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Teacher Policy and Racial/Ethnic Gaps in Access to Advanced Coursework: Evidence from Across the United States

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Abstract

Advanced course-taking in high school sends an important signal to college admissions officers, helps reduce the cost and time to complete a post-secondary degree, and increases educational attainment and future earnings. However, Black and Hispanic students in the U.S. are underrepresented in Advanced Placement coursework and dual enrollment (i.e. early college). In this paper, we systematically examine the social, demographic, economic, and policy factors that are predictive of racial gaps in AP enrollment and access to DE across the U.S. We find that many of the same factors that predict higher AP access overall also predict higher racial/ethnic gaps in AP, suggesting that policies aimed at increasing AP access need to specifically attend to the inequitable access, rather than simply focusing on increasing access overall. We also find evidence that that might indicate opportunity hoarding by White families contributes to AP gaps – but not DE gaps – suggesting that DE acts as a more equitable avenue for access to college coursework. Our most novel contribution to the literature is our analysis of policies aimed at reducing teacher shortages in high needs areas, in which we find no evidence that the disparities in access to advanced coursework were reduced following implementation of these policies.

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Since 1995, the Advanced Placement (AP) program, operated through the College Board, has provided an opportunity for high school students in the United States to earn college-level credits in a wide range of subjects. Students enroll in AP coursework during high school and can take course-specific examinations to earn college credit. Although not all students take the AP exams, AP course-taking sends a signal to college admissions officers about the preparation and academic motivation of students (Geiser & Santelices, 2004; Santoli, 2002).

Between 1990 and 2019, the number of high schools participating in the AP program increased by almost 45 percent (College Board, n.d.). As of 2020, eight states[1] and the District of Columbia required all high schools to offer AP courses (Patrick et al., 2020). An alternative to AP is dual enrollment (DE, i.e., early college), which allows high school students to take college courses, typically with syllabi and requirements determined by the college (Xu et al., 2021). Rural schools disproportionately offer DE (Thomas et al., 2013), and one potential advantage is that it lessens concerns about a lack of teachers qualified to support advanced coursework.

Students of color are underrepresented in AP and DE. For example, in 2015-16, Black/African-American students represented approximately 15.4% of U.S. public school enrollment, but only 9.4% of those enrolled in at least one AP course, 7.5% of those enrolled in at least one AP science course, and 6.4% of those enrolled in at least one AP math course (U.S. Department of Education, Office for Civil Rights, n.d.). Similarly, Black and Hispanic students represent 4.7% and 5.7% of students in DE, compared to a national average of 8.1% overall (Fink, 2018). Such inequities put students of color at a disadvantage because advanced coursework is linked to higher educational attainment and future earnings (Joensen & Nielsen, 2009; Rose & Betts, 2004), and earning college credit can reduce the cost and time to complete a

[1] These eight states include Arkansas, Connecticut, Indiana, Iowa, Louisiana, Mississippi, South Carolina, and West Virginia.

post-secondary degree.

While some studies have documented substantial racial disparities in advanced coursework, and the school- or district- correlates of these gaps, there is less known about the role of aggregate community level implicit bias or state policy efforts to compensate teachers for serving in high-needs content or geographic areas. To build upon these gaps in knowledge, the present study systematically examines the social, demographic, economic, and policy factors that are predictive of racial gaps in AP enrollment and access to DE.[2]

We find that many of the same factors that predict higher AP access overall also predict higher racial/ethnic gaps in AP, suggesting that policies aimed at increasing AP access need to specifically attend to the inequitable access, rather than simply focusing on increasing access overall. We also find evidence that that might indicate opportunity hoarding by White families contributes to AP gaps – but not DE gaps – suggesting that DE acts as a more equitable avenue for access to college coursework. Our most novel contribution to the literature is our analysis of policies aimed at reducing teacher shortages in high needs areas, in which we find no evidence that the disparities in access to advanced coursework were reduced following implementation of these policies.

In the next section, we review the relevant literature to frame our study. Then, we discuss the data and analytic approach and the results and conclude with discussion of the results and their implications for educational policy and practice.

Literature Review

Racial inequalities in AP and DE

[2] The Civil Rights Data Collection also includes measures of test taking and test passing in some years, but due to inconsistencies in reporting across years, we do not include these outcomes in the present study.

A variety of studies have documented gaps in access to AP courses. Small rural schools and high poverty schools offer fewer AP courses (Klopfenstein, 2004; Planty et al., 2007), as schools are likely to only introduce new, advanced coursework when they have a critical mass of students academically prepared for it (Cisneros et al., 2014; Iatarola et al., 2011). Rural areas are more likely to offer DE as an alternative to AP (Thomas et al., 2013), perhaps because these schools may not have a critical mass of students that are academically prepared for it (Cisneros et al., 2014; Iatarola et al., 2011), or because they may lack teachers qualified to teach AP.

Some states have enacted policies aimed at reducing inequities in AP attainment through AP testing fee subsidies or AP teacher training. Jeong (2009) finds that exam fee subsidies are associated with increases in AP exam taking, particularly for disadvantaged students. However, Klopfenstein (2004) concludes that government incentives to subsidize test fees did not increase the relative representation of underserved groups, because it simply led to an increase in access across all demographic groups.

Disparities in advanced course-taking can exist within schools or districts as well, in ways that generally reflect other tracking and gifted identification patterns. Students of color may enter high schools less prepared for rigorous AP curricula in part because of the compounding effects of tracking or other categorical sorting mechanisms, which can affect students' access to high-achieving peers (Kubitschek & Hallinan, 1998, Zimmer, 2003), more experienced teachers (Kalogrides & Loeb, 2013), and teachers who hold higher educational expectations for their students (Kelly & Carbonaro, 2012).

Indeed, prior achievement is a significant driver of advanced course-taking (Conger et al., 2009; Xu et al. 2021). Notably, evidence from Florida suggests that background characteristics of students, including their eighth-grade test scores, are entirely driving the underrepresentation of Black and Hispanic students in advanced coursework, because after controlling for these pre-high school characteristics, Black and Hispanic students are *more* likely to take advanced courses than observably similar White peers (Conger et al., 2009).

A recent nation-wide study, incorporating some of the same data used here (Xu et al., 2021), finds that the types of characteristics associated with higher overall AP participation are also associated with wide racial/ethnic gaps in AP enrollment, and the authors concluded that providing additional resources to increase AP access – without intentionally focusing on improving equity of access - may serve to widen racial gaps.

Some factors associated with higher AP enrollment are also associated with higher DE, such as per-pupil instructional expenditures and the share of students enrolled in gifted and talented programs (Xu et al., 2021). Similarly, academic achievement gaps prior to high school are strong predictors of access gaps for both AP and DE.

Teacher shortages, teacher quality, and related policy interventions

Disparate access to effective teachers may also affect course-taking behaviors for students of color. Teachers are generally understood to be the most important school-input for student achievement (Chetty, Friedman, & Rockoff, 2014; Rivkin, Hanushek, & Kain, 2005), yet low-income students and students of color are disproportionately taught by less experienced teachers (Goldhaber et al., 2015; Isenberg et al., 2016; Kalogrides & Loeb, 2013; Sass et al., 2012) and less effective teachers in terms of value-added (Glazerman & Max, 2011; Goldhaber et al., 2015; Isenberg et al., 2016; Mansfield, 2015; Sass et al., 2012). A lack of adequately prepared teachers has also been cited as a driver of the lack of AP offerings, particularly in rural areas (Gagnon & Mattingly, 2016), but teacher shortages at all levels can affect students' preparedness for advanced coursework.

Teacher shortages – particularly for secondary math and science teachers – affect almost every state in the nation, with these shortages typically occurring in districts serving greater shares of disadvantaged students (Espinoza et al., 2018). For example, in 2017-18, 47 states plus D.C. experienced teacher shortages in mathematics and 43 states identified teacher shortages in science (U.S. Department of Education, n.d.). In 2007-2008, only 63.1% of high school math teachers and 73.6% of high school science teachers had majored in and were certified to teach those subjects (National Center for Education Statistics, n.d.). Shortages are particularly acute in rural areas, and areas serving more economically disadvantaged and/or non-White students (Dee & Goldhaber, 2017).

Several policy strategies have been implemented to address teacher shortages. Some states financially incentivize teachers to serve in hard-to-staff schools and districts or to pursue positions in high-needs content areas (Dee & Goldhaber, 2017). Based on our collection of state policies, as of 2017-18, 24 states incentivized teaching in high needs schools, districts, or geographic areas, which we refer to generally as location-focused policies, and 25 incentivized teaching in high needs content areas. These efforts include a mix of salary supplements (12%), bonuses/stipends (35%), scholarships, tuition assistance, and loan forgiveness (38%), mortgage assistance (2%), or other incentives (13%). As of 2017-18, 18 states had both types (content and location focused), as of 2017-18, and 19 states plus D.C. had neither type (see Table 1).

Teacher compensation can influence teacher mobility (Clotfelter et al., 2008, Feng, 2009), but relatively large monetary incentives are necessary to induce teachers to take positions in hard to staff or high poverty schools (Glazerman et al., 2013). Service scholarships and loan forgiveness are another approach that many states have adopted to alleviate financial barriers to entering the teaching profession, with these efforts often being targeted to high-need subject areas or communities (Espinoza et al., 2018).

Quasi-experimental analyses have shown policies targeting hard-to-staff content or geographic areas can reduce teacher attrition of teachers in hard-to-staff areas (Clotfelter et al., 2008; Feng & Sass, 2018) and improve student test scores, particularly in reading (Swain et al., 2019). In one study, a bonus program in California increased the likelihood that academically talented teachers would choose to begin their teaching career in a low-performing school, but there was no impact on teacher retention (Steele et al., 2010). A random assignment study found that incentives for high-performing teachers to move into disadvantaged schools attracted high value-added teachers to targeted schools, increased teacher retention, and increased student test scores in elementary school (Glazerman et al., 2013). Given the potential these policies hold for retaining teachers and improving student achievement outcomes, it is worth assessing whether such policies might impact more distal outcomes such as racial/ethnic gaps in advanced course-taking, but to our knowledge, no direct empirical evidence on this topic currently exists.

Teacher diversity and implicit bias

Students of color face a variety of disadvantages in an education system that is run primarily by White educators. Students of color represent almost half of the nation's students, but teachers of color represent only 18% of teachers (Boser, 2014). Related to the lack of teacher diversity, implicit racial bias may have an influence on students through their interactions with teachers or other adults in the school system, or through the way a community's implicit bias places expectations on students' academic abilities and aspirations.

Implicit measures are useful in research because they "provide an estimate of the construct of interest without having to directly ask the participant," (Fazio & Olson, 2008, p. 300), and as a result are less likely to be affected by social desirability bias (Brauer et al., 2000).

Implicit bias measures are situational and fluid, and should not be used as a trait-like factor for individual people (Steffens & Buchner, 2003), but are useful as aggregate (e.g. community-level) measures (Payne et al., 2017). There are negligible differences between the implicit bias of teachers and similar nonteachers (Starck et al., 2020), so community measures of implicit bias serve as a good proxy for educator implicit bias as well.

Implicit bias has clear implications for education. In a lab-based study, in which participants were assigned roles of instructor (White participants only) or learner (White or Black), Jacoby-Senghor et al. (2016) found that the White instructor's implicit bias led to an increase in instructor anxiety, which reduced the effectiveness of their pedagogical techniques and learner performance, if the learner was Black but not if the learner was White. When non-Black learners watched videos of the same lessons, there was still an effect of implicit bias on learner performance, suggesting that the cause was a decrease in pedagogical skills of White instructors working with Black learners, rather than stereotype threat or other situational identity threat on the part of the Black learners.

Further, teachers' evaluations of students can be racially biased. For example, Copur-Gencturk et al. (2019) used an audit study in which gender- and race-specific names were randomly assigned to mathematics problem solutions. No teacher bias was detected in their assessment of the correctness of solutions, but when assessing the students' mathematical ability, there were biases against students whose randomly assigned names indicated they were Black, Hispanic, or female.

National studies have found a correlation between aggregate implicit bias and racial disparities in student discipline (Chin et al., 2020; Riddle & Sinclair, 2019) and racial test score gaps (Pearman, 2020). Importantly, however, the significant correlation is generally attenuated once controlling for other racial sorting mechanisms such as racial segregation, racial gaps in gifted identification, and racial gaps in special education identification (Pearman, 2020).

In sum, a variety of factors – school resources, teacher quality, and demographic, economic, and social factors – may play a role in determining racial and ethnic gaps in advanced course-taking through either AP or DE. To alleviate such gaps, a systematic analysis of these factors is necessary. Further, there is a lack of knowledge about the impact of state policies designed to alleviate teacher shortages in hard-to-staff subject and geographic areas. The present study addresses these gaps. Specifically, we ask:

1) What factors are associated with AP and DE access overall and within-district racial/ethnic gaps in AP or DE?
2) Are teacher compensation policies aimed at recruiting and retaining teachers in hard-to-staff content areas and/or hard-to-staff geographic associated with greater and/or more equitable access to AP and DE?

Data and Methods

This study uses data from several nation-wide sources. Key outcomes—racial/ethnic gaps in AP course-taking and DE —are derived from the Civil Rights Data Collection for 2011-12, 2013-14, 2015-16, and 2017-18, with DE outcomes only available in the last three collections. These data include the number of students in each racial/ethnic group enrolled in at least one AP course, overall and for AP math and science, and the number of students in each racial/ethnic group in DE. For the purposes of this study, we need a unit of analysis with sufficient numbers of students in more than one racial/ethnic group, so we focus on the geographic district level, combining the results for all schools in the geographic boundaries of that district, rather than on school level analyses, where within-unit diversity is more limited.

To create these geographic district-level data, we begin with school-level data from the CRDC, and exclude schools with zero students in grades 10-12, juvenile justice system/Department of Justice system schools, alternative education schools, virtual schools, and special education schools, resulting in 26,406 schools in 13,269 districts. The school data are summarized at the geographic district level, including traditional public schools, magnet schools, and charter schools within the geographic boundaries of the district, as defined by the Stanford Education Data Archive (SEDA) data (Reardon et al., 2021). To reduce the influence of outliers such as schools with very little racial/ethnic diversity, our analyses that compare Black-White or Hispanic-White gaps in AP or DE outcomes are limited to districts that had at least 10 students of both racial/ethnic groups enrolled in grades 10-12. This limits the samples further, reflecting that U.S. school districts are still substantially racially segregated.[3]

We use a robust set of geographic district-level covariates from the American Community Survey's (ACS) Education Demographic and Geographic Estimates (EDGE) web portal,[4] as well as the National Center for Education Statistics' (NCES) Common Core of Data (CCD),[5] provided by SEDA.[6] The SEDA also includes district location type (urban, suburban, town, or rural) and district demographics such as the percent of students who are free- and reduced-price lunch eligible (FRL), the percent who are receiving special education services, and the percent with limited English proficiency (LEP), eighth grade math achievement, as well as racial academic achievement gaps in grade eight.[7] The SEDA-provided achievement gaps are only available for districts with at least 20 students in both racial/ethnic groups being compared

[3] There are approximately 7,200 districts with fewer than 10 Black students in grades 10-12, over 500 with fewer than 10 White students in grades 10-12, and nearly 6,000 with fewer than 10 Hispanic students in grades 10-12.
[4] The ACS EDGE data are available for download at https://nces.ed.gov/programs/edge/Demographic/ACS.
[5] The CCD data are available for download at https://nces.ed.gov/ccd/ccddata.asp.
[6] The SEDA data are available for download at https://cepa.stanford.edu/seda/data-archive.
[7] We use the grade-cohort standardized scale such that a 1-unit change is equivalent to a one-grade level difference in average performance, comparable across districts.

(Fahle et al., 2018).

The SEDA includes a SES composite index, calculated from ACS data including median family income, the proportion of adults with at least a bachelor's degree, the unemployment rate, the household poverty rate, the proportion of households receiving SNAP benefits, and the proportion of households with children headed by a single mother. SEDA provides SES composites for Black, White, and Hispanic families separately, as well as two gap measures: the White-Black SES gap and the White-Hispanic SES gap, indicating levels of economic disparity within the community. As with the achievement gaps, the SES gaps are only available for districts with at least 20 students in both groups being compared (Fahle et al., 2018).

The SEDA also provides a measure of within-district, between-school segregation, the information index (or Theil index), calculated as the average deviation of each student's school racial diversity from the district's racial diversity. Values of zero indicate racial balance or no segregation, while values of one indicate fully segregated schools (Theil, 1972).[8]

We further supplement these data with CCD enrollment data by grade. We calculate the number of 10^{th}-12^{th} graders in each district and the share of students who participated in or attained one of our relevant AP or DE outcomes. CCD data are also used to calculate the racial/ethnic representation of the district (percent White, percent Black, percent Hispanic, and percent from other races[9]).

[8] The results are very robust to using an alternative measure of segregation, the relative diversity index, which measures differences in exposure to White students. For example, the Black-White relative diversity index captures differences in exposure to White students in the average school that White students attend and in the average school that Black students attend. A value of zero indicate balanced racial exposure, and values of one indicate complete segregation.

[9] Given our analytic approach, which focuses on comparing outcomes in districts with at least 20 students in each of two different racial/ethnic backgrounds, we unfortunately would have very little ability to analyze access gaps for various Asian, Pacific Islander, indigenous, or other racial/ethnic groups. We recognize that excluding these groups from the analysis further marginalizes groups that are already often "othered," excluded, and marginalized and encourage future research that centers and is better able to address advanced coursework access for these groups of students.

This study also uses measures of implicit racial bias from the Race Implicit Association Test (IAT, Xu et al., 2014), a dataset representing over one million U.S. residents who completed the Race IAT between 2009 and 2015. Systematic reviews have generally attested to the reliability and validity of the IAT (Lane et al., 2007; Greenwald et al., 2009). See Xu et al. (2014) for more description of the test and these measures.

Specifically, we use IAT data from White U.S. residents 18 years of age or older in the fifty states (plus D.C.) whose county of residence was identified. The focus on White respondents reflects the approach taken in prior studies (Leitner et al., 2016; Pearman, 2020), and is used to capture the implicit bias of the predominant group among teachers and school leaders. To reduce outliers and statistical noise in our measures, we also drop observations if they did not have an IAT score combined over all IAT blocks on the assessment or if the test reported an error percent of 40% of greater, similar to prior studies (e.g., Johnson & Chopik, 2019).

The IAT data are collected through a voluntary web-based sample, so the data are unlikely to be nationally representative. To create a more geographically representative estimate of local implicit bias, we use post-stratification (Little, 1993). We group respondents into eight bins based on age group (18 to 24 or 25 and older) and educational attainment (less than high school, high school degree, some college or an associate's degree, and a bachelor's degree or higher), and we assign responses a greater weight based on their relative representation in their county. Age and educational attainment for the county are based on the average of the American Community Survey 5-year rolling estimates from 2015-2017.[10]

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[10] Earlier years were excluded due to a lack of the detail needed to create all the post ratification cells (e.g. earlier years did not break out educational attainment for individuals aged 18-24).

Finally, the last dataset used is a collection of state-level teacher compensation policies related to recruiting and retaining teachers to serve in hard-to-staff subjects or locations. These policies were collected and coded by the researchers from a variety of sources. First, the researchers used the National Council on Teacher Quality's (2018) "Databurst" of state-level policies related to two areas: 1) whether the state explicitly supports additional compensation for teachers in high-needs schools, and 2) whether the state explicitly supports additional compensation for teachers in shortage subject areas. Then, we searched for each policy and earlier similar policies, using a variety of sources including the National Council on Teacher Quality's (2020) State Teacher Policy Database, the Education Commission of the States (2020) State Education Policy Tracking website, the National Conference of State Legislatures (2020) Education Legislation Bill Tracking website, and websites like Justia Law, Google, websites or databases maintained by state legislatures, state departments of education, or departments of higher education. Each policy collected was coded by type, effective date, and repeal/sunset date if applicable. A summary of these policies is available in Table 1.

District-by-year characteristics for the 32 states that had these types of policies at some point during our study period (2011-12 to 2017-18), as well as the 18 states plus D.C. that did not have these types of policies during this period, are in Table 2. Districts in states with these policies were 8.6 percentage points more likely to offer at least one AP, but 1.1 percentage points less likely to offer DE than districts in states without these policies. AP enrollment rates overall were 1.8 percentage points higher, and DE rates were 1.2 percentage points lower in districts in states with these policies, relative to other states. In both types of states, within-district White/Black disparities were larger for AP than for DE. There is some evidence that gaps in AP access were lower – but gaps in DE access were slightly higher – in districts in states with these policies, relative to those in other states.

States with these types of policies had districts that were on average larger and serving greater shares of FRL-eligible students, LEP students, and non-White students. Districts in states with these types of policies are also more likely to be urban or rural and less likely to be suburban or in towns. Districts in states with these types of policies were slightly below the average for eighth grade, while districts in states without these types of policies were slightly above the average. Districts in states with these types of policies had slightly larger White/Hispanic eighth grade test scores gaps, lower SES overall (despite having a higher FRL share), and slightly larger racial SES gaps. The within-district segregation measures are relatively stable across both types of states, although statistically significant differences were estimated. Finally, implicit racial bias is slightly higher in states with these types of policies.

To answer our two primary research questions, we use a series of multivariate regression models predicting AP- and DE-related outcomes as a function of observable district and community characteristics. Before focusing on the teacher policy-related differences in outcomes (RQ2), we first simply describe the factor associated with our AP and DE outcomes (RQ1), using the following equation:

$$Y_{dst} = \alpha_0 + \boldsymbol{X_{dt}\alpha_1} + \boldsymbol{\delta_s} + \boldsymbol{\theta_t} + \varepsilon_{dst} \qquad (1)$$

Y_{dst} is one of several AP- or DE-related outcome measures: 1) binary indicators[11] of whether AP or DE were offered in the geographic district *d* in year *t*, 2) the proportion of 10th-12th graders in geographic district *d* in year *t* enrolled in at least one AP,[12] at least one math AP,

[11] Linear probably models are used for binary outcomes.
[12] More precisely, we cannot determine from the CRDC data the precise grade level of those enrolled in AP courses, so the proportion represents the number of students in AP overall divided by the number of students in grades 10-12.

at least one science AP, or DE, separately, 3) absolute risk differences (ARD) indicating White/Black and White/Hispanic differences in AP course-taking (overall, for math AP, and for science AP) and DE, and 4) relative risk ratios (RRR) indicating White/Black and White/Hispanic differences in AP course-taking (overall, and for math and science) and DE.

As an example, the White/Black ARD of exposure to at least one AP math course equals the percent of White students (in this case, in grades 10-12 in a geographic district *d* and year *t)* enrolled in at least one AP math course, minus the percent of Black students (in grades 10-12 in a geographic district *d* and year *t)* enrolled in at least one AP math course. The RRR is calculated by dividing – rather than subtracting – these exposure rates. For the ARD, zero indicates equal rates of exposure, and for the RRR, a value of one indicates equal rates of exposure. In both cases, greater values indicate that White students are overrepresented at greater rates, relative to Black students. It is recommended to report both the relative and the absolute risks, (Noordzij et al., 2017; Shores et al., 2020).

$\boldsymbol{X_{dt}}$ is a vector of geographic district-by-year level observable characteristics, including the log of student enrollment in grades 10-12, indicators for locale type (urban, suburban, or town, relative to rural), the percent of students that are LEP, the percent that are in special education, the percent Black, percent Hispanic, and percent of an other non-White race[13], eighth grade math achievement and racial/ethnic gaps in eighth grade math achievement, comparable across the nation, SES index and racial/ethnic SES gaps, and the Theil index between schools.

We use enrollment in grades 10-12 as the denominator in the calculations of these proportions, to approximate a share among the grades in which students are more likely to be enrolled in AP. Very few AP students are in ninth grade or below.

[13] Given our analytic approach, which focuses on comparing outcomes in districts with at least 20 students in each of two different racial/ethnic backgrounds, we unfortunately would have very little ability to analyze access gaps for various Asian, Pacific Islander, indigenous, or other racial/ethnic groups. We recognize that excluding these groups from the analysis further marginalizes groups that are already often "othered," excluded, and marginalized and encourage future research that centers and is better able to address advanced coursework access for these groups of students.

In addition, we control for the county-level measures of implicit bias among Whites (IAT), post-stratified and linked to the geographic district level data.[14] For ease of interpretation across these variables, all continuous variables in $\boldsymbol{X_{dt}}$ (i.e., everything except for urban, suburban, and town indicators) are in standard deviation units (i.e., standardized to have a mean of zero and standard deviation of one). We control for time-invariant differences across states using state fixed effects, $\boldsymbol{\delta_s}$ and for nation-wide differences across time using year fixed effects, $\boldsymbol{\theta_t}$. Finally, ε_{dst} is the idiosyncratic error term, clustered at the state level.

To answer RQ2, focusing on the relationship between state policies aimed at recruiting and retaining teachers in hard-to-staff subject or geographic areas, we estimate the following:

$$Y_{dst} = \beta_0 + \boldsymbol{X_{dt}\beta_1} + \boldsymbol{\beta_2} content_{st} + \boldsymbol{\beta_3} location_{st} + \boldsymbol{\gamma_d} + \boldsymbol{\theta_t} + \varepsilon_{dst} \quad (2)$$

In this case, we include geographic district fixed effects, $\boldsymbol{\gamma_d}$, and indicators of whether there was an active state policy in year *t* aimed at teacher shortages in content shortage areas ($content_{st}$) or in geographic shortage areas (e.g. high needs schools and districts, $location_{st}$). All other variables are as in Equation (1), except that time-invariant district factors (e.g. location type) are removed. In some models, we also combine $content_{st}$ and $location_{st}$ in to one variable indicating whether state *s* had either of these types of policies in year *t.*

The fixed effect approach allows us to identify the relationship between these policy types, and the outcomes of interest, exploiting only within-district variation in exposure to these state policies over time as they are enacted and/or repealed.[15] The fixed effects also help to account for differences in the types of states (and their districts) that enact these types of policies, and those that do not. However, the timing of this legislation is likely endogenous, so we do not

[14] In some cases, particularly in rural areas, some geographic school districts serve multiple counties or parts thereof. In these instances, IAT data for all counties served were averaged to create the community level IAT measure for the district.
[15] There was only one known repeal that affected our panel years (2011-12 through 2017-18).

interpret these results as causal. Specifically, while our original intent was to estimate difference-in-differences or event-study specifications, there was evidence of non-parallel pre-trends, precluding a causal interpretation.

Results

First, we present the results from Equation (1), in Tables 3-5. Table 3 presents the results for the outcomes related to overall advanced course-taking. All p-values have been adjusted using the Benjamini and Hochberg (1995) false discovery rate correction, assuming a false discovery rate of 0.05. As shown in Table 3, districts located in urban areas and towns, districts with higher eighth grade math achievement, and districts with higher SES tend to have greater access to AP coursework, all else equal. In column 3 only, we also find that districts with more Black students and with greater White-Black SES gaps, enroll a greater share of students in AP overall. Further, in column 4, we see that districts with more White-Black segregation across schools have lower rates of AP math-taking, and in column 5, we see that districts with greater White/Black test score gaps had higher rates of AP science-taking. Notably, some of the relationships are the opposite when looking at DE, as compared to AP. For example, districts with more non-White, non-Black, non-Hispanic students tend to have greater AP access but lower DE access, and suburban districts tend to have greater AP science access, but lower DE access. Community-level implicit racial bias is not associated with these outcomes, all else equal.

Tables 4 and 5 focus on the White/Black and White/Hispanic gaps in advanced coursework access, respectively. For all eight outcomes in each table, higher values indicate larger disparities. The ARD and log(RRR) outcomes should be interpreted differently. Specifically, while the ARD is a simple difference of proportions in the [0, 1] interval, where a .1

unit change indicates a 10 percentage point change in the difference, it is helpful to use exponentiation to interpret the results for the log(RRR) outcomes.

Table 4 shows that district percent Black and district percent other race (non-White, non-Black, non-Hispanic) were positively correlated with Black-White access gaps in AP – but not DE. There is also some evidence, not consistent across all columns, that relatively to rural districts, non-rural districts had larger gaps in AP access. Higher performing districts (in eighth grade math) and those with higher achievement gaps tended to have larger AP access gaps as well. Higher SES districts and those with greater White-Black SES gaps also had greater AP gaps. Particularly noteworthy, the only significant predictor of DE gaps is eighth grade achievement gaps.

Similarly, Table 5 shows the results for the White-Hispanic gap outcomes. Larger districts had lower White-Hispanic AP access gaps, according to columns 5 and 6. Districts with more Hispanic students tended to have larger AP access gaps, as did non-rural districts. Districts with higher eighth grade achievement gaps and higher White-Hispanic SES gaps had higher gaps in access to both AP and DE. Finally, more segregated districts had greater AP gaps, but at least as shown in column 4, lower DE gaps.

Our second research question focused on two types of policy efforts aimed at reducing inequalities in one of the most important educational inputs known: effective teaching. Specifically, we estimate whether district exposure to state policies aimed at recruiting and retaining teachers to shortage content or geographic areas are associated with AP and DE access and racial/ethnic gaps therein. While our investigations into pre-trends indicates that the timing of policy adoption is endogenous, precluding causal interpretations, the descriptive results are still informative, as they estimate whether there were within-district differences in outcomes, comparing years with these policies to other years without these policies.

Table 6 shows the main results for AP and DE access overall (in Panel A), the Black-White gaps in access (Panel B) and the Hispanic-White gaps (Panel C). Overall, having either a content- or location-focused state policy was not associated with greater or lower AP access, but districts in states with policies aimed at recruiting and retaining teachers for content-specific shortages had greater rates of DE overall, and larger Black-White gaps in DE.

Although these results are generally null, it is logical that any benefits of these policies might be concentrated within more disadvantaged districts suffering from greater challenges recruiting and retaining quality teaching faculties. Thus, we also estimate separate models for rural and non-rural districts, for districts with SES above or below the median in the first year of the panel, and those with a share of non-White students above or below the median in the first year of the panel.

The results related to overall access to AP and DE are in Table 7, and the outcomes related to Black-White gaps and Hispanic-White gaps in access are in Tables 8 and 9, respectively. There two model types: one focusing on whether the state had either policy, and one separately indicating content-related and location-related policies.

Table 7 shows that in general, there is little evidence that having either type of policy was associated with access to AP, but policies focused on content-related teacher shortages were associated with greater access to DE, particularly in rural districts, high SES districts, and districts with lower shares of non-White students. There is also some evidence that DE was less likely to be offered in districts in years in which their state had location-related teacher recruitment/retention policies, and more likely to be offered in district-year combinations with content-related policies. However, the opposite signs on these policy indicators may be due, at least in part, to collinearity between these two indicator variables. Specifically, approximately 40% of district-year observations had both active content- and location-related policies, 38% had neither, and only about 22% had one or the other but not both. As a result, we suggest interpreting the differences by policy type with caution.

Tables 8 and 9 show the heterogeneity results for the White/Black and White/Hispanic disparities, respectively. While the results are not statistically significant in all cases, there is suggestive evidence of heterogeneity by district type. Table 8 suggests that content-related teacher policies are associated with larger White-Black gaps in AP science enrollment in rural districts and any AP enrollment in low SES districts. In non-rural areas, content-related policies were related to larger White-Black gaps in DE access.

Table 9 indicates that content-related teacher policies are associated with larger White-Hispanic gaps in AP science enrollment in rural districts and larger White-Hispanic gaps in any AP enrollment in districts with a lower shares of non-White students. Among high SES districts, White-Hispanic gaps in DE were also larger in district-year combinations in states with either type of teacher policy.

In summary, although the results are not consistent across all outcomes, these types of policies – particularly those addressing content area needs – tended to be associated with greater access to advanced coursework overall, but also larger racial/ethnic gaps in access. In no model were these policies associated with reductions in racial/ethnic gaps in advanced coursework.

Discussion and Conclusions

This study assessed the potential drivers of advanced coursework access and gaps, with descriptive findings that attest to some notable differences for AP and DE access. In general, access to AP overall is greater in more diverse, non-rural districts, with higher academic performance and SES overall, as well as higher gaps in achievement and SES. In addition, more integrated districts had lower access to AP math. Altogether, these findings indicate greater access to AP in places where there is wide variation in academic preparation, and where there is a high degree of integration and diversity, which may reflect opportunity hoarding (Lewis & Diamond, 2015; Tilly, 1999). This concept has been used to describe behaviors by which some parents (e.g., White or higher SES parents) seek to protect and maintain the best possible educational opportunities for their own children, while excluding others from those same opportunities. Lewis and Diamond (2015) and Kelly and Price (2011) have attributed racialized tracking and advanced coursework disparities to opportunity hoarding, and Rodriguez and McGuire (2019) have applied this concept specifically to AP coursework. Our findings, here, related to AP – but generally not DE – continue to support this theory.

In our study, we also find that the types of characteristics associated with higher overall AP access are also generally associated with larger racial/ethnic gaps in AP access, consistent with earlier studies (Xu et al., 2021). In other words, not only do more diverse, non-rural districts, higher performing and higher SES districts tend to have greater access overall, they also tend to have higher racial/ethnic gaps in AP access. Further, other indicators of disparity such as SES gaps and achievement gaps are predictive of AP gaps. Overall, this continues to support the idea that AP access might be hoarded or is being used to internally segregate students covertly, through academic tracking.

Notably, however, these sorts of patterns, and the possible indication of academic hoarding does not appear to be as clear, when considering access to DE and early college, particularly for Black students. There was very little indication that DE access was greater in areas with greater diversity, more integration, or greater gaps in SES and academic achievement.

Similarly, the only statistically significant predictor of Black-White gaps in access to DE was eighth grade achievement gaps, which suggests that these advanced coursework gaps are closely tied to academic preparedness, rather than other considerations such as racial demographics or racial differences in SES.

The results for Hispanic-White gaps in DE were a bit different. Hispanic-White eighth grade achievement gaps were predictive of Hispanic-White DE gaps, similar to the findings related to Black-White gaps. However, districts with greater Hispanic-White SES gaps and more integration tended to have larger Hispanic-White gaps in DE access as well.

Our second research question focused on two key types of teacher policy efforts that might increase access to advanced coursework, particularly for underserved students in less advantaged districts. While non-parallel pre-trends preclude a causal interpretation, we use a set of district and year fixed effects to estimate the relationship between exposure to these policies and a variety of key AP and DE outcomes. Overall, these policies are not associated with greater or lower AP access, but in districts exposed to state policies compensating teachers for high needs content areas, their rates of DE were higher and White-Black gaps in DE were higher in years in which those policies were active.

We had hypothesized that any benefits of these policies might be concentrated within more disadvantaged districts suffering from greater challenges recruiting and retaining quality teachers. We find little evidence consistent with this hypothesis, however. In summary, overall, and for different types of districts, we find almost no evidence that these policies were associated with reductions in racial/ethnic gaps in advanced coursework. As mentioned previously, however, we should not interpret these results as causal, given that states endogenously choose if, when, and how to implement these policies. This is the key limitation of this study. We initially intended to estimate difference-in-difference models estimating the causal effects of these policies, and event study specifications clearly indicated the parallel trends assumption was not met.

Another key limitation is that some of the policies studied were enacted decades before the panel began, and others were enacted much more recently, so estimating the results separately by years of exposure is not practical with only four years of outcome data spanning an eight year period. Ideally, we would use a set of lagged and lead variables to look at possible changes in outcomes both in the short run, and the long run, but that was not practical here.

Additionally, due to inconsistencies in the reporting of exam taking outcomes in the CRDC data across years of our panel, we were unable to include other AP test taking and test passing outcomes, and the data available related to DE was limited to only three years. Further, although the lack of teacher diversity may also contribute to underrepresentation of students of color in AP coursework, there is not systematically reported data on teacher diversity for all districts in the country. If the Office for Civil Rights began systematically collecting this information from schools and districts, it would enable a more robust set of analyses in the future.

In summary, district level factors such as rural geography, low SES, and low academic achievement are associated with lower AP course access overall and lower racial/ethnic gaps in access. Perhaps unsurprisingly, racial/ethnic gaps in AP course enrollment are also correlated with socioeconomic disparities and achievement gaps.

What may be less intuitive, however, is that relatively socioeconomically advantaged and high performing districts tend to have larger within-district racial and ethnic gaps in AP access. This supports a theory that racial and ethnic gaps in AP course enrollment may be a result of opportunity hoarding by relatively advantaged White families, rather than simply a lack of resources to provide these educational opportunities.

In contrast, our results do not indicate that DE opportunities are being hoarded in the same ways, as racial gaps – particularly the Black-White gap – in DE access are much more closely aligned with eighth grade achievement gaps, than other demographic or socioeconomic factors. While of course, the gap in access and the early gaps in achievement are still reflective of inequalities within the education system that remain to be addressed, these findings suggest that DE opportunities may be a more equitable way of providing access to advanced, college-level coursework, than AP.

Given the importance of access to advanced coursework for later life outcomes including educational attainment and wages during adulthood (Joensen & Nielsen, 2009; Rose & Betts, 2004), ongoing disparities must be addressed if we are to create a more equitable and prosperous society. In particular, since gaps in AP access are positively correlated to overall access, policies that support access to rigorous coursework throughout the K-12 continuum need to specifically attend to these gaps, rather than just focusing on increasing access overall, as suggested by earlier work as well. Further, as in prior studies (Conger et al., 2009; Xu et al., 2021), the strongest predictor of racial/ethnic gaps in AP and DE access is racial/ethnic gaps in pre-high school achievement, suggesting that addressing advanced coursework gaps also needs to focus on the underlying root causes contributing to achievement gaps as well.

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Table 1. State policies related to geographic-area and content-area focused strategic teacher compensation

State	Type of Compensation	For High Needs Schools/Districts?	For High Needs Content Areas?	First school year effective	Repeal/Sunset Date	State Policy
Alabama	None	N/A	N/A	N/A	N/A	N/A
Alaska	None	N/A	N/A	N/A	N/A	N/A
Arizona	None	N/A	N/A	N/A	N/A	N/A
Arkansas	Bonus/Stipend	N/A	Yes - STEM	2007-08	N/A	Arkansas Act 564 (House Bill 2414 of 2007)
California	Other	N/A	Yes - "areas of highest need"	1970-71	N/A	California Education Code 45028(e)
California	Bonus/Stipend	Yes - High Priority Schools	N/A	2000-01	N/A	California Education Code 44395
Colorado	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - Rural Schools or Districts	N/A	2017-18	N/A	Colorado Revised Statutes 23-76-104
Colorado	Bonus/Stipend	Yes - low performing, high-needs schools	N/A	2009-10	N/A	Colorado Revised Statutes 22-2-504
Connecticut	Mortgage assistance	Yes - priority school districts & transitional school districts	Yes - subject matter shortage areas	2000-01	N/A	General Statutes of Connecticut 8-265pp
Delaware	None	N/A	N/A	N/A	N/A	N/A
Florida	Salary supplement	Yes - high priority location areas	Yes - high need content areas	2014-15	N/A	Florida Statutes 1012.22(1)(c)(5)
Florida	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - statewide critical teacher shortage subject area	1986-87	5/5/2011	Florida Statutes 1009.58
Georgia	Salary supplement	N/A	Yes - Secondary teachers and elementary math and science teachers	2009-10	N/A	Code 20-2-212.5. (Act No. 51 of 2009)
Hawaii	Bonus/Stipend	Yes - Focus, Priority, or Superintendent's Zone	N/A	2015-16	N/A	Hawaii Revised Statutes 302A-706; Act No. 2015-107
Idaho	None	N/A	N/A	N/A	N/A	N/A
Illinois	None	N/A	N/A	N/A	N/A	N/A
Indiana	None	N/A	N/A	N/A	N/A	N/A
Iowa	Salary supplement	Yes - high needs schools based on SES, LEP share, academic growth, teacher attrition, and geographic balance	N/A	2013-14	N/A	IA Code § 284.11

Iowa	Bonus/Stipend	N/A	Yes - high needs subjects (STEM, ESL, Special Ed., or other hard to staff subjects)	2014-15	N/A	IA Code § 261.110
Kansas	None	N/A	N/A	N/A	N/A	N/A
Kentucky	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - critical shortage areas in high schools	2009-10	N/A	Amending KRS 164.769 (HB 480 signed by Governor as Act Ch 93 of 2009)
Kentucky	Other	Yes - Schools with targeted or comprehensive support and improvement status	N/A	2018-19	N/A	Kentucky SB152, amending KRS 157.390
Louisiana	Bonus/Stipend	Yes - low performing schools	Yes - core subjects designated as critical to the school's improvement	2005-06	N/A	LA Rev Stat § 17:427.3
Louisiana	Bonus/Stipend	N/A	Yes - mathematics, biology, chemistry, physics, or special education	2004-05	N/A	LA Rev Stat § 17:427.2
Louisiana	Salary supplement	Yes - particular school need or geographic area	Yes - area of certification or subject area	2012-13	N/A	LA Rev Stat § 17:418 (Act No 1 of 2012)
Maine	None	N/A	N/A	N/A	N/A	N/A
Maryland	Bonus/Stipend	Yes - Schools with "comprehensive needs"	N/A	1999-00	N/A	Maryland Code § 6-306
Maryland	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - existing teachers who add certification in math or science	1985-86	N/A	Code of Maryland Regulations (COMAR) 13A.07.07
Massachusetts	None - differential pay is not explicitly banned	N/A	N/A	N/A	N/A	N/A
Michigan	None	N/A	N/A	N/A	N/A	N/A
Minnesota	None	N/A	N/A	N/A	N/A	N/A
Mississippi	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - geographic shortage area	N/A	1998-99	1-Jul-14	Mississippi Critical Teacher Shortage Act of 1998; HB 609 of 1998
Mississippi	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - geographical areas of critical shortage	Yes - subject areas of critical shortage	2020-21	N/A	Critical Needs Teacher Forgivable Loan Program. MS S 2353 of 2020
Missouri	None	N/A	N/A	N/A	N/A	N/A

Montana	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - "impacted schools" including rural/isolated schools, schools on Indian reservations, etc.	N/A	2007-08	N/A	Montana Code Annotated 20-4-501; 20-4-503; 20-4-505; 20-4-134
Nebraska	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - accelerated forgiveness if also teach in a "very sparse" or low-income school	Yes - shortage content area required	2009-10	N/A	Nebraska §§ 79-8,132−79-8,140 R.R.S., with rules clarified in the Nebraska Department of Education Rules and Regulations Title 92 Chapter 25
Nevada	Bonus/Stipend	Yes - "at risk" schools based on FRL percent, pupil transiency rate, EL percent, IEP percent, and dropout rate	N/A	2007-08	N/A	NV Rev Stat § 391A.400
Nevada	Other	Yes -turnaround schools	N/A	2015-16	N/A	2015 NV S 92; Chapter 541
Nevada	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - high needs areas	Yes - subject areas in which there is a shortage (including STEM, special education, and ESL)	2015-16	N/A	2015 NV S 511; Chapter 388
New Hampshire	None	N/A	N/A	N/A	N/A	N/A
New Jersey	None	N/A	N/A	N/A	N/A	N/A
New Mexico	Bonus/Stipend (for exemplary teachers)	Yes - merit pay for exemplary teachers is higher if they teach in low performing schools	Yes - merit pay for exemplary teachers higher if they teach in STEM	2018-19	N/A	Budget Bill of 2018
New York	Bonus/Stipend	Yes - schools with shortage of certified teachers	Yes - subject areas in which there is a shortage of certified teachers	2000-01	N/A	New York Education Law 3612
North Carolina	Salary supplement	Yes - low performing schools	N/A	2017-18	N/A	In Appropriations Bill, Section 8.2.(a)
North Dakota	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - content areas or grade levels of teacher shortage	2001-02	5/1/2019	ND 15-10-38 (HB No. 1444 of 2001)
North Dakota	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - rural or remote districts were added (previously it was just content areas or grade levels)	Yes - the 2017 law added the rural/remote benefit	2017-18	5/1/2019	ND 15-10-38 (SB 2037 of 2017) and repealed by HB 1429 of 2019.

Ohio	Other	Yes - hard to staff schools	Yes - math, science, and special education, or other subject areas of need	2004-05	N/A	Ohio Revised Code 3319.57.
Oklahoma	Other	Yes - schools in need of improvement and hard-to-staff schools	Yes - subject areas including but not limited to STEM and foreign language	2010-11	N/A	Oklahoma Statutes 70-5-141; OK Senate Bill 2033 (Act No 291 of 2010)
Oregon	None	N/A	N/A	N/A	N/A	N/A
Pennsylvania	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - urban and rural districts	N/A	1988-89	N/A	Urban and Rural Teacher Loan Forgiveness Act of 1988. Pennsylvania Statutes Title 24 P.S. Education § 5194.
Rhode Island	None	N/A	N/A	N/A	N/A	N/A
South Carolina	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - critical needs geographic areas	Yes - critical needs subject areas	2000-01	N/A	2019 South Carolina Code of Laws 59-26-20
South Dakota	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - areas of critical need	2004-05	N/A	Created by Gov. Rounds
Tennessee	Other	Yes - hard to staff schools	Yes - hard to staff subject areas	2008-09	N/A	Tennessee Code 49-3-306(h)
Texas	Bonus/Stipend	Yes - math and tech. teachers in high needs campus	Yes - math and tech. teachers in high needs campus	2001-02	9/1/2019	Texas Education Code 21.411-412
Texas	Bonus/Stipend	Yes - high needs campuses	Yes - reading teachers in high needs campus	1999-00	9/1/2019	Texas Education Code 21.410
Texas	Bonus/Stipend	Yes - science teachers in high needs campus	Yes - science teachers in high needs campus	2003-04	9/1/2019	Texas Education Code 21.412-413
Utah	Salary supplement	N/A	Yes - secondary math and science starting 2008; added special education, computer science in 2015	2008-09	N/A	Utah 53a-17a-156. Passed as Act 397 of 2008. Then in 2015, Act 122 added special education and computer science.
Vermont	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - Math, science, or computer science in a year with a critical shortage	1983-84	N/A	16 V. S.A. § 2869
Virginia	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - high needs areas including high FRL schools	Yes - teachers in high need subjects or grades	2001-02	N/A	VA Code 22.1-290.01
Virginia	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - high needs areas including high FRL schools	Yes - teachers in high need subjects or grades	2001-02	N/A	VA Code 22.1-290.01

Virginia	Other	Yes - schools in need of improvement	Yes - middle school subjects in critical need	2011-12	N/A	VA Code 22.1-199.1
Virginia	Bonus/Stipend	Yes - hard to staff or low performing schools	Yes - critical shortage areas and hard to staff positions	2013-14	N/A	VA Code 22.1-318.2
Virginia	Bonus/Stipend	Yes - hard to staff schools or low performing schools not fully accredited	Yes - STEM	2014-15	N/A	Budget Bill - HB5010 (Chapter 3)
Washington	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - designated teacher shortage geographic areas	Yes - designated teacher shortage areas/classifications	2004-05	N/A	Washington Administrative Code 250-65
Washington	Bonus/Stipend	Yes - high poverty schools	N/A	2007-08	N/A	Washington Administrative Code 392-140-970 to 392-140-976
Washington, D.C.	None	N/A	N/A	N/A	N/A	N/A
West Virginia	Scholarship/Loan Forgiveness/Tuition Assistance	Yes - school or geographic area of critical need	Yes - subject area of critical need	2015-16	N/A	Act No. 216 of 2015 (WV H.B. 2645)
Wisconsin	Bonus/Stipend	Yes - high poverty schools	N/A	2007-08	N/A	Wisconsin Statute 115.42
Wyoming	Scholarship/Loan Forgiveness/Tuition Assistance	N/A	Yes - Special education, math, science, foreign language, reading	2009-10	N/A	Act 69 of 2009 (Originally HB 173)

Table 2. Observable characteristics of geographic district-year observations, for states with and without teacher compensation policies to address targeted teacher shortage areas

	Had a state policy to address teacher shortages	Did not have such a policy	Diff.
Num. of Geographic District-Year Obs.	27,978	14,924	
AP Offered	72.2%	63.6%	8.6% ***
Dual Enrollment Offered	83.9%	85.1%	-1.1% ***
Pct. Of 10th-12th Graders Enrolled in AP	15.7%	13.9%	1.8% ***
Pct. Of 10th-12th Graders Enrolled in AP Math	4.1%	4.0%	0.1%
Pct. Of 10th-12th Graders Enrolled in AP Science	4.7%	4.4%	0.3% ***
Pct. Of 10th-12th Graders Enrolled in Dual Enrollment	13.9%	15.1%	-1.2% ***
White-Black ARD in AP Enrollment	0.12	0.12	0.00
White-Black ARD in AP Math Enrollment	0.04	0.04	0.00 ***
White-Black ARD in AP Science Enrollment	0.04	0.04	0.00
White-Black ARD in Dual Enrollment	0.06	0.05	0.02 ***
White-Hispanic ARD in AP Enrollment	0.08	0.09	-0.01 ***
White-Hispanic ARD in AP Math Enrollment	0.03	0.03	0.00
White-Hispanic ARD in AP Science Enrollment	0.03	0.03	0.00
White-Hispanic ARD in Dual Enrollment	0.06	0.04	0.01 ***
White/Black RRR in AP Enrollment	2.22	2.27	-0.05
White/Black RRR in AP Math Enrollment	2.56	2.77	-0.21 ***
White/Black RRR in AP Science Enrollment	2.47	2.51	-0.03
White/Black RRR in Dual Enrollment	2.12	2.03	0.10
White/Hispanic RRR in AP Enrollment	1.67	1.78	-0.11 ***
White/Hispanic RRR in AP Math Enrollment	1.99	2.09	-0.09 ***
White/Hispanic RRR in AP Science Enrollment	1.87	1.91	-0.05
White/Hispanic RRR in Dual Enrollment	1.83	1.69	0.14
Student Enrollment in Grades 10-12	1053.0	725.2	327.77 ***
% Free- and reduced-price lunch	51.9%	48.6%	3.2% ***
% Limited English proficient	4.9%	3.9%	1.1% ***
% Special Education	13.7%	14.9%	-1.2% ***
% White	71.3%	78.3%	-7.1% ***
% Black	8.6%	6.4%	2.2% ***
% Hispanic	15.5%	10.8%	4.7% ***
% Other Race	4.6%	4.4%	0.2% *
Urban	7.7%	6.7%	1.1% ***
Suburban	19.4%	23.4%	-4.0% ***
Town	19.8%	20.7%	-0.9% **
Rural	53.0%	49.2%	3.8% ***
Avg. Eighth Grade Math Test Scores	7.95	8.10	-0.15 ***
Grade 8 Math Test Score Gap (White/Black)	1.55	1.54	0.01
Grade 8 Math Test Score Gap (White/Hispanic)	0.93	0.89	0.04 **
SES Index	0.11	0.17	-0.06 ***
SES Gap (White/Black)	1.93	1.89	0.04 ***
SES Gap (White/Hispanic)	1.08	1.06	0.03 ***
Theil Index Between Schools (White/Black)	0.04	0.04	0.00 ***
Theil Index Between Schools (White/Hispanic)	0.03	0.03	0.00 ***
Implicit Racial Bias (Community Level IAT, White Respondents)	0.40	0.39	0.01 ***

Note. Excludes districts with fewer than 20 students enrolled in grades 10-12. RRR and ARD only reported for districts with at least 10 students in each of the races/ethnicities being compared. For the purposes of this table, we include states that had these types of policies during at least one year in the panel, in the first column.
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Predicting overall AP and dual enrollment access

	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)
Log of Student Enrollment (Gr. 10-12)	0.007	0.008	0.004	0.001	0.000	-0.003
	(0.004)	(0.004)	(0.002)	(0.000)	(0.000)	(0.002)
% LEP	0.015	-0.006	0.002	-0.001	-0.002	0.000
	(0.014)	(0.007)	(0.004)	(0.001)	(0.002)	(0.004)
% Special Education	0.000	-0.007	-0.007	-0.003	-0.003	-0.014***
	(0.008)	(0.006)	(0.004)	(0.001)	(0.001)	(0.005)
% Black	0.007	-0.010	0.012***	0.005	0.006	-0.005
	(0.006)	(0.006)	(0.003)	(0.001)	(0.001)	(0.003)
% Hispanic	0.003	-0.006	0.012	0.003	0.005	-0.013**
	(0.017)	(0.012)	(0.006)	(0.002)	(0.004)	(0.005)
% Other Race	0.001	-0.022***	0.018***	0.009	0.012	-0.009***
	(0.007)	(0.007)	(0.006)	(0.001)	(0.002)	(0.003)
Implicit Racial Bias	0.011	-0.006	-0.002	0.000	0.001	0.002
	(0.004)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)
Avg. Eighth Grade Math Test Scores	0.016	0.003	0.028	0.011***	0.013***	0.009
	(0.009)	(0.007)	(0.004)	(0.001)	(0.001)	(0.004)
Gr. 8 Math Test Score Gap (White/Black)	0.008	0.002	0.009	0.003	0.003***	0.000
	(0.004)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)
Gr. 8 Math Test Score Gap (White/Hispanic)	0.003	0.003	0.001	0.000	0.000	0.000
	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)
SES Composite Index	0.044	-0.011	0.054***	0.015***	0.016	-0.013
	(0.010)	(0.008)	(0.003)	(0.002)	(0.002)	(0.003)
SES Gap (White/Black)	0.000	-0.008	0.007***	0.002	0.002	-0.002
	(0.005)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)
SES Gap (White/Hispanic)	-0.004	0.006	0.003	0.001	0.000	0.002
	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)
Theil Index Btwn. Schools (White/Black)	0.009	0.000	-0.001	-0.002***	-0.002	-0.003
	(0.005)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)
Theil Index Btwn. Schools (White/Hispanic)	0.005	0.004	0.005	0.000	0.001	-0.001
	(0.007)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)
Urban	0.135	0.024	0.083***	0.019	0.016	-0.019
	(0.025)	(0.013)	(0.008)	(0.003)	(0.003)	(0.009)
Suburban	0.102	-0.004	0.060	0.012	0.010***	-0.017**
	(0.015)	(0.010)	(0.007)	(0.002)	(0.003)	(0.007)
Town	0.072***	-0.003	0.034	0.007***	0.007***	-0.010
	(0.019)	(0.007)	(0.007)	(0.002)	(0.002)	(0.006)
Constant	0.825***	0.987***	0.157***	0.0368***	0.039***	0.025
	(0.013)	(0.018)	(0.009)	(0.002)	(0.002)	(0.017)
Observations	14,417	14,417	14,414	13,350	13,023	8,145
Adj. R-squared	0.149	0.168	0.345	0.278	0.277	0.280

Note. All models include state fixed effects and academic year fixed effects. All control variables except for urban, suburban, and town indicators are in standard deviation units. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses. SEDA calculated measures of racial/ethnic gaps are limited to districts with at least 20 students in both groups being compared.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$ adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 4. Predicting White/Black gaps in AP and dual enrollment access

	ARD in AP Enrollment (Wh-Bl)	ARD in AP Math Enrollment (Wh-Bl)	ARD in AP Science Enrollment (Wh-Bl)	ARD in Dual Enrollment (Wh-Bl)	Log(RRR) in AP Enrollment (Wh/Bl)	Log(RRR) in AP Math Enrollment (Wh/Bl)	Log(RRR) in AP Science Enrollment (Wh/Bl)	Log(RRR) in Dual Enrollment (Wh/Bl)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of Student Enrollment (Gr. 10-12)	0.001	0.000	0.000	-0.001	-0.009	0.011	0.002	-0.078
	(0.002)	(0.000)	(0.001)	(0.001)	(0.006)	(0.006)	(0.007)	(0.080)
% LEP	0.006	0.004	0.002	0.007	0.053	0.100	0.070	0.093
	(0.004)	(0.002)	(0.003)	(0.003)	(0.024)	(0.052)	(0.047)	(0.097)
% Special Education	-0.003	0.001	0.002	-0.002	0.018	0.034	0.063	-0.057
	(0.004)	(0.001)	(0.002)	(0.002)	(0.014)	(0.027)	(0.028)	(0.111)
% Black	0.027	0.011	0.013***	0.004	0.108	0.305***	0.284***	0.341
	(0.003)	(0.001)	(0.001)	(0.002)	(0.016)	(0.031)	(0.029)	(0.213)
% Hispanic	0.021	0.005	0.008	-0.009	0.013	0.130	0.110	-0.080
	(0.005)	(0.003)	(0.003)	(0.004)	(0.027)	(0.060)	(0.054)	(0.077)
% Other Race	0.001	0.002	0.001	-0.005	0.016	0.108***	0.070***	-0.065
	(0.004)	(0.002)	(0.002)	(0.002)	(0.016)	(0.031)	(0.023)	(0.180)
Implicit Racial Bias	-0.003	-0.001	-0.001	0.003	0.020	0.041	0.032	-0.036
	(0.002)	(0.001)	(0.001)	(0.003)	(0.016)	(0.023)	(0.028)	(0.026)
Avg. Eighth Grade Math Test Scores	0.012***	0.004***	0.006***	0.004	0.021	0.024	0.045	0.024
	(0.003)	(0.001)	(0.002)	(0.003)	(0.012)	(0.025)	(0.020)	(0.083)
Gr. 8 Math Test Score Gap (White/Black)	0.024***	0.008***	0.008	0.005***	0.110***	0.206***	0.200***	0.198***
	(0.003)	(0.001)	(0.001)	(0.002)	(0.011)	(0.017)	(0.015)	(0.068)
SES Composite Index	0.036***	0.012	0.012	-0.006	0.065***	0.146	0.100***	0.023
	(0.003)	(0.002)	(0.002)	(0.002)	(0.016)	(0.026)	(0.026)	(0.077)
SES Gap (White/Black)	0.017***	0.004	0.005***	0.006	0.089***	0.086	0.076	-0.053
	(0.002)	(0.001)	(0.001)	(0.001)	(0.008)	(0.013)	(0.014)	(0.167)
Theil Index Btwn. Schools (White/Black)	0.000	-0.001	0.001	-0.006	-0.036	-0.044	-0.032	0.127
	(0.002)	(0.001)	(0.001)	(0.001)	(0.015)	(0.022)	(0.021)	(0.283)
Urban	0.061	0.017	0.012***	-0.014	0.231	0.421	0.328	0.099
	(0.008)	(0.002)	(0.003)	(0.008)	(0.033)	(0.070)	(0.047)	(0.134)
Suburban	0.035	0.012	0.008	-0.004	0.167	0.268***	0.219***	0.011
	(0.005)	(0.002)	(0.003)	(0.007)	(0.038)	(0.071)	(0.051)	(0.182)
Town	0.030	0.007***	0.010***	0.007	0.115	0.075	0.047	0.326
	(0.005)	(0.002)	(0.003)	(0.006)	(0.026)	(0.055)	(0.048)	(0.140)
Constant	0.068***	0.015***	0.014	-0.006	0.434***	0.101	0.079	1.578
	(0.004)	(0.002)	(0.002)	(0.009)	(0.025)	(0.066)	(0.046)	(0.204)
Observations	9,184	8,585	8,437	4,501	8,296	5,443	5,669	3,430
Adj. R-squared	0.232	0.154	0.131	0.146	0.184	0.336	0.303	0.039

Note. All models include state fixed effects and academic year fixed effects. All control variables except for urban, suburban, and town indicators are in standard deviation units. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses. SEDA calculated measures of racial/ethnic gaps are limited to districts with at least 20 students in both groups being compared.
*** p<0.01, ** p<0.05, * p<0.1 adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 5. Predicting White/Hispanic gaps in AP and dual enrollment access

	ARD in AP Enrollment (Wh-Hi)	ARD in AP Math Enrollment (Wh-Hi)	ARD in AP Science Enrollment (Wh-Hi)	ARD in Dual Enrollment (Wh-Hi)	Log(RRR) in AP Enrollment (Wh/Hi)	Log(RRR) in AP Math Enrollment (Wh/Hi)	Log(RRR) in AP Science Enrollment (Wh/Hi)	Log(RRR) in Dual Enrollment (Wh/Hi)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of Student Enrollment (Gr. 10-12)	-0.001	0.000	0.000	-0.001	-0.014**	-0.014***	-0.009	-0.027
	(0.001)	(0.000)	(0.000)	(0.001)	(0.005)	(0.005)	(0.004)	(0.020)
% LEP	0.004	0.002	0.000	0.007	0.043	0.060	0.051	0.134
	(0.004)	(0.001)	(0.002)	(0.003)	(0.022)	(0.023)	(0.025)	(0.083)
% Special Education	0.002	0.000	0.002	-0.003	0.031***	0.018	0.023	0.049
	(0.003)	(0.001)	(0.002)	(0.003)	(0.0113)	(0.018)	(0.018)	(0.049)
% Black	0.020	0.007	0.009	0.001	0.057***	0.141	0.111	-0.049
	(0.003)	(0.001)	(0.002)	(0.002)	(0.014)	(0.030)	(0.020)	(0.052)
% Hispanic	0.018***	0.007***	0.012***	0.001	0.112***	0.364	0.312	0.138
	(0.006)	(0.002)	(0.003)	(0.005)	(0.0409)	(0.064)	(0.066)	(0.112)
% Other Race	0.003	0.003	0.003	-0.006***	0.020	0.092	0.076***	-0.008
	(0.003)	(0.001)	(0.001)	(0.002)	(0.015)	(0.018)	(0.020)	(0.036)
Implicit Racial Bias	-0.001	-0.001	-0.001	0.001	-0.002	-0.027	-0.011	0.009
	(0.002)	(0.001)	(0.001)	(0.002)	(0.012)	(0.019)	(0.022)	(0.035)
Avg. Eighth Grade Math Test Scores	0.004	0.002	0.003***	0.004	0.005	0.022	0.011	-0.011
	(0.003)	(0.001)	(0.001)	(0.002)	(0.016)	(0.024)	(0.018)	(0.041)
Gr. 8 Math Test Score Gap (White/Hispanic)	0.018	0.007	0.007	0.007***	0.101***	0.168***	0.152***	0.184
	(0.003)	(0.001)	(0.001)	(0.002)	(0.010)	(0.014)	(0.012)	(0.036)
SES Composite Index	0.027***	0.010	0.010	-0.004	0.080	0.192	0.158	0.013
	(0.003)	(0.001)	(0.001)	(0.002)	(0.015)	(0.029)	(0.023)	(0.050)
SES Gap (White/Hispanic)	0.012***	0.005	0.004	0.004***	0.056	0.081	0.062	0.079***
	(0.00127)	(0.001)	(0.001)	(0.00124)	(0.007)	(0.014)	(0.010)	(0.023)
Theil Index Btwn. Schools (White/Hispanic)	0.005	0.001	0.004***	-0.006***	0.000	0.020	0.038***	0.008
	(0.003)	(0.001)	(0.001)	(0.001)	(0.007)	(0.014)	(0.010)	(0.038)
Urban	0.044	0.014	0.009***	-0.011	0.182	0.485***	0.322	0.059
	(0.008)	(0.002)	(0.003)	(0.005)	(0.028)	(0.041)	(0.040)	(0.099)
Suburban	0.021***	0.008***	0.002	-0.011	0.115	0.350***	0.210	0.039
	(0.006)	(0.002)	(0.002)	(0.005)	(0.026)	(0.036)	(0.034)	(0.075)
Town	0.021	0.006***	0.007***	0.005	0.121	0.224	0.158	0.126
	(0.005)	(0.002)	(0.002)	(0.005)	(0.021)	(0.037)	(0.034)	(0.069)
Constant	0.046***	0.011	0.009	0.003	0.198***	-0.219	-0.161	1.446***
	(0.004)	(0.002)	(0.002)	(0.007)	(0.020)	(0.037)	(0.026)	(0.063)
Observations	11,310	10,417	10,095	5,990	9,959	6,824	6,872	4,519
Adj. R-squared	0.161	0.122	0.122	0.072	0.146	0.360	0.309	0.078

Note. All models include geographic district fixed effects and academic year fixed effects. All control variables except for urban, suburban, and town indicators are in standard deviation units. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses. SEDA calculated measures of racial/ethnic gaps are limited to districts with at least 20 students in both groups being compared.
*** p<0.01, ** p<0.05, * p<0.1 adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 6. Predicting overall AP and dual enrollment outcomes by teacher policy type

	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Either Type of Policy	0.009	-0.032	-0.005	-0.003	-0.013	0.012						
	(0.017)	(0.049)	(0.012)	(0.005)	(0.011)	(0.025)						
Content-Related Policy							0.030	0.053	0.009	0.002	0.003	0.151***
							(0.015)	(0.045)	(0.014)	(0.005)	(0.008)	(0.026)
Location-Related Policy							0.001	-0.030	-0.005	-0.004	-0.014	0.009
							(0.015)	(0.048)	(0.011)	(0.005)	(0.011)	(0.025)
Observations	14,417	14,417	14,414	13,350	13,023	8,145	14,417	14,417	14,414	13,350	13,023	8,145
Adj. R-squared	0.627	0.284	0.657	0.537	0.594	0.591	0.627	0.284	0.657	0.537	0.594	0.592

	ARD in AP Enrollment (Wh-Bl)	ARD in AP Math Enrollment (Wh-Bl)	ARD in AP Science Enrollment (Wh-Bl)	ARD in Dual Enrollment (Wh-Bl)	Log(RRR) in AP Enrollment (Wh/Bl)	Log(RRR) in AP Math Enrollment (Wh/Bl)	Log(RRR) in AP Science Enrollment (Wh/Bl)	Log(RRR) in Dual Enrollment (Wh/Bl)	ARD in AP Enrollment (Wh-Bl)	ARD in AP Math Enrollment (Wh-Bl)	ARD in AP Science Enrollment (Wh-Bl)	ARD in Dual Enrollment (Wh-Bl)	Log(RRR) in AP Enrollment (Wh/Bl)	Log(RRR) in AP Math Enrollment (Wh/Bl)	Log(RRR) in AP Science Enrollment (Wh/Bl)	Log(RRR) in Dual Enrollment (Wh/Bl)
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
Either Type of Policy	-0.002	-0.003	-0.015	0.018	0.007	0.043	-0.016	0.183								
	(0.008)	(0.006)	(0.013)	(0.033)	(0.030)	(0.036)	(0.049)	(0.350)								
Content-Related Policy									0.005	0.003	0.001	0.061***	0.073	0.033	0.076	
									(0.014)	(0.007)	(0.008)	(0.017)	(0.035)	(0.043)	(0.209)	
Location-Related Policy									0.001	-0.002	-0.012	0.017	0.011	0.070	0.022	0.320
									(0.008)	(0.005)	(0.012)	(0.031)	(0.029)	(0.051)	(0.069)	(0.410)
Observations	9,184	8,585	8,437	4,501	8,296	5,443	5,669	3,430	9,184	8,585	8,437	4,501	8,296	5,443	5,669	3,430
Adj. R-squared	0.507	0.348	0.342	0.442	0.444	0.613	0.569	-0.218	0.507	0.348	0.342	0.441	0.444	0.613	0.569	-0.218

	ARD in AP Enrollment (Wh-Hi)	ARD in AP Math Enrollment (Wh-Hi)	ARD in AP Science Enrollment (Wh-Hi)	ARD in Dual Enrollment (Wh-Hi)	Log(RRR) in AP Enrollment (Wh/Hi)	Log(RRR) in AP Math Enrollment (Wh/Hi)	Log(RRR) in AP Science Enrollment (Wh/Hi)	Log(RRR) in Dual Enrollment (Wh/Hi)	ARD in AP Enrollment (Wh-Hi)	ARD in AP Math Enrollment (Wh-Hi)	ARD in AP Science Enrollment (Wh-Hi)	ARD in Dual Enrollment (Wh-Hi)	Log(RRR) in AP Enrollment (Wh/Hi)	Log(RRR) in AP Math Enrollment (Wh/Hi)	Log(RRR) in AP Science Enrollment (Wh/Hi)	Log(RRR) in Dual Enrollment (Wh/Hi)
	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)
Either Type of Policy	-0.001	-0.003	-0.014	-0.008	-0.014	0.012	-0.034	-0.029								
	(0.007)	(0.004)	(0.011)	(0.010)	(0.043)	(0.087)	(0.084)	(0.146)								
Content-Related Policy									-0.006	-0.001	0.009	0.033	0.080	-0.142	-0.060	
									(0.013)	(0.009)	(0.007)	(0.014)	(0.076)	(0.113)	(0.122)	
Location-Related Policy									-0.001	-0.003	-0.015	-0.012	-0.038	0.035	-0.047	-0.151
									(0.007)	(0.004)	(0.010)	(0.014)	(0.029)	(0.068)	(0.075)	(0.300)
Observations	11,310	10,417	10,095	5,990	9,959	6,824	6,872	4,519	11,310	10,417	10,095	5,990	9,959	6,824	6,872	4,519
Adj. R-squared	0.382	0.237	0.270	0.356	0.388	0.589	0.541	0.274	0.382	0.236	0.270	0.356	0.388	0.589	0.541	0.274

Note. All models include geographic district fixed effects, academic year fixed effects, and other control variables corresponding to those included in Tables 3-5. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$ adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 7. Heterogeneity checks by district type: Predicting overall AP and dual enrollment access by teacher policy type

	Rural						Non-Rural					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Either type of policy	0.020	-0.084***	0.003	-0.001	-0.005	0.005	-0.005	0.012	-0.014	-0.004	-0.020	0.023
	(0.027)	(0.025)	(0.013)	(0.005)	(0.008)	(0.017)	(0.009)	(0.068)	(0.007)	(0.004)	(0.013)	(0.020)
Observations	4,145	4,145	4,145	3,687	3,576	2,111	10,272	10,272	10,269	9,663	9,447	6,034
Adj. R-squared	0.591	0.119	0.624	0.528	0.527	0.556	0.640	0.312	0.664	0.542	0.600	0.601

	Rural						Non-Rural					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Content-related policy	-0.009	0.119***	0.029	0.014	0.005	0.216***	0.043	0.023	0.004	-0.002	0.002	0.116
	(0.024)	(0.032)	(0.017)	(0.006)	(0.010)	(0.033)	(0.012)	(0.054)	(0.012)	(0.004)	(0.007)	(0.028)
Location-related policy	0.027	-0.099***	-0.001	-0.004	-0.005	0.003	-0.019	0.020	-0.012	-0.004	-0.020	0.018
	(0.027)	(0.026)	(0.010)	(0.004)	(0.008)	(0.019)	(0.011)	(0.066)	(0.007)	(0.004)	(0.012)	(0.022)
Observations	4,145	4,145	4,145	3,687	3,576	2,111	10,272	10,272	10,269	9,663	9,447	6,034
Adj. R-squared	0.591	0.121	0.624	0.529	0.526	0.561	0.640	0.312	0.664	0.542	0.601	0.602

	Low District SES						High District SES					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Either type of policy	0.023	-0.049	0.001	-0.003	-0.012	0.020	-0.021	0.031	-0.018	0.000	-0.014	-0.019
	(0.023)	(0.028)	(0.011)	(0.005)	(0.010)	(0.021)	(0.013)	(0.084)	(0.015)	(0.004)	(0.009)	(0.025)
Observations	7,166	7,166	7,166	6,457	6,332	4,034	7,145	7,145	7,142	6,805	6,600	4,023
Adj. R-squared	0.593	0.256	0.566	0.386	0.451	0.560	0.675	0.293	0.667	0.544	0.612	0.616

	Low District SES						High District SES					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Content-related policy	0.042	0.021	0.034	0.008	0.013	0.121	0.030	0.075	-0.013	-0.005	-0.007	0.173***
	(0.035)	(0.063)	(0.015)	(0.007)	(0.008)	(0.041)	(0.012)	(0.041)	(0.011)	(0.002)	(0.006)	(0.042)
Location-related policy	0.011	-0.037	-0.001	-0.005	-0.014	0.020	-0.024	-0.002	-0.011	0.002	-0.009	-0.015
	(0.019)	(0.037)	(0.008)	(0.003)	(0.009)	(0.022)	(0.016)	(0.069)	(0.012)	(0.003)	(0.009)	(0.017)
Observations	7,166	7,166	7,166	6,457	6,332	4,034	7,145	7,145	7,142	6,805	6,600	4,023
Adj. R-squared	0.593	0.255	0.567	0.386	0.452	0.560	0.675	0.293	0.667	0.544	0.612	0.619

	High District % Non-White						Low District % Non-White					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Either type of policy	0.007	-0.050	-0.008	-0.004	-0.018	0.011	0.012	0.006	0.004	-0.001	-0.006	0.018
	(0.025)	(0.041)	(0.017)	(0.005)	(0.015)	(0.027)	(0.014)	(0.051)	(0.019)	(0.004)	(0.004)	(0.027)
Observations	7,955	7,955	7,952	7,396	7,290	4,631	6,353	6,353	6,353	5,863	5,639	3,424
Adj. R-squared	0.572	0.317	0.689	0.567	0.617	0.603	0.677	0.233	0.618	0.506	0.569	0.574

	High District % Non-White						Low District % Non-White					
	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment	AP Offered	Dual Enrollment Offered	Share of 10th-12th Grade Enrolled in AP	Share of 10th-12th Grade Enrolled in AP Math	Share of 10th-12th Grade Enrolled in AP Science	Share of 10th-12th Grade Dual Enrollment
Content-related policy	0.045	0.048	0.006	0.000	0.001	0.097***	0.023	0.055	0.014	0.001	-0.001	0.176***
	(0.021)	(0.026)	(0.011)	(0.004)	(0.007)	(0.019)	(0.016)	(0.062)	(0.017)	(0.004)	(0.005)	(0.040)
Location-related policy	-0.003	-0.030	-0.006	-0.005	-0.018	0.007	0.006	-0.029	-0.003	-0.001	-0.004	0.016
	(0.022)	(0.047)	(0.015)	(0.005)	(0.013)	(0.028)	(0.015)	(0.057)	(0.011)	(0.004)	(0.005)	(0.022)
Observations	7,955	7,955	7,952	7,396	7,290	4,631	6,353	6,353	6,353	5,863	5,639	3,424
Adj. R-squared	0.572	0.317	0.689	0.567	0.617	0.603	0.677	0.233	0.618	0.505	0.569	0.578

Note. Full model results available from authors by request. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1 adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 8. Heterogeneity checks by district type: Predicting White/Black gaps in AP and dual enrollment access by teacher policy type

	Rural								**Non-Rural**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	0.001	-0.001	-0.008	0.015	0.057	0.270	-0.104	0.592	-0.004	-0.005	-0.018	0.034	-0.012	-0.058	-0.025	-0.126
	(0.018)	(0.012)	(0.007)	(0.024)	(0.099)	(0.100)	(0.067)	(0.332)	(0.003)	(0.004)	(0.016)	(0.022)	(0.021)	(0.062)	(0.066)	(0.376)
Observations	1,815	1,581	1,562	944	1,514	857	884	735	7,369	7,004	6,875	3,557	6,782	4,586	4,785	2,695
Adj. R-squared	0.343	0.106	0.153	0.534	0.387	0.603	0.520	0.231	0.515	0.365	0.357	0.427	0.446	0.605	0.573	-0.296

	Rural								**Non-Rural**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	0.077	0.035	0.031***		0.392	0.288	0.414		-0.004	-0.002	-0.003	0.078***	0.026	0.047	0.023	
	(0.066)	(0.030)	(0.008)		(0.384)	(0.258)	(0.268)		(0.005)	(0.005)	(0.009)	(0.019)	(0.059)	(0.082)	(0.215)	
Location-related policy	-0.008	-0.007	-0.013	0.015	0.011	0.203	-0.210	0.592	0.003	-0.002	-0.013	0.030	0.018	0.009	0.056	0.173
	(0.007)	(0.009)	(0.006)	(0.024)	(0.056)	(0.128)	(0.143)	(0.332)	(0.007)	(0.005)	(0.015)	(0.023)	(0.039)	(0.097)	(0.106)	(0.650)
Observations	1,815	1,581	1,562	944	1,514	857	884	735	7,369	7,004	6,875	3,557	6,782	4,586	4,785	2,695
Adj. R-squared	0.346	0.109	0.155	0.534	0.388	0.601	0.522	0.231	0.515	0.365	0.356	0.427	0.445	0.605	0.573	-0.296

	Low District SES								**High District SES**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	0.000	-0.003	-0.014	0.022	0.025	0.096	-0.010	0.189	-0.003	0.003	-0.011	-0.002	-0.041	-0.056	0.066	-0.095
	(0.009)	(0.006)	(0.011)	(0.030)	(0.036)	(0.051)	(0.061)	(0.434)	(0.015)	(0.003)	(0.010)	(0.042)	(0.063)	(0.232)	(0.137)	(0.280)
Observations	4,826	4,322	4,218	2,667	4,300	2,784	2,845	2,105	4,295	4,212	4,163	1,795	3,940	2,630	2,785	1,294
Adj. R-squared	0.536	0.300	0.399	0.395	0.473	0.621	0.585	-0.223	0.461	0.361	0.299	0.491	0.404	0.602	0.549	0.393

	Low District SES								**High District SES**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	0.025	0.007	0.012	-0.039	0.168***	-0.007	-0.052		-0.020	-0.008	-0.014		-0.001	0.107	0.197	
	(0.015)	(0.014)	(0.007)	(0.021)	(0.039)	(0.119)	(0.132)		(0.008)	(0.006)	(0.011)		(0.052)	(0.197)	(0.156)	
Location-related policy	0.000	-0.004	-0.014	0.022	0.013	0.120	0.032	0.189	0.008	0.006	-0.003	-0.002	0.007	0.007	0.144	0.598
	(0.007)	(0.005)	(0.010)	(0.030)	(0.030)	(0.053)	(0.062)	(0.434)	(0.011)	(0.003)	(0.010)	(0.028)	(0.091)	(0.224)	(0.173)	(0.900)
Observations	4,826	4,322	4,218	2,667	4,300	2,784	2,845	2,105	4,295	4,212	4,163	1,795	3,940	2,630	2,785	1,294
Adj. R-squared	0.536	0.300	0.398	0.394	0.474	0.621	0.585	-0.223	0.461	0.361	0.299	0.491	0.404	0.602	0.550	0.397

	High District % Non-White								**Low District % Non-White**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	-0.003	-0.005	-0.016	0.017	0.009	0.021	-0.001	0.182	-0.004	0.008	-0.004	0.037	-0.082	0.275	-0.220	0.686
	(0.007)	(0.005)	(0.014)	(0.031)	(0.036)	(0.026)	(0.029)	(0.452)	(0.027)	(0.007)	(0.006)	(0.062)	(0.159)	(0.142)	(0.180)	(0.254)
Observations	6,551	6,101	6,021	3,276	6,189	4,455	4,599	2,632	2,570	2,433	2,360	1,186	2,051	959	1,031	767
Adj. R-squared	0.570	0.397	0.440	0.442	0.437	0.549	0.527	-0.196	0.295	0.227	0.095	0.421	0.369	0.634	0.538	0.375

	High District % Non-White								**Low District % Non-White**							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	-0.004	-0.008	-0.004	-0.032	0.099	-0.031	-0.028		0.027	0.010	0.006		0.012	-0.044	0.222	
	(0.005)	(0.007)	(0.007)	(0.020)	(0.065)	(0.084)	(0.121)		(0.032)	(0.008)	(0.008)		(0.173)	(0.378)	(0.364)	
Location-related policy	0.002	-0.004	-0.013	0.015	0.018	0.058	0.048	0.307	-0.018	0.002	-0.007	0.025	-0.058	0.326	-0.236	0.503
	(0.008)	(0.005)	(0.013)	(0.031)	(0.035)	(0.038)	(0.052)	(0.501)	(0.013)	(0.007)	(0.006)	(0.044)	(0.159)	(0.381)	(0.338)	(0.475)
Observations	6,551	6,101	6,021	3,276	6,189	4,455	4,599	2,632	2,570	2,433	2,360	1,186	2,051	959	1,031	767
Adj. R-squared	0.569	0.397	0.439	0.441	0.437	0.549	0.527	-0.196	0.295	0.227	0.095	0.420	0.368	0.634	0.536	0.375

Note. Full model results available from authors by request. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.

Table 9. Heterogeneity checks by district type: Predicting White/Hispanic gaps in AP and dual enrollment access by teacher policy type

	Rural								Non-Rural							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	0.006	0.003	-0.004	-0.002	0.043	0.044	0.095	-0.126	-0.007	-0.006	-0.023	-0.011	-0.093	-0.015	-0.123	0.044
	(0.007)	(0.009)	(0.019)	(0.012)	(0.048)	(0.146)	(0.123)	(0.226)	(0.011)	(0.005)	(0.010)	(0.011)	(0.056)	(0.089)	(0.102)	(0.152)
Observations	2,680	2,311	2,207	1,578	2,090	1,113	1,130	1,175	8,630	8,106	7,888	4,412	7,869	5,711	5,742	3,344
Adj. R-squared	0.253	0.179	0.084	0.379	0.355	0.592	0.546	0.249	0.399	0.255	0.294	0.346	0.379	0.549	0.519	0.284

	Rural								Non-Rural							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	-0.001	-0.005	0.047***		0.074	-0.447	0.164		-0.009	0.001	0.003	0.037	0.040	-0.042	-0.163	
	(0.013)	(0.019)	(0.014)		(0.115)	(0.440)	(0.122)		(0.016)	(0.009)	(0.006)	(0.016)	(0.085)	(0.115)	(0.116)	
Location-related policy	0.003	0.003	-0.008	-0.003	0.001	0.101	0.060	-0.126	-0.005	-0.006	-0.021	-0.016	-0.087	-0.009	-0.096	-0.170
	(0.009)	(0.008)	(0.017)	(0.012)	(0.075)	(0.114)	(0.126)	(0.226)	(0.008)	(0.004)	(0.009)	(0.016)	(0.049)	(0.081)	(0.071)	(0.456)
Observations	2,680	2,311	2,207	1,578	2,090	1,113	1,130	1,175	8,630	8,106	7,888	4,412	7,869	5,711	5,742	3,344
Adj. R-squared	0.252	0.178	0.087	0.379	0.355	0.594	0.545	0.249	0.399	0.255	0.294	0.346	0.379	0.549	0.519	0.284

	Low District SES								High District SES							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	-0.002	-0.001	-0.012	-0.005	-0.030	0.116	0.016	-0.136	0.003	-0.006	-0.014	-0.026	-0.005	-0.195	-0.122	1.354***
	(0.011)	(0.006)	(0.011)	(0.007)	(0.059)	(0.064)	(0.099)	(0.210)	(0.011)	(0.007)	(0.007)	(0.045)	(0.074)	(0.187)	(0.132)	(0.363)
Observations	5,321	4,742	4,606	3,106	4,578	2,998	2,988	2,403	5,891	5,593	5,407	2,816	5,290	3,762	3,819	2,062
Adj. R-squared	0.405	0.205	0.248	0.374	0.417	0.609	0.565	0.332	0.347	0.241	0.274	0.334	0.354	0.574	0.521	0.218

	Low District SES								High District SES							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	0.010	0.010	0.020	-0.011	0.090	-0.069	0.057		-0.022	-0.011	0.000	0.000	0.061	-0.166	-0.155	
	(0.023)	(0.017)	(0.008)	(0.016)	(0.130)	(0.227)	(0.211)		(0.008)	(0.005)	(0.005)	(0.023)	(0.057)	(0.119)	(0.093)	
Location-related policy	-0.005	-0.002	-0.013	-0.005	-0.050	0.113	-0.015	-0.136	0.012	-0.001	-0.013	-0.038	-0.014	-0.068	-0.041	0.017
	(0.009)	(0.005)	(0.009)	(0.007)	(0.042)	(0.056)	(0.092)	(0.210)	(0.010)	(0.006)	(0.007)	(0.031)	(0.061)	(0.181)	(0.120)	(1.749)
Observations	5,321	4,742	4,606	3,106	4,578	2,998	2,988	2,403	5,891	5,593	5,407	2,816	5,290	3,762	3,819	2,062
Adj. R-squared	0.405	0.205	0.249	0.374	0.417	0.608	0.565	0.332	0.347	0.241	0.273	0.335	0.354	0.574	0.521	0.213

	High District % Non-White								Low District % Non-White							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Either type of policy	-0.004	-0.007	-0.018	-0.005	-0.044	0.100	-0.051	0.102	0.013	0.010	0.001	-0.020	0.115	-0.352	0.145	-0.255
	(0.005)	(0.003)	(0.010)	(0.011)	(0.054)	(0.132)	(0.143)	(0.175)	(0.015)	(0.010)	(0.014)	(0.010)	(0.125)	(0.258)	(0.214)	(0.226)
Observations	7,082	6,549	6,407	3,728	6,550	4,921	4,931	2,954	4,130	3,786	3,606	2,194	3,318	1,839	1,876	1,511
Adj. R-squared	0.464	0.336	0.365	0.396	0.417	0.533	0.491	0.349	0.215	0.120	0.122	0.289	0.314	0.565	0.500	0.029

	High District % Non-White								Low District % Non-White							
	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.	ARD: AP Enr.	ARD: AP Math Enr.	ARD: AP Science Enr.	ARD: Dual Enr.	Log(RRR): AP Enr.	Log(RRR): AP Math Enr.	Log(RRR): AP Science Enr.	Log(RRR): Dual Enr.
Content-related policy	-0.017	-0.007	-0.006	-0.014	-0.077	-0.197	-0.201		-0.004	-0.002	0.020	0.016	0.246***	0.124	0.040	
	(0.014)	(0.006)	(0.005)	(0.014)	(0.077)	(0.110)	(0.070)		(0.013)	(0.012)	(0.008)	(0.045)	(0.0541)	(0.252)	(0.191)	
Location-related policy	-0.002	-0.005	-0.016	-0.008	-0.029	0.121	-0.038	-0.005	0.014	0.007	-0.008	-0.029	-0.021	-0.397	0.044	-0.490
	(0.004)	(0.003)	(0.009)	(0.014)	(0.042)	(0.100)	(0.103)	(0.282)	(0.015)	(0.010)	(0.013)	(0.019)	(0.089)	(0.245)	(0.160)	(0.480)
Observations	7,082	6,549	6,407	3,728	6,550	4,921	4,931	2,954	4,130	3,786	3,606	2,194	3,318	1,839	1,876	1,511
Adj. R-squared	0.464	0.336	0.365	0.396	0.417	0.534	0.492	0.349	0.215	0.119	0.122	0.288	0.315	0.565	0.499	0.031

Note. Full model results available from authors by request. Heteroskedastic-robust standard errors, clustered at the state level, are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1 adjusted using the Benjamini and Hochberg (1995) correction for multiple hypothesis testing, assuming a false discovery rate of 0.05.