reelection, a logit model of the probability of facing a challenger, and an OLS model of incumbent vote share in competitive elections. Columns 1 and 3 do not reveal any evidence of asymmetries. Impacts of test score increases and declines on the probability that an incumbent runs for reelection appear virtually identical to one another. In the OLS vote share models, although the negative test scores show a larger effect, neither spline segment attains statistical significance, suggesting that the linear fit from Table 1 is the preferred specification. In both instances, we cannot reject the hypothesis that the two spline segments have equal slopes.

Asymmetric effects, however, are apparent in the competitiveness model (column 2). While positive improvements in test scores appear unrelated to the probability that an incumbent faces a challenger, test score declines have a substantial impact on the willingness of challengers to enter the race. Because coefficients in logit models are difficult to interpret, especially under the present specification with splines, we depict the results of these models graphically in Figure 1.<sup>31</sup> The graph represents the point estimates from the logit model, with 90 percent confidence intervals, over the observed range of test score change, holding other variables at their medians. Looking first to the left of zero, we see that point estimates rapidly approach one and confidence intervals shrink as student performance slides.

Importantly, test score trends do not have to be egregious before effects are observed. For

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<sup>30</sup> A virtue of this analysis is the natural location of the knot, as positive values indicate improvement and negative values decline. We also estimated a more flexible nonlinear function using a lowess smoother within a generalized additive model (Beck and Jackman 1998; Hastie and Tibshirani 1990). The results were similar to those obtained with the simpler spline function.

<sup>31</sup> These graphs were produced using the CLARIFY software for Stata. (Tomz, Wittenberg, and King 2001)

example, the difference between no change in scores and a drop of one point is associated with a 14 percent increase in the probability that the incumbent faces competition. At the very low end, the marginal effect of a decrease in scores is smaller because the estimated probabilities of competition are already close to one. Where test scores have increased, however, the pattern is quite different. The point estimates are basically flat for scores above zero, and the confidence intervals widen as observations become sparse at the high end. Although declining test scores are bait for challengers, increasing scores do not ward them off.

Next, we address the concern that test score change may proxy for other conditions that influence voters' assessments of incumbents. If test score changes correlate with broader shifts in the overall health of the local community, then the effects we observed in the preceding analyses may be spurious, merely indicating that all incumbents faced greater electoral pressures in deteriorating communities. To explore this possibility, we model the effects of test scores on county council elections.<sup>32</sup> If test scores provide unique information about the performance of the school board, then we expect them to have negligible effects on county council races. Results of the same three stages of analysis are shown for county council races in Table 4.

Test score changes showed no significant effect on incumbent vote share or probability of seeking reelection, suggesting that for the most part, voters are able to connect the right evaluative criteria with the right local election. Curiously, test score changes yielded a significant *positive* effect on the probability of the city council incumbent faced competition, in contrast with school board elections where the effect pointed in the opposite

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<sup>32</sup> Models that examine presidential and state legislative races generate results comparable to those presented below.

direction. We are reticent to assign meaning to this particular finding, but suggest that the general results in Table 4 allay concerns that test score changes merely stand as proxies for other trends in the local area that affect the prospects of all incumbents.

### *The 2002 School Board Elections*

In this section, we replicate the main school board models for the 2002 elections, when turnout was roughly half that observed in 2000.<sup>33</sup> Unfortunately, available demographic data on the voting population (race, age, and gender) do not provide much of a basis to probe the differences between the two electorates in any depth.<sup>34</sup> It seems fair to assume, however, that voters in 2002 are significantly more educated than their counterparts of two years prior.

Our theoretical expectations for the midterm election are less clear. On the one hand, these voters are probably better informed about student achievement trends, and hence better equipped to vote retrospectively. On the other hand, when casting their ballots these voters may rely upon alternative kinds of information. John Zaller, for instance, has argued recently that retrospective voting occurs principally among low-information voters, while high-information voters pay more attention to candidates' policy positions (2004). If true, then test score changes may not impact board members' electoral prospects during a non-presidential election.<sup>35</sup>

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<sup>33</sup> Roughly 53 percent of registered voters turned out in 2000; in 2002, meanwhile, just 26 percent did.

<sup>34</sup> Nor do they reveal significant differences between the two electorates.

<sup>35</sup> In making this claim, Zaller is not alone. While much of the empirical literature on retrospective voting began by focusing on Congress (Alesina and Rosenthal 1989; Born 1986; Erikson 1990; Jacobson and Kernell 1983; Tuftes 1978; Weatherford 1978), supportive evidence appears especially robust in presidential elections, where turnouts are much higher (Fiorina 1981; Kinder and Kiewiet 1981; Peltzman 1990). By extension, scholars have observed more robust relations between economic developments and voting behavior during on-year elections than during off-year elections (Fiorina 1978).

The results would appear to bolster Zaller's claims. As Table 5 show, changes in test scores do not impact the probability that an incumbent in 2002 seeks reelection, the probability he faces competition, or his final vote share. These null findings, what is more, do not appear to be a statistical artifact. In models not presented, we added administrative data from teacher, parent, and student ratings of local schools; we experimented with two- and three-year changes in test scores, rather than one-year changes; we examined precinct deviations from district mean scores; we looked at changes in the percentage of students who attained failing scores on the PACT;<sup>36</sup> we restricted the sample of 2002 elections to only those districts that held elections in 2000; and we replicated the spline models for 2002 in an attempt to uncover asymmetric effects.<sup>37</sup> None of these alternative approaches produced any evidence of retrospective voting in the 2002 elections.<sup>38</sup>

With respect to the control variables, additional differences between the 2000 and 2002 models are observed. Lagged incumbent vote share, for instance, is only marginally significant in the 2002 vote share model, though it stood out as the most highly significant variable in the 2000 model. This finding, however, is not altogether surprising. Again, because voters in this non-presidential election are assuredly more educated, they may be less influenced by a candidate's name recognition or candidate spending, the kinds of characteristics that lagged vote shares mean to capture.

While high-information voters in lower-turnout local elections may not vote retrospectively, they probably do care about board members' policy positions. Which policy

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<sup>36</sup> These alternative measures of school performance were not available for the 2000 models.

<sup>37</sup> In addition, one might isolate those races in 2002 with comparable turnout rates as those observed in 2000. Unfortunately, when restricting the analysis in this way, we are left with insufficient cases to draw meaningful conclusions.

<sup>38</sup> In 2002, a highly contested gubernatorial election featured prominent debates over educational performance trends. Significant and positive effects of test score trends, what is more, are observed in models that estimate the incumbent governor's vote share. It remains a puzzle, however, why voters would hold a governor responsible for student learning trends, but not local school board members.

positions? Elsewhere, scholars have shown that low-turnout school board elections attract a disproportionate share of vested stakeholders, such as teachers and administrators (Moe forthcoming). It seems likely that these stakeholders evaluated board members less on the basis of test scores than on a demonstrated commitment to their employment interests. That changes in per-pupil expenditures correlate positively with the probability that incumbents run for office in 2002 (recall, they registered negative and significant impacts in 2000) certainly is consistent with the claim that vested interests exerted a disproportionate level of influence during this off-year election.

Unfortunately, without individual-level data, we cannot further examine Zaller and Moe's claims about high- and low-information voters and the composition of school board electorates in on- and off-year elections. We leave it to future research to extend their arguments to different kinds of local elections with variable turnout rates. We note, though, that that retrospective voting is not a foregone conclusion in all local elections; and, more specifically, that the draw of a presidential election may improve the chances that electorates hold board members accountable for the performance of schools.

#### **Section IV: Conclusion**

Many of the findings presented in this paper reinforce those observed in economic voting models. Just as voters hold presidents, members of Congress, and governors responsible for economic developments, so too do voters evaluate school board members on the basis of student learning trends. Consistent with the "strategic politician" hypothesis, evidence of retrospective voting primarily manifests itself in the choices made by political elites. The largest effects observed in school board elections, as with state and federal elections, arise in models that estimate the probabilities that incumbents run for re-election,

and the probabilities that they face competition when they do. Finally, at least with respect to competitive elections, asymmetric effects are observed. Incumbents, as such, are more likely to experience the wrath of a vengeful electorate than they are the laudations of an appeased public.

An important exception concerns egocentric voting. Much of the economic voting literature suggests that citizens evaluate incumbents more on the basis of state or national economic trends than on changes in their individual lives. When it comes to education, however, egocentric voting appears to be the norm. Deciding whether to support an incumbent school board member, voters principally monitor their local schools rather than broader developments across a board member's jurisdiction.

Obviously, when interpreting these results, caution is warranted. For starters, the principal school board elections examined in this paper occurred at the same time as a presidential election. If the 2002 results are indicative of underlying trends, then non-presidential elections that draw a more selective segment of the electorate may yield very different results. In addition, these empirical findings are consistent with multiple causal stories; and again, without individual-level data, it is virtually impossible to distinguish between them. Evidence of retrospective voting may derive from either a small percentage of high-information voters who vote strictly on the basis of changes in test scores, or a partially-informed electorate that pays casual attention to test scores. Similarly, we do not know whether citizens vote on the basis of test scores or changes in student learning more generally. It could be that citizens obtain direct information about how students score on standardized tests, and vote accordingly; alternatively, these results might derive from parents observing students and schools, but never test scores, provided that changes in test

scores correlate positively with changes in student learning. Plainly, more data are needed to distinguish these various causal pathways.

Still, in at least three ways, the 2000 and 2002 races in South Carolina present a tough test for theories of retrospective voting. First, we are working with aggregate voting data. From a purely statistical standpoint, individual level data collected from a wider variation of races may produce more pronounced effects. Second, standardized tests surely overlook important aspects of student learning. With richer measures of student achievement, scholars may better identify whether, and when, voters hold board members accountable for the quality of their local schools. And finally, South Carolina's accountability system is relatively new. Over time, as voters grow accustomed to the testing regime and learn more about the performance of their schools, retrospective voting may become more common.<sup>39</sup>

With over a half a million local elections held around the country, the vista is wide open for continued research. Scholars may yet examine whether voters hold sheriffs responsible for trends in crime rates, district attorneys for trends in conviction rates, roads commissioners for changes in traffic congestion, mass transit officials for improvements in public transportation, or fire commissioners for reducing emergency response times. Such studies, we anticipate, will advance our understanding of voting behavior in ways not possible by continually tinkering with existing models of recent congressional and presidential elections. As empirical research on single and multiple function local elections progresses, we may better understand how the changing composition of electorates, the availability of different voting heuristics, and the information available on incumbents' job performances contribute to, or detract from, retrospective voting.

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<sup>39</sup> PACT scores in South Carolina have become more widely publicized. The state now sends every parent in the state notification of their school's performance, and districts are required to report school test scores in local newspapers.

**Table 1: Incumbent Vote Share in 2000 School Board Elections**

	(1)	(2)
Change in Total Score 1999-2000 (Precinct)	0.005** (0.002)	0.004** (0.002)
Change in Total Score 1999-2000 (District)	-0.007 (0.006)	-0.006 (0.006)
Incumbent vote share in 1996		0.374** (0.090)
Per Pupil Expenditures, 2000		0.022 (0.014)
Percent Change in per Pupil Expenditures, 1999-2000		-0.136 (0.150)
Total Percentile Score 2000 (District)		-0.000 (0.001)
Constant	0.580** (0.022)	0.202 (0.135)
Observations	960	862
R <sup>2</sup>	0.02	0.23

Robust standard errors in parentheses, with clustering by school district. Least squares regressions estimated. \* significant at 10%, two-tailed test; \*\* significant at 5%. Per pupil expenditures measured in thousands of dollars.

**Table 2: Seeking Reelection and Facing Competition, 2000**

	Does incumbent run for reelection? (Logit)	Is race competitive? (Logit)	Competitiveness Index (LS)
	(1)	(2)	(3)
Change in Total Score, 1999- 2000 (District)	0.178** (0.061)	-0.186** (0.066)	-0.055* (0.027)
Avg. Percentile Score, 2000 (District)	0.001 (0.009)	-0.003 (0.019)	0.010 (0.008)
Incumbent Vote Share in 1996	-0.031 (0.959)	-1.691 (1.132)	-0.760* (0.418)
Per Pupil Expenditures, 2000	-0.043 (0.103)	-0.006 (0.018)	-0.013 (0.061)
Percent Change in Per Pupil Expenditures 1999-2000	-5.241** (1.753)	2.312 (2.259)	0.270 (0.748)
Dummy = 1 if position pays no salary	-1.369** (0.334)	1.588* (0.931)	0.459 (0.387)
Total Number of Registered Voters (District)		0.003 (0.003)	0.008* (0.005)
Constant	1.863 (1.228)	1.074 (1.825)	0.749 (0.808)
Observations	152	108	108
R <sup>2</sup> (pseudo R <sup>2</sup> for logit)	0.09	0.14	0.27

Robust standard errors in parentheses, with clustering by school district. \* significant at 10%, two-tailed test conducted; \*\* significant at 5%. Per pupil expenditures and registered voters measured in thousands of dollars and voters respectively.

**Table 3: Asymmetric Effects, 2000**

	Does incumbent run for reelection? (Logit)	Is race competitive? (Logit)	Incumbent vote share (LS)
	(1)	(2)	(3)
Spline for Change in Test Scores <0 (precinct)	0.165** (0.084)	-0.632** (0.249)	0.004 (0.003)
Spline for Change in Test Scores >0 (precinct)	0.193* (0.102)	0.092 (0.160)	0.003 (0.003)
Change in Total Score 1999- 2000 (District)			-0.006 (0.006)
Avg. Percentile Score, 2000 (District)	0.001 (0.009)	-0.000 (0.023)	-0.000 (0.001)
Incumbent Voter Share in 1996	-0.017 (0.973)	-1.939 (1.199)	0.375** (0.089)
Per Pupil Expenditures, 2000	-0.048 (0.108)	-0.075 (0.191)	0.020 (0.014)
Percent Change in Per Pupil Expenditures 2001-02	-5.316** (1.867)	1.529 (2.364)	-0.134 (0.150)
Dummy = 1 if position pays no salary	-1.387** (0.361)	1.618* (0.924)	
Total Number of Registered Voters (District)		0.030 (0.031)	
Constant	1.842 (1.252)	0.779 (2.026)	0.206 (0.136)
Observations	152	108	862
R <sup>2</sup> (pseudo R <sup>2</sup> for logit)	0.09	0.21	0.23
Unit of analysis	Incumbent	Incumbent	Incumbent x Precinct

Robust standard errors in parentheses, with clustering by school district. \* significant at 10%, two-tailed test conducted; \*\* significant at 5%. Per pupil expenditures and registered voters measured in thousands of dollars and voters respectively.

**Table 4: County Council Elections, 2000**

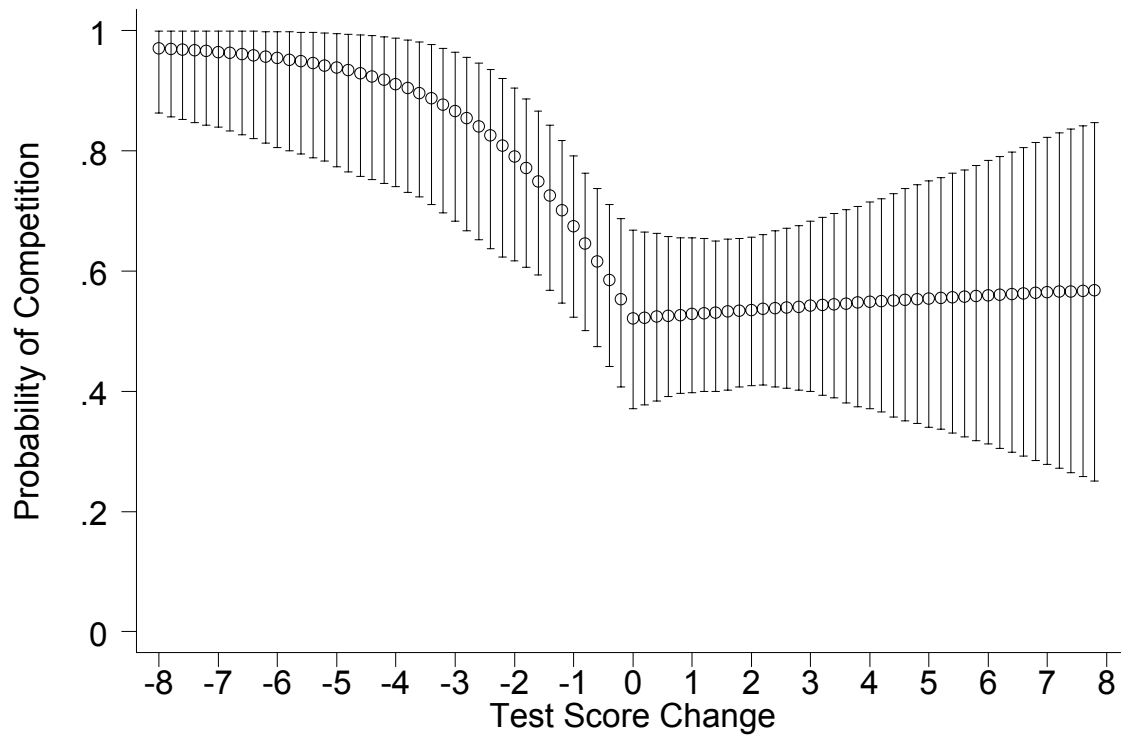
	Incumbent run again? (logit) (1)	Race competitive? (logit) (2)	Incumbent vote share (LS) (3)
Change in district test score, 1999-00	1.112 (0.838)	4.782** (1.432)	-0.008 (0.011)
Change in precinct test scores, 1999-00			-0.000 (0.003)
Incumbent Vote Share, 1996	-0.052 (0.046)	0.152** (0.065)	0.636** (0.134)
Dummy = 1, Democrat	0.607* (0.333)	-1.151** (0.563)	0.047 (0.058)
Constant	-0.696 (0.723)	3.759** (1.228)	0.120 (0.093)
Observations	164	104	611
R <sup>2</sup> (pseudo R <sup>2</sup> for logit)	0.03	0.16	0.35
Unit of analysis	Incumbent	Incumbent	Incumbent x Precinct

Robust standard errors in parentheses, with clustering by school district. \* significant at 10%, two tailed test; \*\* significant at 5%.

**Table 5: 2002 School Board Elections**

	Did incumbent run for reelection? (Logit)	Is race competitive? (Logit)	Incumbent Vote Share 2002 (LS)
	(1)	(2)	(3)
Change in Total Score 2001-02 (District)	0.001 (0.010)	0.004 (0.016)	-0.004 (0.007)
Change in Total Score 2001-02 (Precinct)			-0.004 (0.003)
Total Percentile Score 2002 (District)	-0.002 (0.002)	0.003 (0.003)	0.002 (0.001)
Percent Change in Per Pupil Expenditures 2001-02	0.959*** (0.314)	-0.264 (0.823)	-0.253 (0.218)
Per-pupil expenditures 2002	0.003 (0.054)	0.113* (0.065)	0.018 (0.012)
Incumbent Vote Share 1998	0.149 (0.101)	-0.030 (0.158)	0.211* (0.111)
Dummy = 1 if position pays no salary	0.032 (0.132)	0.119 (0.126)	
Total number registered voters		0.006*** (0.002)	
Constant	0.588* (0.322)	-0.274 (0.363)	0.235** (0.098)
Observations	184	126	1308
R <sup>2</sup> (pseudo R <sup>2</sup> for logit)	0.03	0.16	0.10
Unit of analysis	Incumbent	Incumbent	Incumbent x Precinct

Robust standard errors in parentheses, with clustering by school district. \* significant at 10%, two tailed test; \*\* significant at 5%. Per pupil expenditures and registered voters measured in thousands of dollars and voters respectively.



**Figure 1: Impact of Test Scores on Incumbents' Probability of Facing a Challenger in 2000**

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