8-2020

Taking Advanced Placement Courses but Not the Exam

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Metro Atlanta Policy Lab for Education

Georgia Policy Labs

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August 2020

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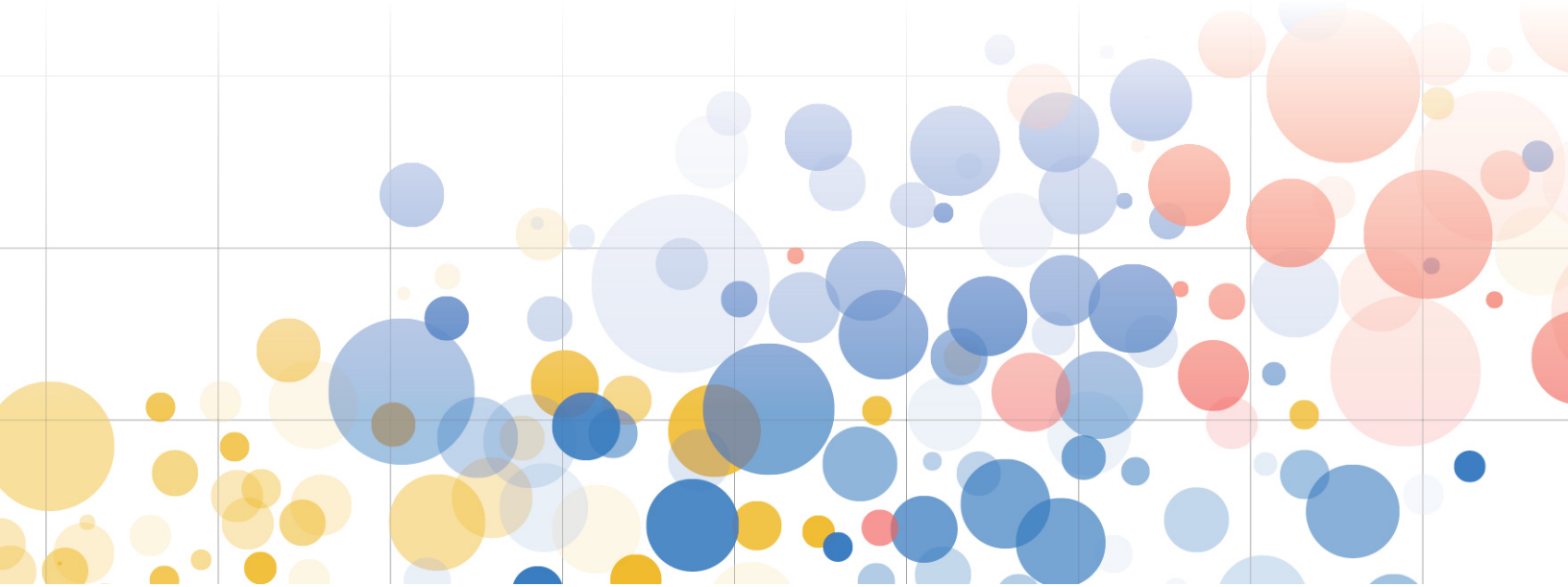


HIGHLIGHTS

- In four metro-Atlanta public school districts, 15 percent of students' AP course enrollments do not result in taking an AP exam. We estimate that up to 32 percent of these untaken AP exams may have earned college credit for the students.
- There are substantial disparities in AP exam-taking rates. AP course taking by White and Asian students does not result in taking an AP exam 13 and 10 percent of the time, respectively, while AP course taking by Black students does not result in taking an AP exam 23 percent of the time. The rate for Hispanic students is 18 percent.
- We find evidence that district AP exam subsidies increase exam-taking rates. In fact, students eligible for free or reduced-price lunch (FRL) who receive higher exam subsidies in two districts are 3 percentage points *more* likely to take the AP exam than students not eligible for FRL in those districts.
- We find little evidence that instructor gender influences the likelihood that female students taking an AP course will take an AP exam; this is true even in courses where female students are underrepresented.

MOTIVATION

Millions of U.S. high school students take advanced, college-level coursework that can lead to college credit. One such program is Advanced Placement (AP). Spanning over 30 AP subjects, the number of students taking AP courses while in high school has increased by 57 percent since 2009 to 1,245,527 or 38.9 percent of public high school graduates in the class of 2019.[1]

One benefit of AP courses is the possibility of receiving college credit. At the end of each AP course, students can take the corresponding AP exam. The exam is scored as an integer between one and five, and scoring high enough (typically earning a score of three or more) results in college credit at most U.S. colleges and universities.

Earning college credit while in high school is correlated to numerous positive collegiate outcomes, including performance in college and college graduation (Dougherty et al., 2006; Morgan & Klaric, 2007; An, 2013; Allen & Dadgar, 2012; Patterson & Ewing, 2013). A few causal studies show that college credit through AP exams also results in a higher probability of graduating from college in four years (Smith et al., 2017) and more females taking upper level STEM courses in college (Gurantz, 2019). At the same time, there is good reason for some students to not take the exam. For example, those not planning to attend college or unlikely to earn a high score receive little benefit from the exam.

Despite the decades-long (successful) push to increase high school students' enrollment in advanced courses like AP and states and school districts subsidizing AP exams for those with lower household incomes, there is little research as to whether and why some students choose not to take the final exam—potentially leaving college credit on the table. We have good reason to believe many students will not take AP exams, even if the exams have the potential to benefit

[1] See College Board website at reports.collegeboard.org/ap-program-results/class-2019-data.

them on the way into and through college. These reasons span from financial issues to informational issues, such as not knowing the potential benefits of college credit while in high school.[2]

RESEARCH QUESTIONS

1) What percentage of students' AP courses are not followed by an AP exam? Does this vary by students' demographics?
2) Are students who do not take the AP exams predicted to perform well on the exams?
3) What are some of the determinants of AP exam taking, and what are some possible policy levers to increase AP exam taking?

DATA AND METHODOLOGY

We use individual-level data on over 95,000 students who enrolled in almost 195,000 individual AP courses across four metro-Atlanta public school districts between school years (SY) 2014-15 and 2016-17.[3] We link AP exam-taking data to student course-level data such that we can determine who took an AP course and did or did not take the corresponding AP exam. We also observe students' AP course grades and basic demographics, including eligibility for free or reduced-price lunch (FRL), gender, and race/ethnicity.

To address the first research question, we look at AP exam-taking rates for various demographic subgroups of students. To answer the third research question, we then use multivariate regression models to isolate how academic and demographic factors relate to AP exam taking. While we focus on potential gender and racial/ethnic disparities, we also consider potential policy levers. Notably, we pay particular attention to FRL-eligible students because these students typically receive higher AP exam subsidies and a reduced fee from the College Board (with districts often paying the balance of fees for some or all exams). We also use data on teacher gender to assess whether there are any "role model" effects for female students in AP courses where female students and teachers are underrepresented. In all our analyses, we compare students in the same high school, same cohort, and same AP subject, so any statistical differences in AP exam-taking rates by student demographics are among students in similar settings.[4]

To predict whether students leave college credit on the table (research question 2), we use all AP exams and scores to estimate how academic and demographic variables, along with high school, cohort, and subject variables, correlate with AP exam scores.[5] Importantly, the analysis includes the AP course grade assigned by the instructor. We then use the resulting estimates to predict (out-of-sample) how students who did not take an AP exam would have performed.

RESULTS

WHO TAKES AP EXAMS?

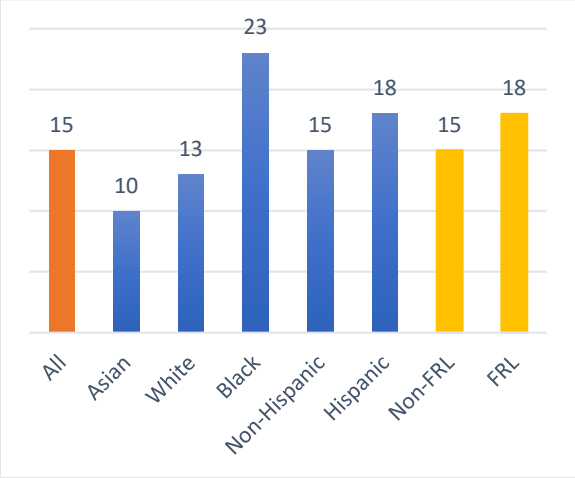
We find that, as a whole, 15 percent of students' AP course enrollments do not lead to an AP exam. The unit of observation is a student-

[2] See Page & Scott-Clayton (2016) for examples and a discussion on the financial, informational, and procedural barriers for high schoolers transitioning to college.
[3] We focus on terminal courses in the AP course sequence, which is typically the second semester of a two-semester course. However, we also consider alternative definitions of enrollment with no substantial changes to our sample size or results.
[4] Formally, we include high school, course subject, and cohort fixed effects.
[5] Formally, we use OLS, so predicted values can be outside the feasible AP score range.

course, so students who take multiple AP courses appear multiple times.

As shown in Figure 1, we also find differences in AP exam-taking rates by student demographics, including by race, ethnicity, and FRL-eligibility status. Twenty-three percent of Black students' AP course enrollments do not result in an AP exam—the highest rate among the subgroups analyzed. In comparison, 10 percent of Asian students' AP course enrollments do not result in an AP exam. Hispanic students and FRL-eligible students enrolled in AP courses take the corresponding AP exam 18 percent of the time, compared to 15 percent of the time for non-Hispanic and non-FRL-eligible students.

Figure 1. Percent of AP Courses Without a Corresponding AP Exam by Student Demographics

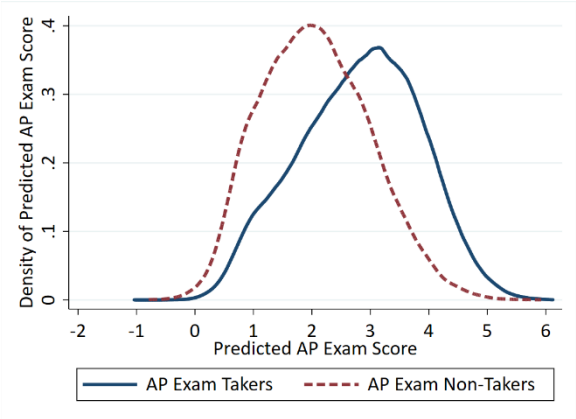


WOULD NON-TAKERS SCORE WELL ON AP EXAMS?

We predict that up to 32 percent of students' AP course enrollments that are not followed by an AP exam would receive a score of 3 or higher, which often (but not always) corresponds to college credit.[6] This amounts to almost 10,000 AP courses in which the student enrolled in the course but did not take the corresponding exam in the four public school districts over three years.

While many students are not capturing the college credit from getting a high score on the AP exams, some may be making an optimal decision not to take the AP exam. As shown in Figure 2, those students who do not take the AP exams are, on average, predicted to score worse than students who take the AP exams. Scoring below a 3 is not by itself indicative of a poor decision because the student may have had a chance at a high score or simply attained additional knowledge while studying for the exam.

Figure 2. Distribution of Predicted AP Exam Scores



WHAT ARE THE DETERMINANTS OF AP EXAM TAKING?

As shown in Figure 1, FRL-eligible students' AP course enrollments are less likely to result in an AP exam than students not eligible for FRL (18 and 15 percent, respectively). However, after

[6] We round 2.5 up because AP exam scores are only integers. Without rounding, 16 percent of students have a 3 or higher.

controlling for many academic and demographic characteristics and accounting for students' high schools, cohort, and AP course subject, AP course enrollments of students eligible for FRL are 2 percentage points *more* likely to result in an AP exam than exams taken by students not eligible for FRL. This result is driven by a 3-percentage point difference in the two districts that provide higher AP exam subsidies for FRL-eligible students. In the other two districts with higher AP exam subsidies (but not differentially so by FRL status), we see no difference in AP exam-taking rates by FRL status. In most educational settings, educational outcomes tend to be worse for FRL-eligible students (e.g., Papay, Murnane, & Willett, 2015), and we interpret this finding as strong evidence that AP exam subsidies lead to an increase in AP exam taking for FRL-eligible students.

We also show that the low AP exam-taking rates for Black students seen in Figure 1 do not fully disappear after adding the many controls mentioned above. Specifically, Black students' AP course enrollments are 4 percentage points less likely to result in an AP exam than White students' AP course enrollments. This is after controlling for the AP course grade and high school, which implies that two students with the same academic credentials in the same AP course and high school have substantially different outcomes.

Next, we find that, conditional on a host of control variables, female students' AP course enrollments are 1 percentage point less likely to result in an AP exam than for male students. In addition, there remain relatively few female students in certain AP subjects (e.g., Physics and Computer Science). We therefore estimate whether female students are more likely to take an AP exam when they are paired with a female teacher, especially in courses in which female students are heavily underrepresented. We find no such effects, which is a notable departure from previous research.[7, 8]

Finally, we find that students in grade 12 are almost 7 percentage points less likely to take AP exams than students in other grades, conditional on the many controls and that taking relatively more AP courses reduces the probability of taking all AP exams. These last results suggest that the timing and number of AP courses may play a role in students' decisions to take an AP exam.

POLICY RECOMMENDATIONS

We find that almost one out of every six students in an AP course does not take the corresponding AP exam, and up to one-third of those non-exam takers could perform well enough to earn college credit while in high school. Education administrators appear aware that students may choose not to take an AP exam and possibly leave credit on the table, which is one reason both the state of Georgia and the districts subsidize the cost of AP exams for students—particularly for FRL-eligible students who may need this extra assistance to help fund the exam. We provide evidence that the AP exam subsidies are working as intended for students eligible for FRL who, after controlling for other student characteristics, take AP exams at similar or higher rates than students not eligible for FRL.

[7] See, for example, Bettinger and Long (2005).

[8] A similar analysis could be run by race but would be better analyzed in a setting with random assignment or students and instructors. We do not have random assignment by gender, so there are potential (likely upward) biases in our estimates, but the schools are roughly balanced on gender, not race.

Why are some students still not taking the AP exams, and why are there still racial disparities? Notably, Black students are the least likely racial group to take AP exams, even when they have the same academic qualifications. We cannot fully answer these questions, but our results provide some other meaningful insights.

First, targeted AP exam subsidies (or other incentives) may work well to level the playing field and induce students to take exams. Most AP subsidies are blanket policies to all students or targeted to students experiencing low incomes or FRL-eligible students. With limited resources, public school districts could target resources to students likely to perform well (and perhaps predicted not to take the exam). These decisions could be based on grade level, course subjects, or number of AP courses taken by a student.

Second, we find no evidence that female instructors serve as "role models" that increase the probability that female students take an AP exam. AP exam taking may be less susceptible to instructor influence compared to commonly considered outcomes like test scores.

Overall, our results demonstrate that not all AP course enrollees take AP exams and some are likely leaving college credit on the table. Relative to offering and filling AP courses, getting students to go the last mile and take the AP exam is potentially a lower-cost policy lever for schools and districts to improve long term college outcomes and exam affordability.

More details about the methodology of this study and additional findings are contained in an academic working paper at gpl.gsu.edu. Jonathan Smith (jsmith500@gsu.edu) is the corresponding author for this brief.

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ACKNOWLEDGMENTS AND AUTHORSHIP

We would like to thank the four metro-Atlanta school districts that provided data for this study. Jonathan Smith was formerly an employee and is currently an affiliate of the College Board.

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Ishtiaque Fazlul received his Ph.D. in economics at Georgia State University and served as a Graduate Research Assistant at the Georgia Policy Labs. He is now a postdoctoral fellow in the department of economics at the University of Missouri. He is an applied microeconomist working on topics related to health and education, with focuses on the intergenerational health effects of education, effects of universal pre-K, and the effects of the Affordable Care Act. Prior to the Ph.D. program, he worked for Innovations for Poverty Action (IPA) as a research associate on several academic research projects.

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Jonathan Smith is an assistant professor of economics at Georgia State University and a faculty fellow with the Georgia Policy Labs. His research focuses on the behavioral and institutional factors that determine how students transition from high school to college and the consequences of those decisions. His research is published in leading economics, policy, and education journals including the *Journal of Labor Economics*, *Journal of Human Resources*, and the *Journal of Policy Analysis and Management* and has been featured in numerous media outlets, including *The New York Times*. Prior to joining Georgia State University, he worked as a policy research scientist at the College Board. He received his Ph.D. in economics from Boston University and a B.A. in economics from Tufts University.

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The Georgia Policy Labs (GPL) is a collaboration between Georgia State University and a variety of government agencies to promote evidence-based policy development and implementation. Housed in the Andrew Young School of Policy Studies, GPL works to create an environment where policymakers have the information and tools available to improve the effectiveness of existing government policies and programs, try out new ideas for addressing pressing issues, and decide what new initiatives to scale. The goal is to help government entities more effectively use scarce resources and make a positive difference in people's lives. GPL has three components: The Metro Atlanta Policy Lab for Education works to improve K-12 educational outcomes; the Career & Technical Education Policy Exchange focuses on high-school-based career and technical education in multiple U.S. states; and the Child & Family Policy Lab examines how Georgia's state agencies support the whole child and the whole family. In addition to conducting evidence-based policy research, GPL serves as a teaching and learning resource for state officials and policymakers, students, and other constituents. See more at gpl.gsu.edu.