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VERSION: June 2020

HOW DOES MINORITY POLITICAL REPRESENTATION AFFECT SCHOOL DISTRICT ADMINISTRATION AND STUDENT OUTCOMES?

June 19, 2020

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Abstract: We employ a regression discontinuity design leveraging close school board elections to investigate how the racial and ethnic composition of California school boards affects school district administration and student achievement. We find some evidence that increases in minority representation lead to cumulative achievement gains of approximately 0.1 standard deviations among minority students by the sixth post-election year. These gains do not come at the expense of white students' academic performance, which also appears to improve. Turning to the policy mechanisms that may explain these effects, we find that an increase in minority representation leads to greater capital funding and an increase in the proportion of district principals who are non-white. We find no significant effects of minority representation on school segregation, the reclassification of English Language Learners, or teacher staffing.

Word count: 9,975

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*The authors are listed in alphabetical order. This work was generously supported by the Spencer Foundation through a Lyle Spencer Research Award. We thank Deven Carlson, Jason Grissom, George Krause, Robert Lowry, Michael Leo Owens, Julia Payson, Beth Reingold, and seminar participants at the University of Georgia, Vanderbilt, Duke, UCLA, and Emory and the APPAM, Boston University Local Political Economy, and State Politics and Policy conferences for helpful comments on this project. We thank Madhu Kumar for excellent research assistance.

Public school districts play a critical governance role in the United States. There were over 3.6 million public school teachers in 2016 and school districts spent a total of \$634 billion in 2013-2014, representing more than 10 percent of overall government expenditures.¹ The vast majority of these school districts are governed by locally elected boards that determine education policies. The decisions these boards make—including negotiating teacher contracts, choosing curriculum used in the classroom, setting tax rates, approving budgets, and adopting disciplinary policies—have direct consequences for the quality of education students receive.²

Despite improvements in the overall academic performance of public school students in recent decades (Rindermann and Thompson 2013), the U.S. education system continues to face large and stubbornly persistent gaps in achievement between white and minority students (Lee 2002). Although the achievement gaps between minority and white students have narrowed in recent years, large differences in performance remain (Clotfeleter, Ladd and Vigdor 2009, Reardon and Galindo 2009, Reardon and Portilla 2016). Some of this gap is undoubtedly due to socioeconomic differences and other structural factors beyond the control of schools, but the actions local districts take can have an impact (Hanushek and Rivkin 2009). In this study, we examine whether (and under what conditions) increasing minority representation on school boards leads to meaningful changes in the administration of local school districts and, ultimately, academic achievement—particularly among minority students.

Survey results illustrate that there are important differences in education policy prefer-

¹These numbers are from the National Center for Education Statistics. Total governmental expenditures in 2014 were approximately \$5.9 trillion according to the Bureau of Economic Analysis.

²In 2015, only 10.3 percent of elementary and secondary students attended private schools and approximately 5.4 percent of public school students attended charter schools, according to the National Center for Education Statistics.

ences between white and non-white voters.³ For example, a 2011 poll indicated that the share of African American and Latino respondents who supported increasing education spending was 18 percentage points higher than among white respondents (West, Henderson and Peterson 2012). This difference on finance issues alone suggests that minority representation on school boards could have a substantively significant effect on policy and student achievement. Indeed, such a possibility has motivated an important literature in political science examining how minority representation on school boards affects district policy decisions and student outcomes (Meier and Smith 1991, Leal and Hess 2000, Leal, Martinez-Ebers and Meier 2004, Ross, Rouse and Bratton 2010).⁴ Credibly assessing the effects of minority representation has proved challenging, however, as school board composition is not random. There are many potential confounds between the demographics of school board members, policy, and student outcomes. As one example of how policy changes can affect racial representation, Abott and Magazinnik (Forthcoming) show that the California Voting Rights Act, which led to many school districts adopting ward-based elections, increased Latino representation in highly-segregated districts. The possibility of confounding is a major validity threat for much of the existing literature, as it is largely limited to examining cross-sectional variation

³For brevity, we will often use the term “race” instead of “race and ethnicity.” Our empirical approach, as well as the coding scheme in the administrative data we use, treats racial minorities and Latinos as mutually exclusive so no candidate is classified in overlapping racial and ethnic groups.

⁴Our work also relates to a large literature on representative bureaucracy, which finds that surpassing a critical mass of racial minorities or women in the ranks of the bureaucracy is related to bureaucratic performance (Meier 1993, Selden 2015, Atkins and Wilkins 2013). In this paper, we study the effects of the demographics of elite-level policymakers and look for evidence of non-linearities in the effects of minority representation. Similarly, educational policy scholars have examined the consequences of teacher racial characteristics on student achievement. See Grissom, Kern and Rodriguez (2015) for a review.

in the proportion of minorities on school boards.

Our study makes two primary contributions to the literature examining minority representation on school boards. First, we use an identification strategy that allows us to draw more credible causal inferences than previous studies. We employ a regression discontinuity design to estimate the impact of plausibly exogenous changes in the race and ethnicity of California school board members on educational, administrative, and fiscal outcomes in the years following the election. Second, we systematically examine and test a broader set of representational theories through which school board composition can affect district administration and student outcomes. Most notably, we find evidence that even small gains in minority representation can have a meaningful impact on policy and student learning even when school boards remain majority white. In other words, a minority election need not result in a majority-minority board in order to yield changes in policy and outcomes. This result is consistent with Austin's (2002) finding that minority city council members are typically successful in forming cross-racial working coalitions, rather than being outvoted by their white colleagues. Equally important, our results are inconsistent with the notion that increasing diversity on governing boards leads to gridlock and reduces investment in public goods.

Using our preferred measure of student achievement, we find that greater representation of racial and ethnic minorities on school boards has a positive effect on the achievement of non-white students. Electing one additional minority school board member leads to student achievement gains of approximately 0.1 student-level standard deviations by the sixth post-election year. We provide suggestive evidence that higher school facility spending is one mechanism contributing to this effect, which is consistent with the delay we observe between the change in school board composition and improved student achievement. In particular, we find that greater minority school board representation increases the probability that a school board proposes and obtains voter approval for a school facilities bond. Importantly, we find no evidence that the improvements in non-white student performance come at the

expense of white students.

In addition to documenting the impact of minority representation on student achievement and bond passage, we systematically examine a variety of other potential policy mechanisms that may be responsible for the learning gains we find. Our analysis is motivated by the scholarly literature on student achievement and includes an examination of staffing levels, the racial and ethnic composition of employees, school-level segregation, the number of bilingual-certified teachers, and English-language learner reclassification. We find little evidence that minority representation on school boards affects the total number of employees or the racial and ethnic composition of rank-and-file workers. Nor does school board composition appear to have a consistent effect on school-level segregation. We do, however, find evidence that the share of school district principals who are non-white increases when minorities win more school board seats, providing another potential policy lever through which changes in board composition may affect student learning.

California School Boards

California school boards can affect student outcomes through a number of channels. They are responsible for hiring and firing superintendents and other senior district managers, which enables them to have an impact on day-to-day decision-making. They also have final say over collective bargaining agreements with district teachers and staff; make curricular decisions, such as choosing textbooks; and set a variety of policies on matters like English language learner reclassification, student discipline procedures, course completion standards for grade advancement, and requirements for high school graduation. Finally, boards are responsible for fiscal governance, such as adopting district budgets, putting school bond measures on the ballot, and more rarely, proposing “parcel” (non-*ad valorem*) property taxes for voter

approval.⁵

California school board elections are non-partisan contests. While party labels do not appear on the ballot, candidates can provide information on their occupation or whether they currently serve as an incumbent. Until recently, many California school board elections were off-cycle, when turnout is generally low (Berry and Gersen 2010, Anzia 2011, Kogan, Lavertu and Peskowitz 2018). Given the lack of partisan information on the ballot, low levels of media coverage, and relatively low turnout and high roll-off in many cases, interest groups play a significant role in informing and mobilizing voters. For example, using data on union endorsements in California school board elections, Moe (2006) finds that a teachers' union endorsement significantly increases the probability that a candidate wins, with an effect larger than that of incumbency.

Theories of Board Decisionmaking

We study three potential ways in which minority school board representation could affect policy outcomes. First, adding representatives who are members of a minority group may increase the group's informal influence and formal bargaining power on the board (e.g., see Baron and Ferejohn 1989). If school boards generally follow norms of consensus and collaboration in their decision-making process, adding a new voice with distinct preferences could result in different policy decisions (Mendelberg, Karpowitz and Oliphant 2014). For example, scholars have found that increasing the representation of minorities affects collective decisionmaking by juries (Anwar, Bayer and Hjalmarsson 2012) and judicial appellate panels (Kastellec 2013), even when a majority of the body's members are white.

Second, in some instances, changing the identity of an individual school board member changes the race or ethnicity of the median school board member. In unidimensional mod-

⁵Due to Proposition 13, California school districts have no discretion to increase their operational *ad valorem* property tax revenues.

els of legislative bargaining with single-peaked preferences, the median legislator is decisive (Black 1948, Krehbiel 1998). If the policy preferences of school board members are systematically correlated with their race or ethnicity, these models would predict that electing one minority member to a school board that was previously all white is unlikely to affect policy because the identity of the median school board member would remain unchanged. However, when adding an additional minority representative changes the race or ethnicity of the median member, there is a potential for the election to affect educational policy outcomes.

Third, increasing diversity on a school board may make it more difficult for members to come to an agreement. Alesina, Baqir and Easterly (1999) develop a model in which racial or ethnic diversity reduces the provision of public goods because groups have heterogeneous preferences or groups derive less utility when a public good is consumed by members of other groups.⁶ In empirical work at the municipal level, Beach and Jones (2017) study California city councils and find that when a candidate of non-modal race wins an election against a modal race candidate, public spending decreases. Similarly, Hopkins (2009) finds that elites are less likely to place a tax measure on the ballot when citizen diversity increases suddenly.

Table 1 summarizes the theoretical predictions for these alternative theoretical accounts. Our interpretations of these models implicitly assume some level of racial polarization among candidates and the electorate. While our theoretical predictions do not require that all citizens vote only for candidates of their race or ethnicity or that there is no overlap between the policy positions of white and non-white candidates, we do assume that minority group membership and policy preferences of school board candidates are correlated. Our reading of opinion polling data and contemporaneous accounts of education politics in California during our sample period suggest that there were important policy differences between white and

⁶Alesina, Baqir and Easterly (1999) develop their theoretical model as a direct democracy where voters directly decide on the level and type of public goods. In a representative democracy with legislators who faithfully represent the preferences of citizens of the same race or ethnicity, the prediction of diversity decreasing public goods provision would hold.

Table 1: Summary of Theoretical Predictions

Analytic Sample	Theory	Literature	Empirical Implications
Minority Win	Policy is made by informal norms of consensus where all members' views are incorporated into policy views. Individual policymakers can influence the behavior of colleagues during deliberation process and/or use their agenda power strategically.	Sommers (2006), Mendelberg, Karpowitz and Oliphant (2014), Kstellec (2013), Baron and Fer-john (1989), Sances and You (2017)	Increasing minority representation on school board affects policy outcomes. A minority candidate's electoral win results in increased public funding of education, more diverse district staff, increased resource allocation to minority students, and improved student achievement among these students.
Non-Modal Win	Increasing diversity on the school board increases conflict and policy gridlock.	Alesina, Baqir and Easterly (1999), Hopkins (2009), Beach and Jones (2017)	School board diversity reduces education spending and the odds of policy change from the status quo. Achievement stays the same or even suffers as a result of gridlock and disinvestment.
Pivotal Win	Policy is made by majority rule, with the median school board member determining outcomes. Race and ethnicity of school board members are correlated with spatial preferences.	Black (1948), Krehbiel (1998)	Electoral victory by a single minority candidate is insufficient to affect policy outcomes. An election producing majority-minority board results in increased public funding of education, more diverse district staff, increased resource allocation to minority students, and improved student achievement among these students.

non-white voters and school board candidates, with minorities supporting higher levels of education spending than whites. For example, Alvord and Rauscher (2019) show that the probability of passing an education bond increases in California school districts with larger African American and Latino populations, suggesting that African American and Latino voters are more supportive of education funding than white voters.

The theoretical predictions we lay out are not mutually exclusive and, for some configurations of school board composition, make similar predictions. For example, the argument that

a victory by a single minority candidate on an otherwise all-white board can affect education policy would also predict that subsequent minority candidate victories, including a pivotal minority win, could produce further policy change. Similarly, in districts where the modal candidate is non-white, several of the above theories would predict that electing an additional white member would reduce support for education expenditures. Nevertheless, each theory suggests a distinct set of predictions that we can test empirically, allowing us to evaluate whether the aggregate results are more consistently in line with one theoretical model than the others. Most of the empirical scholarship on minority school board representation has implicitly focused on the first representational theory by studying how the proportion of minority representation affects policy outcomes (see, e.g., Meier and Smith 1991, Leal and Hess 2000, Leal, Martinez-Ebers and Meier 2004, Ross, Rouse and Bratton 2010).

Empirical Approach

Our goal is to estimate the causal effect of minority school board representation on district policy and student outcomes. The challenge in our setting is that many observed changes in the composition of school boards are the result of changing demographics, voter preferences, and political dynamics within districts. The representation of minorities on local school boards is not randomly assigned and is instead the result of which candidates choose to run for school board, interest group mobilization and persuasion efforts, how citizens decide to vote, and the electoral institutions that aggregate vote choice.⁷ All of these factors could influence not only who serves on school boards but also our outcomes of interest. As a result, observed correlations between school board representation and policy outcomes might be confounded by these unmeasured factors.

⁷Much of the literature on the representation of racial minorities on school boards focuses on how district as opposed to at-large elections have the potential to increase minority representation (Leal, Martinez-Ebers and Meier 2004, Meier and Rutherford 2014; 2017).

To resolve this identification problem, we exploit quasi-random variation in the electoral performance of minority candidates using a regression discontinuity design. Winner-take-all electoral rules create a sharp cutoff in candidates' vote shares where treatment status changes discontinuously. In our setting, a non-white minority candidate wins a seat on the school board when she receives one more vote than the closest white candidate, but the white candidate prevails when the minority candidate trails by one vote. When elections are sufficiently close, exogenous events that are orthogonal to outcomes of interest can determine election outcomes. Examining the differences in outcomes between jurisdictions where a candidate with a given characteristic barely lost the election and those where such a candidate barely won can be used as the basis for estimating the effect of the candidate characteristic. When potential outcomes are continuous across the cutoff this estimate can be interpreted as a causal treatment effect (Imbens and Lemieux 2008).

Statistical Models

To implement the design, we limit our analytic sample to school board elections in districts where either the first runner-up or the winner with the lowest vote share is white and the other candidate is non-white. Letting i denote districts and t the year, our main estimating equation is:

$$Y_{it+k} = \alpha_M \text{MinWin}_{it} + f(\text{MinVS}_{it}) + \epsilon_{it} \text{ for } it \in \text{MinCand} \quad (1)$$

where Y is the district outcome of interest, MinWin is an indicator for whether a minority candidate won the election, MinVS is the difference in vote share between the minority candidate and the non-minority candidate, f is a polynomial function, ϵ is an idiosyncratic error, and MinCand is the subset of elections where a minority and a white candidate are the first runner-up and the lowest performing winning candidate. To estimate the model, we must specify the order of the polynomial f and make a decision about how to select a

bandwidth that determines whether the election is close enough to include in our estimation sample. In all of our models, we use the Calonico, Cattaneo and Titiunik (2014) method. We report bias-corrected point estimates calculated with one mean squared error optimal bandwidth selector and a triangular kernel to weight the local linear regression function and we employ robust standard errors clustered at the district level.

We separately estimate the treatment effect on the outcome of interest in years 0-8 after the election (denoted by the k subscript in the equation). These specifications allow us to examine the dynamic response of school districts to changes in minority board representation. As Cellini, Ferreira and Rothstein (2010) discuss, these estimates should be interpreted as intent-to-treat effects. Because other school board elections take place during the course of our panel, after the focal election we examine, the racial composition of the school board may change in subsequent years.⁸

An additional complication that affects the interpretation of our estimates is that because these are multi-seat contests, the candidates who emerge as the lowest vote-share winner and first runner-up may have policy preferences that are closer to one another than would be true for two randomly-selected candidates. For example, if community groups or labor unions construct slates of endorsed candidates and a large share of voters choose candidates on the basis of these slates, it is possible that candidates who win about the same numbers of votes run on the same slate and thus have policy positions that are quite similar. In this scenario, our empirical strategy might underestimate the magnitude of policy effects one would see if a randomly-selected non-white candidate defeated another randomly-selected white candidate. Similarly, it is important to emphasize that our regression discontinuity

⁸Figure C.3 in the Supplemental Information (SI) shows that that electing a minority board member increases the estimated share of minority board members by roughly 0.2 in years 1-4 after the election. Electing a majority-minority board in year 0 increases the probability of having a majority-minority board for two years, but then has an effect that is close to zero in year 3.

estimates are local average treatment effects that are specific to district-years where white and non-white candidates earned vote shares that were close to the winning threshold. We provide some descriptive information on how this analytic sample compares to the broader set of California school board elections below.

In most districts in California, typical school board elections are multi-seat contests with two to four seats up for election. A small set of districts have ward-based election systems in which a single seat is contested within a fixed geographic area. In both cases, we restrict attention to elections where either the highest performing non-winning candidate or the lowest performing winning candidate is of minority background and the other candidate is white. As a result, we can have at most two candidates in the election sample in a district-year for a multi-seat contest. In ward-based elections, it is possible to have multiple candidates in a given district-year because we include the first- and second-place candidate in each of the wards.

To test the predictions from each of the three representational theories, we replicate the analysis across three different subsets of elections. To examine whether the effects of increased minority representation are amplified when the election produces a majority-minority board, we use two approaches. The first is heuristic, but has the advantage of increased robustness to errors in our racial and ethnic classification procedure. Specifically, we simply restrict the analytic sample to settings where the estimated proportion of minority representatives (excluding the focal election) on the school board is between 0.4 and 0.6. Our second approach is more closely tied to theory, but comes at the cost of increased sensitivity to misclassifications of school board candidate demographics. To identify the effect of a pivotal minority victory on school board outcomes, we restrict attention to district-years where there is potential for a minority victory to determine whether the board's majority consists of minority school board members. We include only those district-years for which the estimated proportion of minority-held seats is greater than 0.5 if the minority candidate were to win and is less than or equal to 0.5 if the minority candidate were to lose. In these district-years,

a minority candidate victory leads to a majority-minority school board while a minority candidate defeat leads to a majority-white board.

We follow the empirical strategy of Beach and Jones (2017) to estimate the effect of increased school board *diversity* on educational, administrative, and fiscal outcomes. The election of an additional white school board member would increase diversity on a board that is majority-minority under this approach. To identify diversity-increasing elections, we first determine the modal race on a school board in the district-year of the election. In our setting, the modal race on the school board is defined by which group among African Americans, Asians, Latinos, and whites has the highest number of seats on the board.⁹ We then restrict attention to elections in which the highest losing candidate or lowest winning candidate is a non-modal race candidate and the other candidate is a modal-race candidate.¹⁰ Because the identifying variation comes from different subsets of election contests, each of the three specifications employ different sample sizes. In the year after the election, the sample size is 720 district-years for elections where a modal race candidate faces a non-modal race candidate, 697 for a white candidate against a non-white candidate, and 156 for a pivotal white candidate against a pivotal non-white candidate.

Validity of RD Design

We conduct two tests of the identifying assumption that potential outcomes are continuous at the vote threshold needed for a candidate to win. We first test for manipulation of the vote-share running variables by examining whether the density of the running variable jumps at this threshold. If some political actors are able to precisely control their vote share, it

⁹In the event that two groups tie for the highest number of seats, both groups are defined as modal.

¹⁰About 95 percent of the elections in our modal vs. non-modal election subsample also appear in our minority candidate election sample. Note, however, that the white candidate is the non-modal candidate in about 20 percent of these elections.

raises the possibility that there are unobserved features of the school districts that differ across treatment and control groups, potentially biasing the estimates. In Figure B.1 in the Supplemental Appendix (SI), we report the results from the McCrary (2008) density test. We do not find evidence that the density of any of the vote share running variables changes discontinuously at the threshold for victory. We next test for balance of pre-treatment district characteristics in Section B in the SI. As Caughey and Sekhon (2011) discuss, the running variable may be continuous but the distribution of other election characteristics may nonetheless be imbalanced across treatment and control observations.¹¹ We find that pre-treatment district characteristics are balanced across treatment and control groups.

Estimating School Board Candidate Race

Elliott et al. (2008) develop a Bayesian procedure for estimating an individual’s race from the joint distribution of surname and race from the Census Bureau’s surname list and the racial and ethnic population distributions in a given geographic area.¹² The key assumption is that, after conditioning on individual race and ethnicity, surname and location are independent of one another. The procedure generates a probability that an individual surname in a given location is African American, Asian, Latino, white, or other. We assign an individual candidate to the group with the largest of the five predicted probabilities and we focus on estimates of candidate race and ethnicity based on the candidate’s surname and the

¹¹Snyder, Folke and Hirano (2015) recommend employing local linear regression RDDs with vote share running variables to prevent bias. All of the dynamic treatment effects are estimated with local linear regressions.

¹²We use the R statistical package developed by Imai and Khanna (2016) to estimate the probabilities.

composition of the school district’s county¹³ during the 2000 Census.¹⁴ We employ 2000 Census data because we are concerned that demographic changes during the sample period could affect both the estimated candidate race probabilities and the unobserved political influence of minority groups. To avoid this concern, we use demographic information from early in the sample period.

While Elliott et al.’s (2008) approach requires only candidates’ surnames and demographic information about their geography, we need to verify that the method performs well relative to more direct approaches that are not feasible in our setting due to the absence of biographical information on school board candidates. In Section A in the SI, we validate our candidate race estimates. We use the Elliott et al. (2008) procedure to estimate the race and ethnicity of California city council candidates and compare the estimates with those reported in Beach and Jones (2017), who used biographical information and candidate photographs to identify candidate race. Classifying candidates using the maximum probability under our preferred estimation approach that uses candidate surname and county demographics in 2000, approximately 96 percent of candidates are classified accurately for Latinos, 97 percent for Asians, 89 percent for whites, and 94 percent for African Americans.

Separately examining the false negative and false positive rates,¹⁵ we see that there are

¹³In some cases, California school districts cross county lines. In these instances, we use the primary county according to the California Department of Education for the purpose of computing school district demographics.

¹⁴This approach does not account for estimation error in the racial classification of school board candidates.

¹⁵In our setting, we define false negatives as instances where Beach and Jones (2017) classify a candidate as a given race and the surname procedure classifies the candidate as not having that race. False positives occur when the surname procedure classifies a candidate as having the given race, but the candidate does not have that race in the Beach and Jones (2017) data.

important performance differences in the procedure across groups. For Latino candidates the false negative rate is 13 percent and the false positive rate is less than 1 percent. For Asians the false negative rate is 21 percent and the false positive rate is 1 percent. For whites, the false negative rate is 3 percent and the false positive rate is 23. For African Americans the false negative rate is 80 percent and the false positive rate is 1 percent. While the procedure appears to perform quite well for Asian American and Latino candidates, it is likely to misclassify the vast majority of African American candidates as white. In an effort to improve the quality of our classifications, we collected and hand-coded additional information on the physical addresses of candidates from campaign filings from Los Angeles County, the largest county in California. We were able to collect over 2,000 candidates' addresses across our sample period. We then mapped these addresses to the Census block and use the demographics of each candidate's Census block to compute the posterior race classification probabilities. For candidates with non-missing address information, we used these Census block-based classifications. This approach increases the number of candidates identified as African American and Asian American by about 13 percent, but it does not significantly change the number of candidates identified as Latinos.

Data

Election Results and School Board Composition

Our election data come from the California Election Data Archive at Sacramento State University. We use elections from 1996-2014 to reconstruct the composition of California school boards over the period beginning with year 2000.¹⁶ The data include the surnames of candidates and the school districts in which they ran, the two inputs we use to estimate

¹⁶In our main student outcomes analysis, we first observe the dependent variable in 2000 so it is necessary to identify election winners from 1996 in order to estimate school board composition in 2000 in districts with four-year terms.

candidate race and ethnicity. We observe the number of votes that each candidate received and a unique identifier for each electoral contest. This information allows us to identify the lowest vote-share winner and the first runner-up among the set of all candidates running in a particular contest.

Table 3 reports summary statistics for the school districts in our sample based on their composition prior to each election. Each observation is a school district-year and each cell reports the mean and standard deviation. The first column provides information about every district and year for which we observe an election, while the next three columns restrict attention to subsamples relevant to testing each set of theoretical predictions and including only close elections that appear in the analysis. The top half of the table summarizes the school board composition based on the predictions from our classification algorithm. The bottom two rows provide information on the composition of students.

The table highlights several important patterns. First, Latinos are by far the most well-represented of the three minority groups on California school boards, with roughly 10 times as many Latino members as African American members¹⁷ and more than six times as many Latino members as Asian American members. Unsurprisingly, these differences are even more dramatic when looking at the proportion of districts that have school boards with majority representation by each of the different groups. Majority-African American and majority-Asian American boards are exceedingly rare, but approximately 13 percent of the board-years in the sample are majority Latino.

Second, districts where we observe close elections featuring candidates of different racial and ethnic backgrounds look quite different from the full sample. Although the student population in the average district is about 56 percent non-white, this increases to about 75 percent non-white for the subsample of close elections that we use in the analysis. Similarly, districts included in our analysis have a greater share of students who qualify for free and

¹⁷Even if one were to adjust the data for the high false negative rate for African Americans, the gap is still quite substantial.

Table 2: Racial Composition of California School Boards

	Full Sample	Min. Sample	Non-Modal Sample	Pivotal Min. Sample
Prop. African American	0.015	0.015	0.015	0.023
SD	0.076	0.065	0.063	0.089
Prop. Asian American	0.022	0.037	0.045	0.042
SD	0.090	0.109	0.123	0.114
Prop. Latino	0.150	0.276	0.279	0.394
SD	0.248	0.262	0.263	0.161
Prop. Minority	0.187	0.328	0.339	0.459
SD	0.271	0.265	0.272	0.070
Prop. White	0.812	0.672	0.660	0.541
SD	0.271	0.265	0.272	0.070
Maj. African American	0.009	0.004	0.003	0.013
SD	0.092	0.066	0.053	0.113
Maj. Asian American	0.012	0.014	0.022	0.019
SD	0.107	0.119	0.148	0.138
Maj. Latino	0.133	0.260	0.265	0.429
SD	0.340	0.439	0.442	0.497
Maj. Minority	0.173	0.319	0.336	0.513
SD	0.378	0.466	0.473	0.501
Prop. FRL	0.487	0.579	0.578	0.586
SD	0.264	0.245	0.247	0.257
Prop. Non-White	0.560	0.740	0.742	0.774
SD	0.277	0.213	0.212	0.192
N	12669	697	720	156

Sample statistics on racial composition of California school boards and enrolled student characteristics. The first column employs the full sample. The second, third, and fourth columns are for the subsample of elections used to estimate the regression discontinuity models. The first column employs the full sample. The second, third, and fourth columns are for the subsample of elections used to estimate the regression discontinuity designs. Prop. FRL is the proportion of enrolled students who qualify for free or reduced price lunch. Prop. Non-White is the proportion of enrolled students who are non-white.

reduced-priced lunch. Most importantly, among districts for which we observe one white and one minority candidate finishing among the lowest vote-share winner and first runner up, the school board is on average about one-third non-white before the election. Thus, we estimate

the impact of a change in minority representation relative to this baseline. Our results do not imply that the same dynamics would necessarily occur in districts with all-white boards that elect their first minority board members.

District and Student Outcomes

We use data from the California Department of Education to construct our achievement and staffing variables. We aggregate outcomes to the district level by weighting standardized test scores by the number of students who completed each assessment, school-level outcomes by school enrollment, and school employee outcomes by school full-time-equivalent staff. To examine student academic achievement, we average the scores on the mathematics and English language arts California Standards Test assessments. We use test scores from 2003-2013 and standardize them by the grade-test level statewide mean and standard deviation.¹⁸ In technical reports, CDE reports the district-level standard deviation of each test and, for a subset of years, also includes the student-level standard deviations. We combine these two statistics to rescale the scores to have a mean of zero and standard deviation of one for each grade level, subject, and year combination.¹⁹ This allows us to express the achievement effects

¹⁸The California tests were also conducted during the 1998-2003 period. However, correspondence with the California Department of Education indicated that these tests are not comparable to the 2003-2013 assessments due to changes in the design of the tests. California stopped administering these tests in 2014 due to the implementation of a new accountability system, the California Assessment of Student Performance and Progress. We also exclude 2015-2019 assessments due to comparability concerns. Indeed, including them in the analysis significantly decreases the precision of our estimates. Because power is already low, our preferred estimates focus on estimating outcomes using 2003-2013 test data—a period that coincides with a consistent test-based federal school accountability regime.

¹⁹Specifically, we regress the individual-level standard deviation normalized test score on the cross-district standard deviation normalized test score and then use the coefficients from

in student-level standard deviations relative to the statewide mean, the most commonly used normalization procedure in education policy research. California also reports test scores separately for each student demographic subgroup, so we can separately measure student achievement for white and non-white students. In order to increase the precision of the estimates and account for cross-district baseline differences in student achievement, we define the dependent variable as the *change* in student achievement outcomes between the focal year and the election year.

To understand how school board composition may affect student performance, we also investigate numerous potential policy mechanisms, although we emphasize that this analysis should be read as exploratory. We use data from EdSource, a website focused on California education policy, to track bond proposals and bond election outcomes. For each district-year, we sum the amount of money requested and approved in real 2000 dollars and then divide by the total number of students enrolled in the district to construct a per-student inflation-adjusted measure of total bond requests and approvals. To examine principal composition, we obtained a complete roster of principals' start and end dates from the California Department of Education. From this roster, we use principals' surnames and county demographics in 2000 (the equivalent procedure that we employ to estimate school board candidate race) to classify each principal's races and ethnicity.²⁰ We then compute the estimated share of principals who are white and non-white for each district-year. In Section E in the SI, we discuss how the other policy mechanisms we examine were constructed and report results for these outcomes.²¹

this model to calculate fitted values for years when individual-level summary statistics are not included in the technical reports.

²⁰In the SI, we report results on the racial composition of teachers. CDE provides data on the self-reported racial composition of building employees that we use for this analysis, but does not have comparable self-reported race and ethnicity for principals.

²¹We caution the reader that our results do not account for multiple hypothesis testing. Given the number of potential mechanisms that we examine, adjusting the p-values for

Results

Our first set of results examines the dynamic effects of school board composition on overall student academic achievement on English-language arts and mathematics tests. We first display these results in tabular form in Table 3 to report the precise value of the bias-corrected point estimates, 90 percent confidence intervals using robust standard errors clustered at the school district level, and sample size within the optimal bandwidth. The rows indicate the number of years after the election and the columns indicate whether the treatment effect is for a minority candidate win, a non-modal candidate win, or a pivotal minority candidate win.

In the years immediately after the election, we see point estimates that are relatively close to zero and statistically insignificant for all three treatments. Starting in years three and four after the election, the estimated effects begins to increase in magnitude. The largest estimated effect occurs five years after the election, when the estimated effect of a pivotal minority candidate victory is approximately 0.15 standard deviations. This effect declines in magnitude over the subsequent years. Contrary to the prediction that diversity leads to disinvestment in public goods provision and worse policy outcomes, we find evidence that diversity-increasing candidate victories also increase student achievement in years four and five after the election. With the exception of year eight, none of the estimates for the average victory of a minority candidate (regardless of existing board composition) are statistically significant at the 90 percent level.

To conserve space, we report the remainder of our results in graphical form. Each marker corresponds to the effect of the relevant election outcome. The circle depicts the estimated effects of a minority win, the cross corresponds to a non-modal candidate win, and the diamond represents a pivotal minority win. Figure 1 includes the coefficient estimates and multiple hypothesis testing would result in failure to reject the null for the subset of outcomes where we did find statistically significant effects using conventional p-values.

Table 3: Impact of School Board Elections on Student Achievement

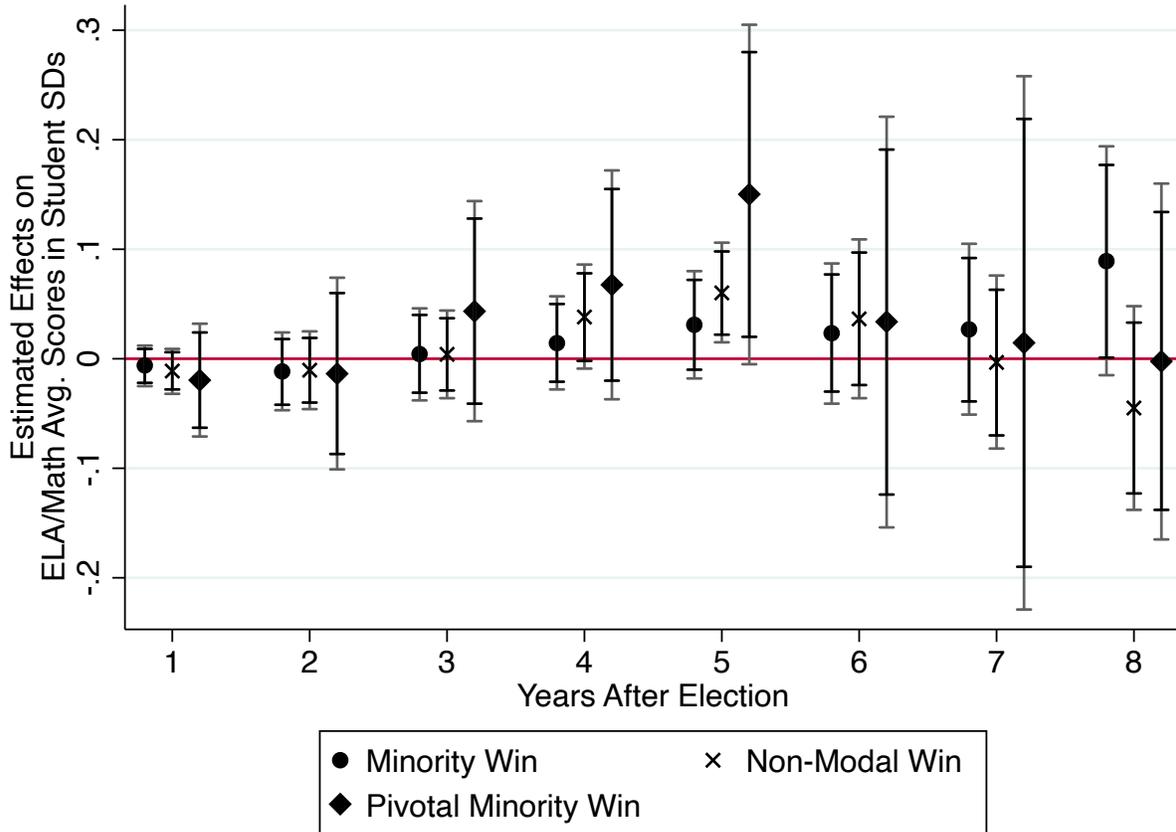
	Minority Candidate Win	Non-Modal Candidate Win	Pivotal Minority Candidate Win
Year 1	-0.0061	-0.0112	-0.0196
CI	[-.022 ; .009]	[-.028 ; .006]	[-.063 ; .024]
N	697	720	156
Year 2	-0.0116	-0.0105	-0.0137
CI	[-.042 ; .018]	[-.04 ; .019]	[-.087 ; .06]
N	604	628	139
Year 3	0.0043	0.0040	0.0433
CI	[-.031 ; .04]	[-.029 ; .037]	[-.041 ; .128]
N	562	590	134
Year 4	0.0143	0.0381	0.0675
CI	[-.021 ; .05]	[-.002 ; .078]	[-.02 ; .155]
N	458	481	110
Year 5	0.0310	0.0601	0.1502
CI	[-.01 ; .072]	[.022 ; .098]	[.02 ; .28]
N	419	381	76
Year 6	0.0233	0.0364	0.0337
CI	[-.03 ; .077]	[-.024 ; .097]	[-.124 ; .191]
N	347	316	65
Year 7	0.0268	-0.0034	0.0145
CI	[-.039 ; .092]	[-.07 ; .063]	[-.19 ; .219]
N	295	265	55
Year 8	0.0891	-0.0450	-0.0024
CI	[.001 ; .177]	[-.123 ; .033]	[-.138 ; .134]
N	206	180	35

Each cell reports the bias-corrected regression discontinuity point estimate of the effects of school board racial composition on student achievement in a given year after the election. The cells also report 90 percent confidence intervals and the number of election observations that are within the optimal bandwidth used to estimate the regression discontinuity models. The coefficients in the first column represent the estimated effect of a minority candidate defeating a white candidate, the coefficients in the second column represent the estimated effect of a candidate of non-modal race defeating a candidate of modal race, and the coefficients in the third column represent the estimated effect of a minority candidate defeating a white candidate when the minority candidate's victory would result in more than 40 but less than 60 percent of school board seats held by non-white school board members.

90 and 95 percent confidence intervals we presented in Table 3. Figure 2 presents separately the estimated effects of school board composition on the achievement of white and non-white students, respectively. For non-white students, the most consistent pattern we see is that the election of a minority school board member produces an increase in student achievement starting about four years after the election.²²

²²The observed differences in estimated treatment effects across the average and non-white student achievement outcomes are partially due to differences in the district-years for which

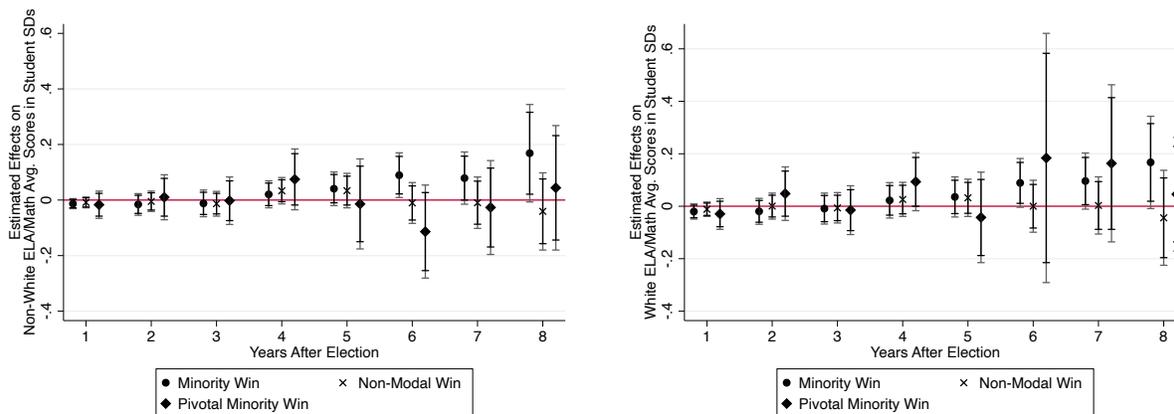
Figure 1: Dynamic Effects of School Board Elections on Overall Academic Achievement



Note: Each marker reports the effect of a change in school board composition on average English and math test scores with associated 90 percent and 95 percent confidence intervals. The dependent variable is change in average test scores relative to the election year. The circle marker corresponds to the estimated effect of a minority candidate defeating a white candidate, the cross corresponds to the effect of a candidate of non-modal race defeating a candidate of modal race, and the diamond corresponds to a minority candidate defeating a white candidate when the minority candidate’s victory would result in more than 40 but less than 60 percent of school board seats held by non-white school board members.

This effect grows over time and reaches standard levels of significance (or comes close) data are available for each dependent variable. We have re-estimated the average student achievement outcome on the subsample of district-years where we have non-missing values for the non-white student achievement outcomes. We find that additional minority wins have a significant positive effect on student achievement, but that the pivotal minority wins treatment is smaller in magnitude and insignificant.

Figure 2: Dynamic Effects of School Board Composition on Academic Achievement by Student Race



Note: Each marker reports the effect of a change in school board composition on average English and math test scores with associated 90 percent and 95 percent confidence intervals. The dependent variable is change in average test scores relative to the election year. The left panel reports results for the average non-white student achievement and the right panel illustrates results for the average white student achievement. The circle marker corresponds to the estimated effect of a minority candidate defeating a white candidate, the cross corresponds to the effect of a candidate of non-modal race defeating a candidate of modal race, and the diamond corresponds to a minority candidate defeating a white candidate when the minority candidate’s victory would result in more than 40 but less than 60 percent of school board seats held by non-white school board members.

starting in year six after the election. Overall, the effect size is about 0.1 standard deviations. To put these results in context, Kraft (Forthcoming) argues that effects of 0.05 to 0.2 student-level standard deviations should be classified as medium-sized on the basis of his meta analysis of randomized experiments of educational interventions. Hill et al. (2008) find that students in grades 3–8 increase their achievement in math and reading by an average of about 0.37 standard deviations per year, so if one assumes a 180-day school year, the achievement gains we find are the equivalent of approximately 46 additional “days of learning” per year. There are some known limitations with this type of back-of-the-envelope conversion (Baird and Pane 2019), but it provides some intuition.

These results are robust to alternative specifications, including controls for baseline achievement and student composition, year fixed effects, and limiting the sample to districts

with at least 250 tested students per year (see Section D of the SI).²³

Recall that the average district in our sample has roughly three times more non-white students than white students, so our estimates for the achievement of the latter are necessarily less precise, particularly for pivotal-minority elections. While we cannot reach a definitive conclusion on whether increased minority school board representation improves white student achievement, the estimates are inconsistent with the hypothesis that white student achievement suffers as a result of greater minority school board representation.

The effects for non-modal candidate wins are generally very close to zero, although we observe some positive point estimates in some years. Overall, we find no evidence that greater diversity on school boards causes student achievement to suffer. The results for pivotal minority wins are generally less consistent and often very imprecisely estimated due to the smaller sample sizes we have for these specifications. We do not find consistent estimates that an election producing a majority-minority board has a bigger impact on student learning, but we may simply lack the power to detect such effects. It is nonetheless noteworthy that the effect of electing majority-minority boards on white student achievement is generally positive and especially so in the later years.

The effects that we document could be driven by electoral victories of Latino candidates, as opposed to all minority candidates. In Section D of the SI, we replicate the analysis with Latino candidate victories as opposed to any minority candidate victory as the treatment effect of interest. We also estimate the effect of pivotal Latino victories, which we define as occurring when a Latino candidate victory makes the school board majority Latino. Although these results are generally consistent with those reported here, the point estimates are in some cases modestly smaller, suggesting that the effects we document are not driven exclusively by Latino candidates.

We focus on 2003-2013 test outcomes because during California administered consistent

²³The results are also similar if we use the identical bandwidth to estimate the student achievement effects for all, white, and non-white students.

exams and the period featured a focus on test-based accountability. The estimates are less precise if we include in the analysis outcomes of the new exams administered 2015-2019 (see Section D of the SI). Besides the change in the tests themselves, this imprecision may be due in part to California’s deemphasizing test-based accountability in this period and changes in state funding that potentially affects one of our main mechanisms (see Rauscher 2020).

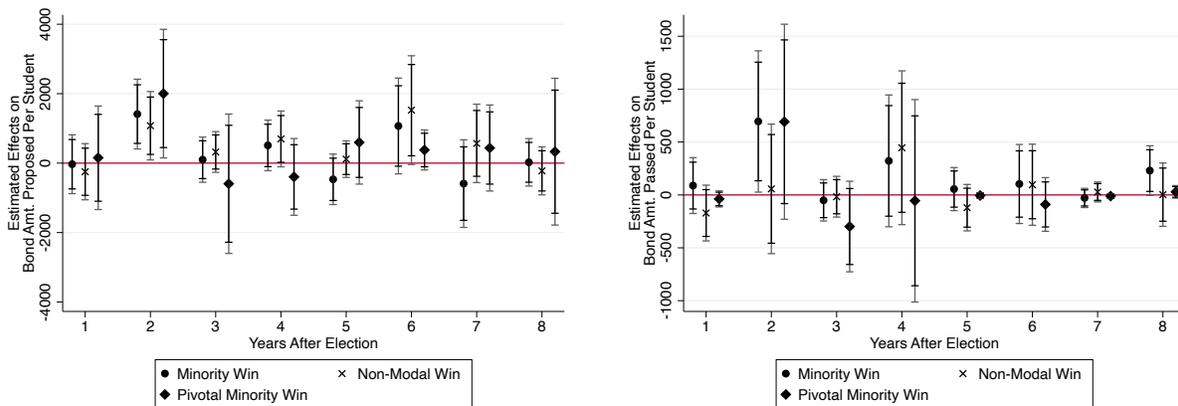
Mechanisms

School boards can affect student achievement in a number of ways. In this section, we explore several of the possible policy mechanisms that may explain the downstream improvements in student performance. Specifically, we investigate policies that the academic literature has identified as having substantively important effects on student achievement, particularly for minority students, and issues on which we expect important demographic differences in preferences. We examine the racial and ethnic composition of teaching staff (Dee 2004), school-level segregation (Angrist and Lang 2004, Hanushek, Kain and Rivkin 2004), English-language learner reclassification (Carlson and Knowles 2016, Shin 2018), and capital expenditures (Cellini, Ferreira and Rothstein 2010, Rauscher 2020). As we discuss in Section E of the SI, there are theoretical reasons to believe that each of these policies has the potential to increase student achievement. Unfortunately, we lack data to examine other potentially important mechanisms, such as student disciplinary policies.

There are some statistically significant effects in some years in these analyses, but one should not put too much weight on them due to the large number of models we estimate. We report all of the results in Section E of the SI and focus here on the two mechanisms—the proposal and passage of bond measures and the racial composition of principals—for which we have the strongest theoretical priors.

As we note above, minority voters have indicated a preference for higher education spending than white voters. There is also evidence from prior literature that increased capital ex-

Figure 3: Dynamic Effects of School Board Composition on Bond Measure Proposal and Passage Amounts



Note: Each marker reports the effect of a change in school board composition on the per-pupil amount of bonds proposed and the per-pupil amount of bond issuance approved by the voters (both adjusted for inflation) with their associated 90 percent and 95 percent confidence intervals. The circle marker corresponds to the estimated effect of a minority candidate defeating a white candidate, the cross corresponds to the effect of a candidate of non-modal race defeating a candidate of modal race, and the diamond corresponds to a minority candidate defeating a white candidate when the minority candidate’s victory would result in more than 40 but less than 60 percent of school board seats held by non-white school board members.

penditures have a positive effect on student achievement. For example, Rauscher (2020) finds that the passage of local school bonds in California improves the achievement of economically disadvantaged students during the same time period as our analysis. This is a particularly plausible mechanism because of the timing of achievement effects we observe. For example, it takes several years for capital expenditures to come online and Rauscher (2020) finds that it takes up to six years after the bond elections for the statistically significant positive effects on achievement to be realized.

Figure 3 presents the results of the bond analysis. We find evidence that the election of additional minorities to school boards increases the magnitude of funds requested and approved two years after the school board election.²⁴ A victory of a minority candidate, re-

²⁴In the SI, we provide several case studies that examine some of the mechanisms through which minority representation can affect school board decision-making and illustrate how the passage of school bonds can affect student learning. Specifically, the cases illustrate the

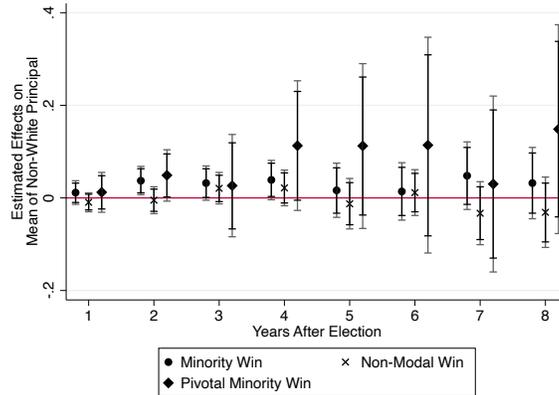
ardless of whether it produces a majority-minority board or not, increases the bond proposal amount by approximately \$2,000 per student and the point estimate is statistically significant at conventional levels. We also observe similar effects for bonds that voters ultimately approve.²⁵ Although California school boards have the discretion to influence only capital revenues because Proposition 13 does not permit increases in *ad valorem* property taxes, we also see some evidence of increases in operational spending. It appears bond passage may free up per-pupil revenue that districts had used to cover capital expenses.²⁶

While we do not find evidence that the number or composition of teachers changes in response to an increase in minority school board representation, we do see that school districts begin to employ more non-white principals. Figure 4 reveals that these principal staffing effects occur almost immediately following the election and that they persist. We also find some evidence that the impact is larger when the election produces a majority-minority board, although these estimates are much less precise due to smaller sample sizes. One importance of investment in facilities, as well as a greater concern and effort among minority school board members to increase facility investments through bond passage. While there is variation across and within districts in whether a multi-racial coalition on the school board is likely to emerge (Rocha 2007), the case studies also illustrate the circumstances under which multi-racial coalitions to improve student achievement form.

²⁵It appears that greater minority school board representation increases willingness to place a bond measure on the ballot and the magnitude of funding requests as opposed to increasing skill or expertise in campaigning for the bond.

²⁶This analysis relies on federal Common Core of Data and is generally noisier than our analysis of capital bonds. Nevertheless, we do see some evidence of increases in overall operational spending as well as expenditures on instruction and student services. We also see significant increases in state revenue following minority elections, which likely reflects the fact that California matches local bond spending with state dollars. These results are available from the authors upon request.

Figure 4: Dynamic Effects of School Board Composition on Principal Race



Note: Each marker reports the effect of a change in school board composition on the proportion of principals who are non-white and the associated 90 percent and 95 percent confidence intervals. The circle marker corresponds to the estimated effect of a minority candidate defeating a white candidate, the cross corresponds to the effect of a candidate of non-modal race defeating a candidate of modal race, and the diamond corresponds to a minority candidate defeating a white candidate when the minority candidate's victory would result in more than 40 but less than 60 percent of school board seats held by non-white school board members.

possible explanation for why we find changes in principal but not teacher composition is that teacher staffing may be more difficult for a school board to influence due to collective bargaining and teacher tenure protections. Superintendents can replace principals more easily.²⁷

To summarize, we find evidence that the election of minority school board members leads to substantively meaningful increases in minority student achievement (and perhaps also in the achievement of white students). We also see that greater minority school board representation increases the amount of bond funds proposed and subsequently approved by voters and the diversity of the principals who oversee individual schools. Strikingly, we find these effects regardless of whether the election produces a majority-minority board, although we see some evidence that the policy effects may be more pronounced under a majority-minority board.

²⁷We also examined superintendent retention but did not find consistent effects.

Discussion

The impact of minority representation on government outcomes is a central concern of research in American politics, election law, public administration, and education. Unlike previous studies that focus on cross-sectional and potentially endogenous differences in representation, our regression discontinuity design allows us to exploit exogenous variation in election outcomes to examine multiple representational theories. We find that greater minority representation on school boards can increase student educational achievement, even when a minority electoral victory does not lead to a majority-minority board. In contrast to canonical political economy models and some empirical evidence in other contexts, elections that increase school board diversity do not adversely affect public goods provision or education outcomes. Indeed, our results are consistent with Meier, Wrinkle and Polinard (1999), who find that increased minority representation improves student performance for both white and minority students.

That we find a positive impact of minority representation on achievement is noteworthy given our focus on California school boards. California's school finance system is particularly centralized, leaving very limited discretion for school boards to meaningfully affect local revenues. Moreover, California state law typically requires a super-majority school board vote to place a school bond on the ballot. In states where a simple-majority is sufficient and where school boards can raise local revenue more easily, it is plausible that we might see even larger impacts from gains in minority representation.

Finally, finding few differences between minority victories that leave white members in the majority and elections that produce majority-minority boards suggests that these small legislative bodies may operate under stronger norms of unanimity and consensus than we see in state and federal legislatures. Our results indicate that even a single member can have a meaningful impact on decision-making and may explain why even small gains in minority representation can move the needle on student outcomes.

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