Advanced Placement (AP) Access and College Enrollment: Postsecondary Effects of AP State Policies *

Ian Callen
University of Virginia

Christiana Stoddard
Montana State University

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Postsecondary education is a key driver of economic mobility, yet persistent gaps in academic preparation and financial barriers limit college access and completion. Using two-way fixed effects and event study designs, we examine the effects of state policies mandating AP course offerings or waiving exam AP exam fees on college interest and enrollment. These policies lead to increases in the fraction of students sending AP scores to universities and increases in applications to in-state public institutions, our measures of college interest. In contrast, overall college acceptances and enrollment rates remain largely unchanged. Moreover, we find no evidence that these policies shift enrollment patterns between two- and four-year institutions or in- and out-of-state colleges. Our findings suggest that while expanding AP access may influence students' application behaviors, it does not necessarily translate into increased college attendance.

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1 — Introduction

In spite of evidence of strong returns to postsecondary education, college enrollment and completion rates have remained stagnant in recent years (De Brey et al. 2021). Academic under-preparation has been identified as one important contributor to low college attendance and completion rates, as well as to longer degree times and the resulting higher costs (Page and Scott-Clayton 2016).

Advanced Placement (AP) courses, rigorous college preparation courses for high school students, are one potential way to address academic preparation concerns and reduce the costs of college. Because AP courses are designed to mimic first-year college courses, they can serve as a "low-stakes" introduction to college-level material. The accompanying exams are optional but students can earn college credit if their exam score exceeds the university-determined threshold (often a score of 3 or higher).[1] The financial benefits of receiving college credit are significant: Smith, Hurwitz, and Avery (2017) estimate that the potential savings associated with passing an AP exam result in around a 10% reduction in the average cost for a year of college tuition.

However, access to AP exams is not universal. Prior work suggests that AP courses are more likely to be offered in schools that are in low-poverty and urban areas (Gagnon and Mattingly 2016; Iatarola, Conger, and Long 2011), while schools in rural areas, or with many low income, Black, or Hispanic students historically have been less likely to offer AP courses (Klopfenstein 2004). At $99 per exam in 2025, exam fees can also be prohibitive. To improve access to courses, several states have implemented policies to mandate the provision of AP courses in high schools while other states have adopted universal AP exam fee waivers.

In this paper, we examine the effect of these two state policies on student aspirations for and subsequent enrollment in postsecondary education. In a prior study (Callen and Stoddard 2024), we found that these two policies increased the number of high school graduates taking AP exams over the course of their high school career. Our prior work, however, did not explore whether increased access led to changes in postsecondary outcomes.

Increased access to AP courses may increase college enrollment by improving academic preparation and information about aptitudes for college level material. In addition, the grades

1. As Chatterji, Campbell, and Quirk (2021) note, "passing" advanced coursework examinations (in our context, an AP exam) make students *eligible* to earn college credit. Whether a student actually *earns* academic credit depends on the institution they attend.

of the AP courses are more heavily weighted in the high school GPA (Gollub et al. 2002; Geiser and Santelices 2004; Kolluri 2018) potentially improving admissions, scholarships, and merit-aid for AP students. However, if increased access to AP courses and exams disproportionately benefits students that would have enrolled in a postsecondary institution regardless of the policies, there may be no impact. Furthermore, if students benefit from AP courses and exams largely through improved success in college admissions or scholarships but colleges and universities do not increase admission slots or the number of scholarships, then broader access to AP courses and exams may simply change the requirements for these limited slots, rather than leading to increases in enrollment.[2]

We examine the relationship between AP course mandates and exam fee waivers on the overall college enrollment of first time freshmen students from adopting states using two-way fixed effect (TWFE) and event study frameworks. The analysis also examines whether there are shifts in the types of institutions that students attend. To separate student interest from college and university responses, we examine the number of score-sends, college applications, and admissions at public institutions located in states with the AP policies.

Given our earlier findings that fee waivers and AP course mandates increase exam taking, it is not surprising that we also find increases in the number of students who choose to send their AP exam scores to an in-state institution. We further find increases in applications to in-state public institutions after fee waiver policies pass. However, the event study analysis suggests that college enrollment rates remain largely unchanged as a result of these policies. We also find no evidence to suggest that these policies shift college enrollment patterns between two- and four-year institutions or between in- and out-of-state institutions, or that college acceptances increase.

2. While the policy language from many states suggest their goal was to provide opportunities for students that otherwise would not have access to AP courses and exams, additional courses and exams for students is not necessarily a bad thing. Although not the intended goal of the policy, passing exams has been shown to have significant curricular and financial impacts for students ((Avery et al. 2018; Gurantz 2021; Smith, Hurwitz, and Avery 2017).

2 — Background and Prior Findings

The Advanced Placement (AP) program is the most widespread college credit-bearing program in the United States.[3] While college attendance rates in the United States have remained close to 60% since the early 2000s, Figure 1 shows that AP exam taking has grown significantly. Nearly 4 in 10 student high school graduates in the United States took at least one AP over the course of their high school career – more than double the rate observed in 2000.[4]

Although much of the existing research on the AP program is observational in nature (Chatterji, Campbell, and Quirk 2021), recent research using regression discontinuity designs show positive impacts of AP credit on college outcomes. Students with marginally passing AP exams scores are more likely to complete four-year bachelor degrees, to major in a the exam subject area, and to take more advanced coursework throughout college that students with exams scores just below the passing score threshold (Avery et al. 2018; Gurantz 2021; Smith, Hurwitz, and Avery 2017). Jackson (2010) and Jackson (2014) study the Advanced Placement Incentive Program (APIP) in Texas, which provided monetary incentives for underprivileged students in Texas to enroll in AP courses and pass AP exams. The program also significantly reduced (but did not eliminate) the cost of exams for all students. They find that APIP increased students' college going and persistence as well as labor market earnings.[5]

However, other literature finds more mixed impacts of expanding access to AP courses. Conger et al. (2021) study AP science course expansions in 23 schools across the United States. They find suggestive evidence that taking an AP science course increases students' science skill and interest in pursuing a STEM major in college but also find that the new AP course-takers have lower confidence in their abilities for college science material, higher levels of stress, and lower grades. In a follow-up study, Conger, Long, and McGhee (2023) find no significant effect of expanded AP science courses on students' plans to enroll in college. Rather, they find that course-takers enroll

3. A discussion of rigorous college preparation courses more generally can be found in Conger and Hemelt (2025).

4. The measures used in this figure do not use the same denominators. The immediate college-going rate (scaled and reported as a percentage) includes all public and private high school graduates, while AP participation is only for public high school graduates. If private school students are more likely to take AP courses (relative to their public school counterparts), the percent of graduates (public and private) taking at least one AP exam would be understated.

5. Note that targeted schools in this expansion were provided with substantial supports and resources that go beyond typical expansions offered in the literature.

in *less* selective institutions than their control group counterparts. Similarly, Owen (2025) uses administrative data from Michigan and finds little evidence that expanding AP course offerings is related to improved college outcomes for any students except for most academically prepared students.

In this paper, we examine the impact of state-provided access to AP courses and exams on students' college interest and attendance. While this is, to our knowledge, the first paper to study these AP specific policies on college outcomes, a related literature has examined state policies for college entrance exams (Hurwitz et al. 2015; Hurwitz et al. 2017; Hyman 2017; Pallais 2015; Swiderski 2024). For instance, Dettling, Goodman, and Smith (2018) and Hyman (2017) find that states that waive exam fees for SAT or ACT college entrance exams have increases in the numbers of low income students with college ready scores and experience a rise in overall college enrollment.[6]

3 — Data

3.1. State policies

The AP course offering mandates and universal exam fee waivers are constructed from state legislative documents and achieved local news reports, using the Education Commission of the States (ECS) report on AP policies in 2016 as our starting point (Zinth 2016). The policies are matched to the cohort year in which the policy first takes effect. The coding of the state policies can be found in Table 1, with more details found in Appendix Tables 1 and 2 in Callen and Stoddard (2024).

3.2. Outcome variables

This study examines several outcomes that may be affected by the state AP policies. The primary outcome of interest is the immediate college-going rate, which is the percent of high school graduates who enroll in a post-secondary institution within twelve months of receiving their high school diploma. This is calculated from college enrollment, reported in the Integrated

6. Dettling, Goodman, and Smith (2018) notes that the increase in enrollment could come from eliminating the fee, but it also could reflect greater convenience from taking tests during normal school hours or a reduction in the logistics of applying to college.

Postsecondary Education Data System (IPEDS) interrelated surveys from 1992 through 2019 (with institutions required to report in even years), divided by the number of high school graduates (reported in the Western Interstate Commission for Higher Education (WICHE) *Knocking at the College Door* reports). IPEDS contains data for all postsecondary institutions that participate in or are applicants for participation in any federal student financial aid program (such as Pell grants and federal student loans), which comprises nearly all public and non-profit private postsecondary institutions in the United States (Ginder, Kelly-Reid, and Mann 2018). We restrict the sample to undergraduate degree-granting institutions and classify institutions as "two-year" or "four-year".[7] Universities are also classified by their level of control (e.g., public or privately funded) and by their selectivity (ranked on the *Barron's* selectivity scale). We aggregate institution-level measures to the state, the unit of analysis.

While the immediate college-going rate is our primary outcome, we examine a second set of variable related to student interest in college and institutional responses. As noted above, previous studies have identified cases where AP policies encouraged student interest in college and other cases where students were discouraged. One measure of student interest is the number of 12th grade students who send their AP exam scores to a post-secondary institution. Score sends come from annual College Board reports from 2001 through 2019. The reports provide the number of students in each state that sent at least one AP exam score to an institution within their state of residency (in-state) as well as the number who sent scores out of state. At the time of AP exam registration, students can designate one university to receive their scores at no cost, similar to standardized admission tests like the SAT and ACT. Despite the free score send, only 48% of grade 12 exam takers send scores to an in-state institution and about 24% send scores to an out-of-state institution.[8]

As a second measure of college interest, we examine the number of applications at public institutions, also reported in the IPEDS data. IPEDS reports do not indicate whether applications come from in- or out-of-state students. As private institutions often draw on larger geographic

7. An institution is classified as a two-year institution if its highest degree and/or primary degree is an associate degree. An institution is classified as a four-year institution if the primary degree offered is a bachelor's degree (or higher).

8. Combining the number of students who send scores to a in-state and out-of-state institution may not represent the number of unique student sending scores.

areas, we focus on applications to public four-year institutions as those most likely most related to policy changes in their state. The analysis examines whether these applications in a state increase following the passage of the AP policies in that same state.

Our final outcome is the number of admissions at public four-year institutions in states with and without the AP policies, again reported by IPEDS. Looking at applications and admissions separately sheds light on how enrollment patterns may relate to both student and institutional behaviors. While two-year institutions are more likely to accept all applicants, four-year institutions typically have some acceptance standards. The data do not permit us to disentangle acceptances for in or out of state students, but the overall acceptance rates are still relevant for parsing out student and institutional responses.

3.3. Time-varying control variables

To account for changes in economic conditions, shifts in the demographic composition of a state, and other educational reforms enacted over this period, the analysis includes a suite of time-varying state control variables, including the log population aged 15-24 (including the proportion by race and ethnic subgroup), the under-seventeen poverty rate, the unemployment rate, median household income, the level of urbanization, whether a state offers free two-year degree programs, whether a state has universal SAT/ACT testing, and the number of public high schools, and the percent of schools that are public.[9] Regression analyses are performed on balanced panels that contain all states. In some regressions due to data limitations, Washington, DC or Alaska are excluded, as noted in the tables.

Table 2 report the average characteristics of states that never passed these policies in the first column and states that ever passed a specified policy in the second column at various points in time. Mean characteristics are broadly similar across adopting and non-adopting states, including the population levels, the number of high schools (and therefore the average high school size), unemployment rates, and the log public high school enrollment, implying that policy adoption is not highly correlated with these characteristics.

9. Policy indicators for free two-year degree programs and universal SAT/ACT testing come from Schanzenbach, Turner, and Turner (2024) and Swiderski (2024), respectively.

4 — Empirical Approach

The empirical approach uses the staggered policy implementation to compare adopting states (the "treatment" states) to the states that never adopt such policies or that adopt at a later date (the "control states"). We make comparisons using both event study and difference-in-difference methods. The basic event-study regression is

$$Y_{st} = \sum_{\substack{\tau=-4 \\ \tau\neq 0}}^{4} \alpha_\tau \text{ AP Mandate}_{s\tau} + \sum_{\substack{\tau=-4 \\ \tau\neq 0}}^{4} \beta_\tau \text{ AP Fee Waiver}_{s\tau} + \pi \mathbf{X}_{st} + \theta_t + \lambda_s + \nu_s t + \epsilon_{st} \quad (1)$$

where Y_{st} is one of the set of outcome variables in state *s* in year *t*. The variables, $AP\ Mandate_{st}$ and $AP\ Fee\ waiver_{st}$, are indicators for whether a state has an AP course mandate or AP fee waiver policy in operation in τ years from time *t*.[10] $\mathbf{X}_{st}$ is a vector of time-varying state-level characteristics. This specification includes state fixed effects (λ_s) – capturing permanent differences between states such as overall attitudes towards college – and year fixed effects (θ_t) which capture any time-varying shocks common to all states. State-specific linear time trends ($\nu_s t$) also account for differential state trends in the outcome that may have occurred even in the absence of treatment. We cluster our robust standard errors at the state level, the level at which policy is implemented (Abadie et al. 2022; Bertrand, Duflo, and Mullainathan 2004). Where the outcome variables are measured as percentages, average marginal effects are estimated using a fractional Probit model, while outcome variables measured as counts are estimated using a Poisson regression, as suggested by Wooldridge (2023).[11]

The corresponding difference-in-differences estimating equation is

$$Y_{st} = \psi + \alpha \text{ AP Mandate}_{st} + \beta \text{ AP Fee Waiver}_{st} + \pi \mathbf{X}_{st} + \theta_t + \lambda_s + \nu_s t + \epsilon_{st} \quad (2)$$

where all variables are defined as in Equation (1).

10. In years where data is only available in even years, we collapse τ to include two years. This is because some policy changes that occur in even years will never have an observation in the year preceding the policy, while policy changes that occur in odd years will. In some cases, this changes the range of years included in the event study estimates as well as the selection of the omitted year.

11. When reporting marginal effect estimates, standard errors are calculated using the delta method.

These designs identify causal effects under the assumption that, in the absence of the policy change, outcomes in "treated" and "control" states would have evolved similarly. This assumption, often referred to as the parallel trends assumption, cannot be directly tested as the potential outcomes for treated states in the absence of treatment are never observed. However, trends can be observed in the years leading up to the policy change. To the extent that the event studies reveals differences in these "pre-trends," it is less likely that parallel trends would have been observed in the absence of policy adoption.

The recent literature shows that variation in treatment timing can bias estimates of the treatment effect if the counterfactual group relies on the comparison between early treated states and late treated states and treatment effects are heterogeneous (Callaway and Sant'Anna 2021; De Chaisemartin and d'Haultfoeuille 2020; Goodman-Bacon 2021). To account for this, we also include results from the event study specifications proposed by Callaway and Sant'Anna (2021), where the control group is restricted to states that never pass an AP program policy or are not yet treated. The Callaway and Sant'Anna (2021) event study approach also explicitly accounts for heterogeneity in the effects of the policy across states as well as the heterogeneity across time. Given the small number of treatment states and changes within states in policy features over time, we do not attempt to also explicitly model specific program features. For that reason, we use the Callaway and Sant'Anna (2021) estimates for specific states to check the plausibility of the results.

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5 — Results

5.1. Immediate college-going

Figure 2 plots event-study estimates of the impact of AP course mandates (panel A) and AP exam fee waivers (panel B) on the immediate college going rate (squares). The figure also plots event-study estimates for immediate college going in two-year institutions (triangles) and four-year institutions (circles) to see if the policies shifted the level of institutions chosen by first time freshmen immediately after high school. Overall, the estimates show few significant changes in response to either policy, both overall and by institution level. Point estimates for the course mandates are generally negative, with significant declines in two-year enrollment two and four

years after the course mandate policy passes. There is some evidence that fee waivers raise four year college going rates two years after implementation, but the effect at four years out is less precisely estimated. The event study results also show that coefficients in the leading years are generally not statistically significant.

The comparable difference-in-differences estimates are reported in Panel A of Table 3, again with separate estimates overall and by institutional level (two-year vs. four-year). Columns (1) through (3) report results where the outcome variable is the college-going rate. As in the event-study analysis, there is a small negative effect of AP course mandate policies on two-year college-going rates, but otherwise there is no relationship. Given that the college-going rate is a ratio where the denominator variable is also subject to change, we report results using the numerator as the outcome (estimated using a Poisson regression specification) in columns (4) through (6).[12] Although we find small decreases in the two-year college-going rate, the decrease in the number of students enrolling in two-year institutions is not statistically different from zero.

Figure 3 displays estimates from the methodology proposed by Callaway and Sant'Anna (2021) for individual treated states. [13] These state-specific estimates are in line with estimates found in the aggregate, showing no evidence that these policies impact the overall immediate college-going rate and no relationship between policy strength and the individual state estimates.

Do students with improved AP access attend different types of universities, due to better information or improved success in admissions or in receiving financial aid? Figure 4 focuses on four year college-going rates, disaggregated by public (triangle) and private (circle) four-year institutions. The corresponding TWFE results are in Panels B and C of Table 3. Neither approach indicates any effect of course mandates at either type of institutions. Fee waivers, however, have a modest positive effect on college-going at private four year colleges of about 1 percent. In the Appendix Table A1 and Appendix Figure A2, we report results for enrollment in more or less selective institutions, but these show minimal effects of either policy.

12. A linear specification yields similar results and is available upon request.
13. The overall event study figures are in Appendix Figure A1.

5.2. Score sends, applications, and admissions

The results thus far suggest that AP course mandates are not associated with increased immediate college going rates. Exam fee waivers similarly show minimal effects, with the possible exception of a modest increase in attendance at private four-year institutions.

However, these generally null effects on college going may mask other student or institutional behavioral responses, which we next explore using college score sends,applications and acceptances. First, null effects on college going would be expected if the policy induced exam takers would have enrolled in college regardless. In this case, more students might send exam scores to schools (given previous findings that these policies increase exam taking), but the number of college applications (and subsequent enrollment) would not increase. Second, it could be that the composition of students enrolling might change. Some students might be encouraged to enroll due to improved information or skills but others might be discouraged by the difficult coursework. In this case, neither the number of students sending exam scores nor the number applying to college might change. Finally, there may be limitations on the "supply" side. The AP policies might induce more students to apply to college, but colleges may not increase admission or scholarship slots. The greater prevalence of AP exams taking would instead lead to increased standards for these opportunities. Additionally, our previous work showed that many, though not all, of the policy induced AP exams received low scores, and this may be a negative signal to colleges.

To parse out these explanations, we first examine AP score sends. As noted, on average, only about 48% of exam takers students send their scores to an in-state institution and 24% send scores out-of state. More score sends could indicate more college interest. The TWFE results in Table 4 show that the course mandate policies do not increase score sends. However, exam fee waivers do increase the percentage of 12th graders who send an AP score to both in-and out-of state institutions. The increase at in-state institutions is about 1 percent, with a smaller increase for out-of-state institutions. The increase in score sends may not be surprising given prior evidence that AP program policies also increase AP exam participation by about 1 percent (Callen and Stoddard 2024). Table 4 shows no change in the rate of score sending among exam takers in response to the score sends: the increase sends is driven by more exam taking. The event study estimates presented in Figure 5 show similar estimated effects for score send patterns to that found

in Table 4.

The second indicator of college interest is the number of applications to four-year institutions. We caveat these results by noting that the IPEDS data on applications do not report the state of residence for applicants or whether applications are for first time freshman. Because student bodies at private universities tend to come from larger geographic regions, we restrict the focus to applications at public schools. Table 5 shows AP exam fee waivers are associated with 8 more applications per 100 high school graduates at a public 4 year university while course mandates do not appear to impact applications. The IPEDS data also report the number of university admissions at these same public four year institutions. Column 2 of Table 5 reports these results, which do not show any significant increases in admissions following either AP policy. The event studies for applicants and admissions are reported in Figure 6. These are broadly consistent, with positive and significant increases in applications following fee waivers, but no significant increase in admissions.

6 — Discussion

A number of states have made efforts to increase access to the AP program by mandating course offerings or waiving AP exam fees. We find that these policies are not associated with increases college enrollment, neither overall or separately at two- and four-year institutions, with the only exception being a modest increase at private institutions following exam fee waivers.

We attempt to gauge whether these statewide policies affect student interest in college by examining patterns in score sends to colleges and applications at public four year institutions. Following these policies, more students send exam scores to in-state universities, consistent with the increase in exam taking noted in previous research (Callen and Stoddard 2024). We also find that fee waivers are associated with more applications at public four year schools. However, the statewide policies do not lead to changes in the number of student admitted at public four-year institutions. The lack of impact from the AP policies on college enrollment may therefore be related to limitations on admission slots and the statewide AP programs may simply make these slots (or scholarships) more competitive. Our findings compliment recent evidence from Conger, Long, and McGhee (2023) and Owen (2025) that show expanding access to the AP program does

not result in increased college-going. The findings from this study suggest that a focus on AP access alone as a lever to improve college enrollment may have limited impact. In short, access to AP courses and exams may serve a necessary but not sufficient condition in addressing concerns surrounding postsecondary enrollment.

It's worth noting that our findings do not rule out the possibility that AP participation generates benefits beyond initial college enrollment. For example, students who earn college credit through AP exams may be able to graduate more quickly, reduce overall tuition costs, or gain access to more advanced coursework earlier in their college careers. Indeed, prior work has documented such curricular and financial advantages associated with passing AP exams (Avery et al. 2018; Gurantz 2021; Smith, Hurwitz, and Avery 2017). These downstream benefits are not captured in our study and future research could explore whether expanded AP access improves longer-term outcomes such as credit accumulation, major choice, persistence, or time to degree. Likewise, future work should seek to understand *which* students benefit from these policies and *why*, especially given related work from Arkansas that suggests compliance with course mandates appears to decrease the share of career and technical education courses in a near one to one ratio (Arce-Trigatti 2018).

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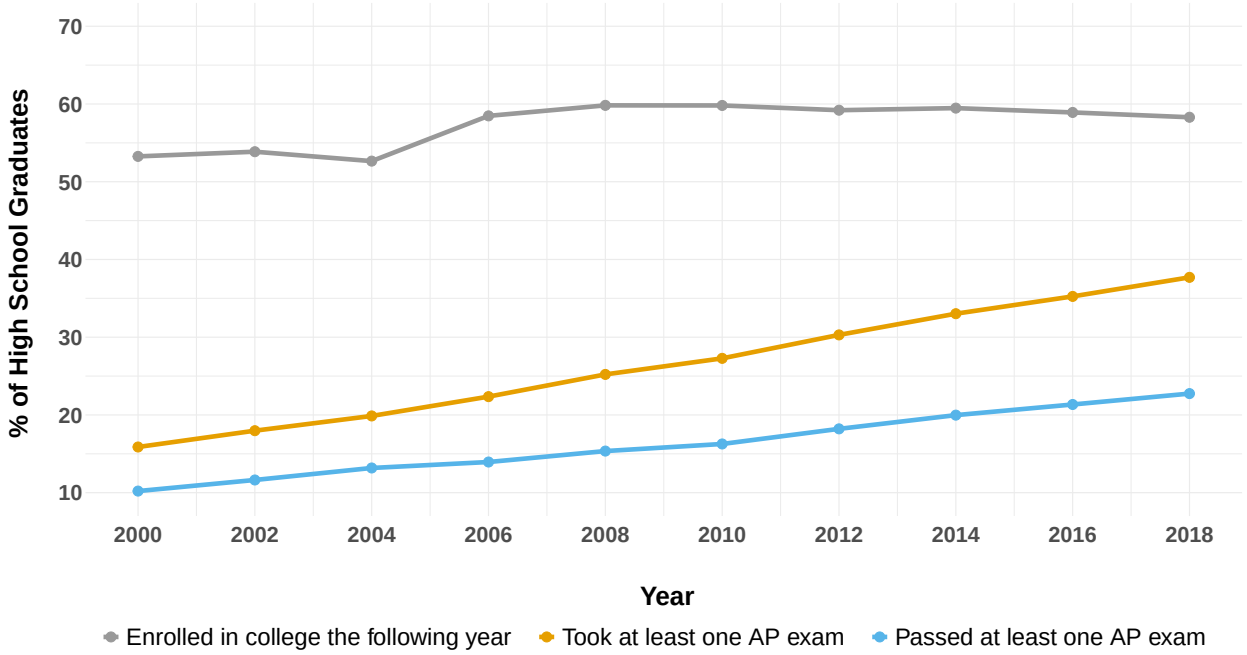
Figures and Tables

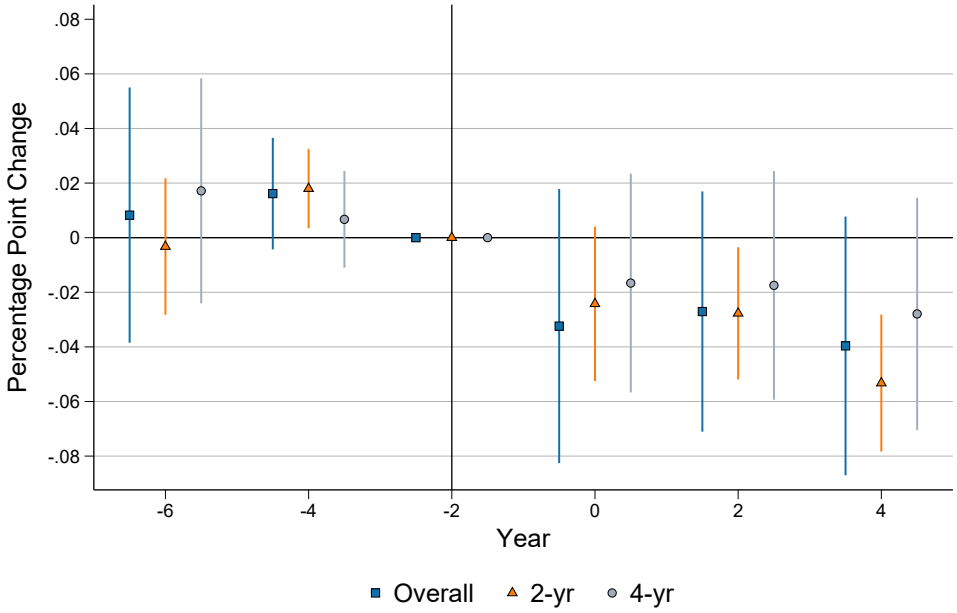
Figure 1—Percent of graduates enrolling college, taking AP exams, and/or passing AP exams



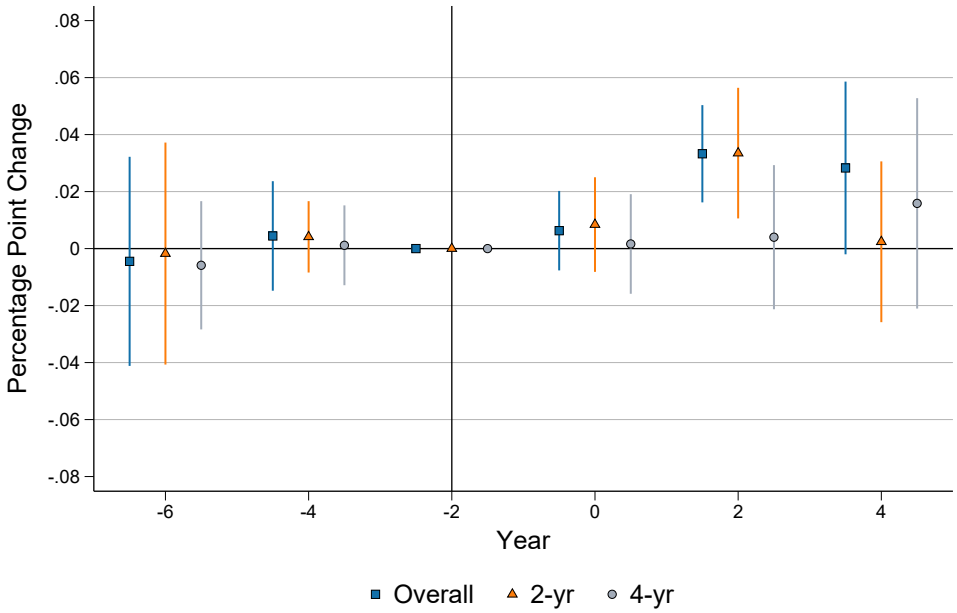
Note - The above figure displays the percent of graduates by each respective outcome: enrolling in a postsecondary institution within 12 months of graduating; taking at least one AP exam over the course of their high school career; passing at least one AP exam over the course of their high school career. For AP exam outcomes, values represent the percent of public high school graduates while college enrollment includes public and private high school graduates.

Figure 2 — Event Study Estimates for the Immediate College-Going Rate

(a) Immediate College Going Rate – Mandate Effects



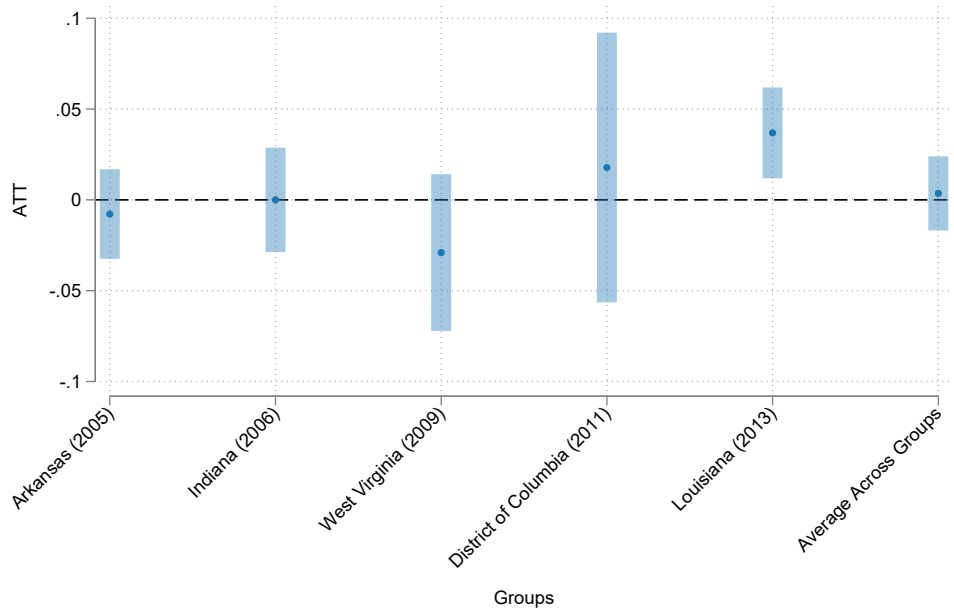
(b) Immediate College Going Rate – Funding Effects



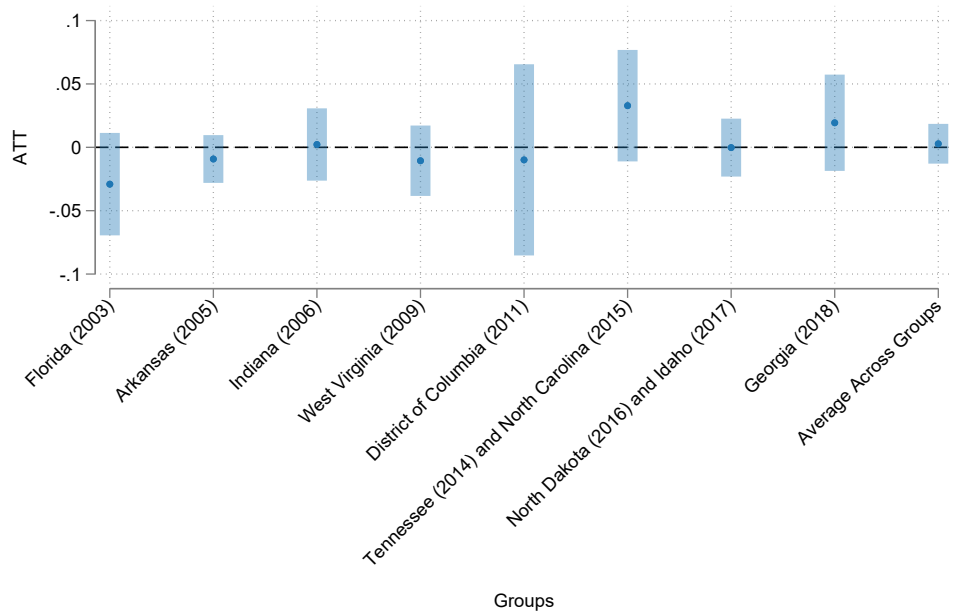
Note - Each figure presents average marginal effect estimates of either the α_τ or β_τ coefficients in Equation (2). Due to data limitations, time variables are binned and represent two years combined. For instance, $t = -2$ (the omitted group) represents observations a year and two years prior to the policy being enacted. All regressions include state and year fixed effects, state-level control variables, and state-specific linear time trends. Model is estimated using a fractional Probit specification. All standard errors are clustered at the state level.

Figure 3 — Callaway and Sant'Anna (2021) Group Estimates for the Immediate College-Going Rate

(a) Immediate College Going Rate – Mandate Effects



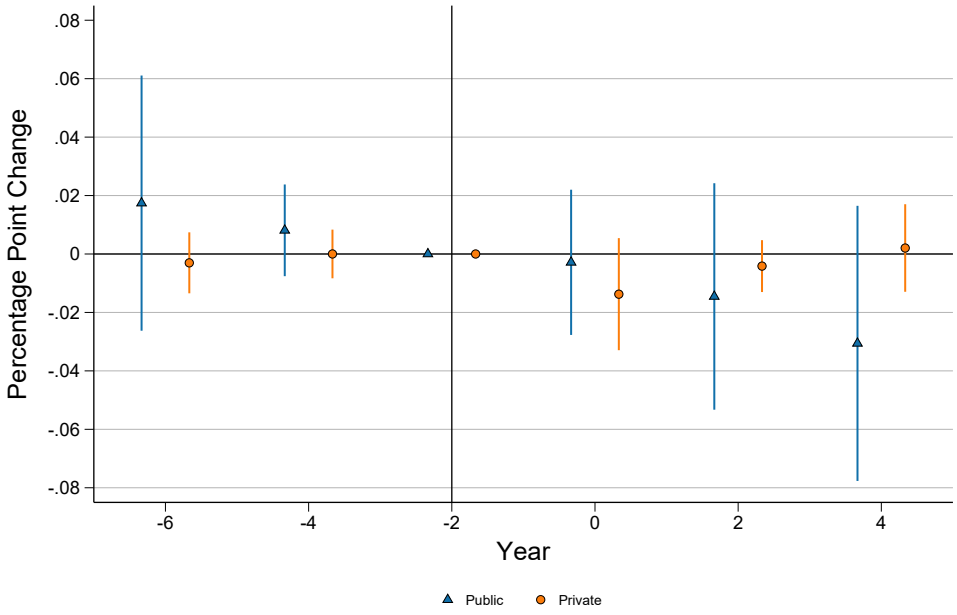
(b) Immediate College Going Rate – Funding Effects



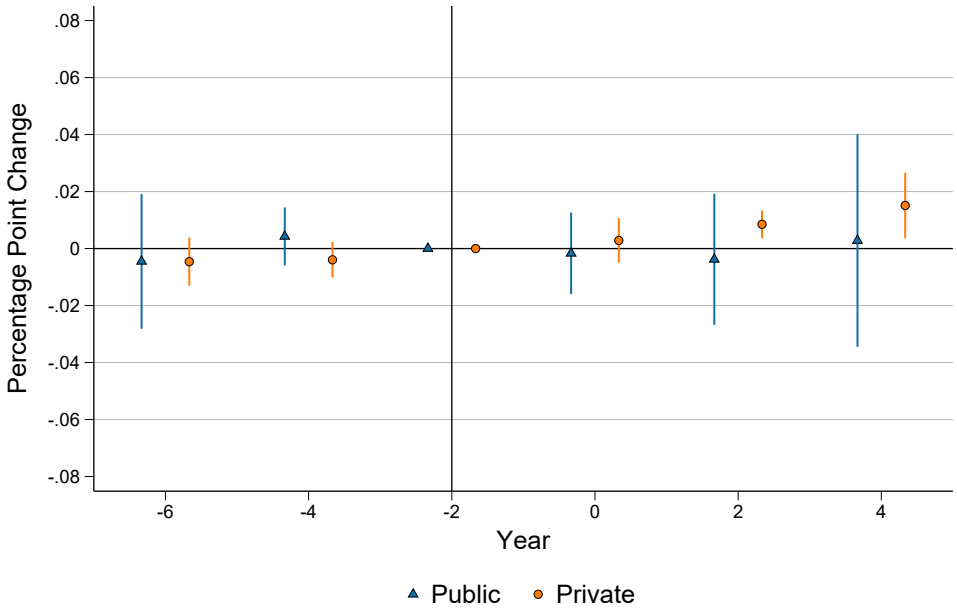
Note - Each figure presents average marginal effect estimates of either the α_τ or β_τ coefficients in Equation (2). Due to data limitations, time variables are binned and represent two years combined. For instance, $t = -2$ (the omitted group) represents observations a year and two years prior to the policy being enacted. All regressions include state and year fixed effects, state-level control variables, and state-specific linear time trends. Model is estimated using methodology proposed by Callaway and Sant'Anna (2021). All standard errors are clustered at the state level.

Figure 4 — Event Study Estimates for the 4-year Immediate College-Going Rate (by Institutional Control)

(a) 4-yr Immediate College Going Rate – Mandate Effects



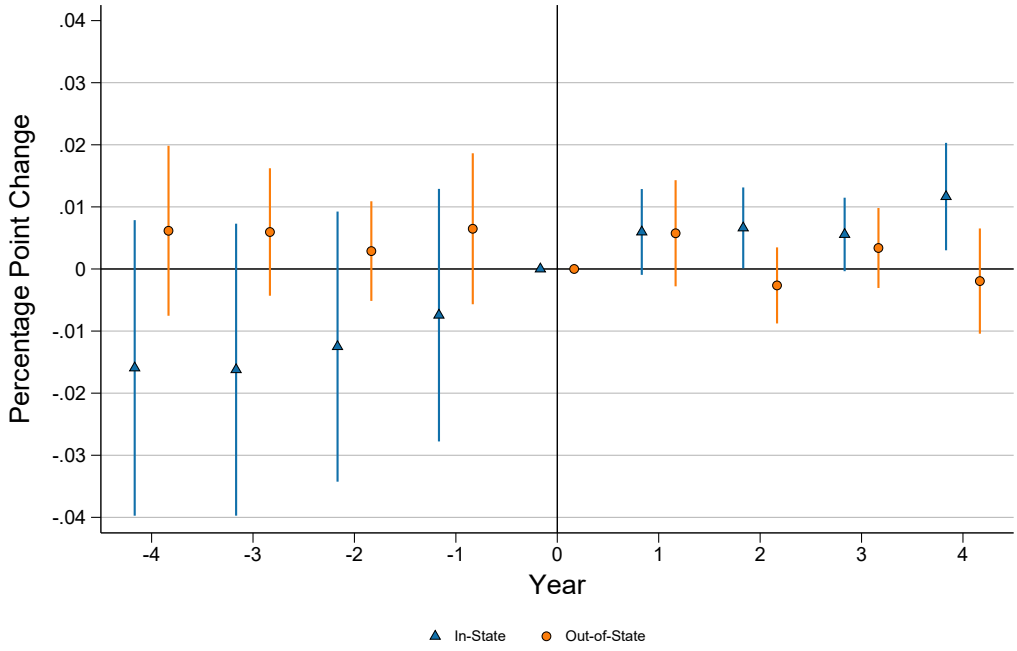
(b) 4-yr Immediate College Going Rate – Funding Effects



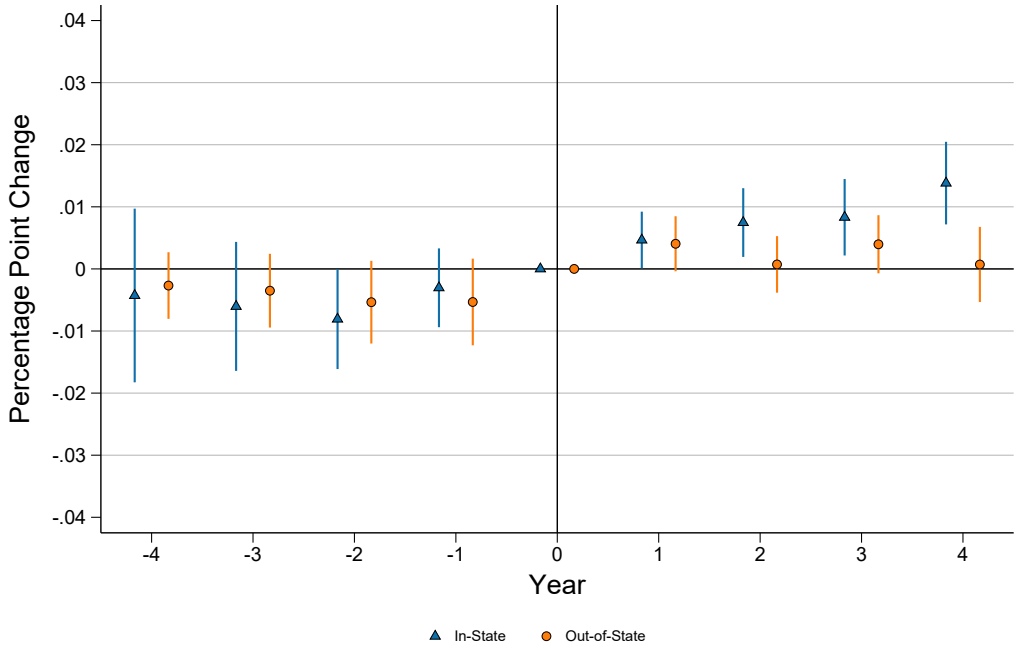
Note - Each figure presents estimates of either the α_τ or β_τ coefficients in Equation (2). Due to data limitations, time variables are binned and represent two years combined. For instance, $t = -2$ (the omitted group) represents observations a year and two years prior to the policy being enacted. All regressions include state and year fixed effects as well as state-level control variables and state-specific linear time trends. Model is estimated using a fractional Probit specification. All standard errors are clustered at the state level.

Figure 5 — Event Study Estimates for the Proportion of Grade 12 Students Sending AP Scores to Postsecondary Institutions

(a) Proportion of Students Sending AP Scores to Postsecondary Institutions – Mandate Effects



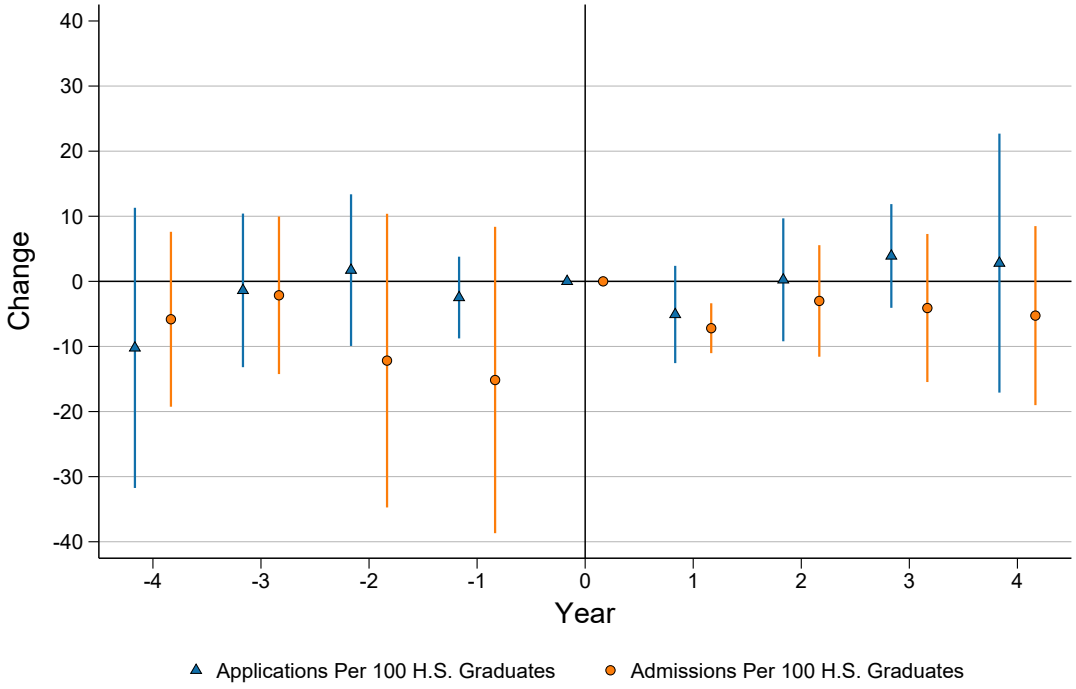
(b) Proportion of Students Sending AP Scores to Postsecondary Institutions – Funding Effects



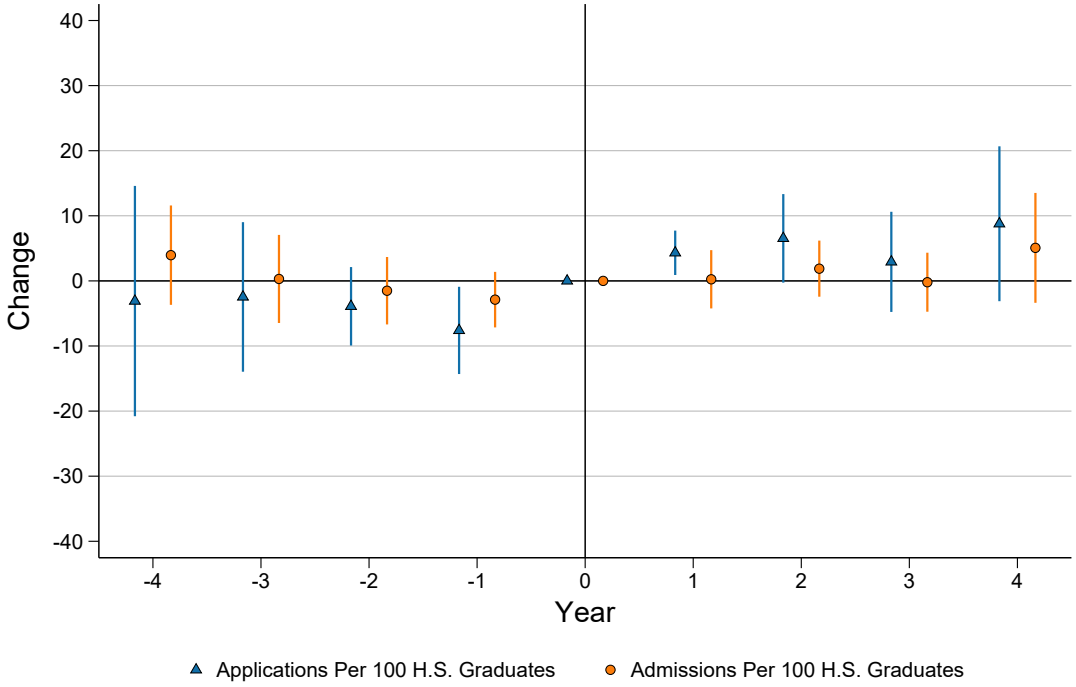
Note - Each figure presents average marginal effect estimates of either the α_τ or β_τ coefficients in Equation (2). All regressions include state and year fixed effects as well as state-level control variables and state-specific linear time trends. Model is estimated using a fractional Probit specification. All standard errors are clustered at the state level.

Figure 6 — Event Study Estimates for the Number of Public Four-Year Applications and Admission Offers

(a) Applicants and Admissions Per 100 H.S. Graduates – Mandate Effects



(b) Applicants and Admissions Per 100 H.S. Graduates – Funding Effects



Note -

Table 1—State Policies on AP/IB/Cambridge Course Offerings and AP Exam Funding

State	All High Schools Must Offer AP/IB/Cambridge Courses	State Funds At Least One AP Exam for All Students
Arkansas	2005	2005
District of Columbia	2011	2011
Florida		2003
Georgia		2018
Indiana	2006	2006
Kentucky		2009
Louisiana	2013	
North Carolina		2015
North Dakota		2016
South Carolina	1984	1985
Tennessee		2014
West Virginia	2009	

Note – The table reports the classification of state-level policies mandating the provision of Advanced Placement (AP) courses in high schools and universal fee waivers for AP exams. The year listed in the table above indicates when a state's (inclusive of D.C.) policy first impacts college enrollment patterns among students from that state.

Table 2 — Summary Statistics, State Characteristics

	1992		2000		2010		2018	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Never Treated	Ever Treated	Never Treated	Ever Treated	Never Treated	Ever Treated	Never Treated	Ever Treated
Panel A: Mandate Policies								
Log population (15-24)	13.01	12.84	13.10	12.85	13.19	12.90	13.21	12.86
% Asian	0.04	0.01	0.04	0.02	0.05	0.02	0.06	0.03
% Black	0.10	0.27	0.11	0.26	0.12	0.26	0.12	0.26
% Hispanic	0.08	0.03	0.11	0.05	0.14	0.06	0.16	0.08
% White	0.76	0.68	0.71	0.67	0.66	0.65	0.63	0.63
Unemployment rate	0.07	0.08	0.04	0.05	0.09	0.09	0.04	0.04
Poverty rate (under 17)	0.20	0.28	0.15	0.21	0.20	0.27	0.16	0.23
Log median household income	10.35	10.20	10.64	10.47	10.82	10.69	11.04	10.89
% Offering free 2-yr program	0.00	0.17	0.00	0.17	0.02	0.17	0.40	0.67
% universal SAT/ACT testing	0.00	0.00	0.00	0.00	0.16	0.00	0.56	0.50
Log public high school enrollment	11.91	11.66	12.05	11.61	12.10	11.66	12.12	11.70
Log public high school graduates	10.36	10.09	10.51	10.13	10.65	10.19	10.71	10.29
# Public high schools	312.98	226.33	353.38	228.00	393.69	225.67	412.24	238.67
% Rural	0.43	0.38	0.46	0.43	0.48	0.47	0.43	0.42
Observations	45	6	45	6	45	6	45	6

	1992		2000		2010		2018	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Never Treated	Ever Treated	Never Treated	Ever Treated	Never Treated	Ever Treated	Never Treated	Ever Treated
Panel B: Funding Policies								
Log population (15-24)	12.97	13.03	13.06	13.12	13.14	13.22	13.14	13.24
% Asian	0.04	0.01	0.05	0.02	0.06	0.02	0.06	0.03
% Black	0.10	0.21	0.11	0.20	0.12	0.21	0.12	0.21
% Hispanic	0.08	0.04	0.11	0.07	0.14	0.10	0.16	0.12
% White	0.75	0.73	0.71	0.69	0.66	0.66	0.63	0.63
Unemployment rate	0.07	0.07	0.04	0.04	0.09	0.09	0.04	0.04
Poverty rate (under 17)	0.20	0.23	0.15	0.18	0.20	0.24	0.17	0.20
Log median household income	10.35	10.25	10.65	10.54	10.83	10.70	11.04	10.94
% Offering free 2-yr program	0.00	0.09	0.00	0.09	0.03	0.09	0.42	0.45
% universal SAT/ACT testing	0.00	0.00	0.00	0.00	0.12	0.18	0.53	0.64
Log public high school enrollment	11.88	11.88	12.01	11.95	12.05	12.05	12.06	12.11
Log public high school graduates	10.33	10.31	10.49	10.39	10.60	10.57	10.66	10.68
# Public high schools	316.75	252.00	348.27	303.55	388.93	319.36	408.48	331.27
% Rural	0.43	0.38	0.47	0.43	0.48	0.49	0.43	0.43
Observations	40	11	40	11	40	11	40	11

Note – The table reports averages of each variable for states that do and do not implement an AP mandate (Panel A) or AP fee waiver (Panel B) policy at some point between 1992 and 2018. Averages are shown for 1992, 2000, 2010, and 2018. Timing of AP policies can be found in Table 1.

Table 3 — The Effect of Advanced Placement (AP) Program Policies on the Immediate College-Going Rate

	College-going rate			Number of students enrolled		
	(1)	(2)	(3)	(4)	(5)	(6)
	Overall	2-yr	4-yr	Overall	2-yr	4-yr
Panel A: All institutions						
AP Mandate	-0.039*	-0.036***	-0.023	-0.038	-0.047	-0.006
	(0.023)	(0.012)	(0.019)	(0.035)	(0.052)	(0.025)
AP Funding	0.016	0.015*	0.004	0.024	0.053	-0.005
	(0.010)	(0.009)	(0.009)	(0.018)	(0.062)	(0.014)
Panel B: Public institutions						
AP Mandate	-0.032	-0.033***	-0.016	-0.037	-0.043	0.000
	(0.022)	(0.013)	(0.016)	(0.038)	(0.054)	(0.026)
AP Funding	0.009	0.016*	-0.002	0.022	0.049	-0.012
	(0.010)	(0.009)	(0.008)	(0.023)	(0.062)	(0.017)
Panel C: Private institutions						
AP Mandate	-0.032		-0.008	-0.024		-0.021
	(0.022)		(0.006)	(0.043)		(0.048)
AP Funding	0.009		0.008***	0.033		0.031
	(0.010)		(0.003)	(0.022)		(0.020)
Functional Form:	Probit	Probit	Probit	Poisson	Poisson	Poisson
Observations	714	714	714	714	714	714

Note – The table reports regression estimates of the effect of state-level Advanced Placement (AP) program policies in regard to funding and access on the proportion and number of high school graduates that enrolled in a postsecondary institution within 12 months of graduating. Timing of state policies (both AP Mandate and AP Funding) are defined in Table 1. Robust standard errors, clustered at the state-level, are shown in parentheses. Regression includes state-level control variables: log population (15-24), percent of population (15-24) by race, unemployment rate, median household income, poverty rate, log public four-year tuition rate, and other state policies that may influence the outcome. *, **, ***, indicate statistical significance at the ten-, five-, and one-percent levels, respectively.

Table 4 — The Effect of Advanced Placement (AP) Program Policies on the Proportion of Grade 12 Students and Candidates Sending AP Scores to Postsecondary Institutions

	% Grade 12 Students		% Grade 12 Candidates	
	(1) In-State	(2) Out-of-State	(3) In-State	(4) Out-of-State
AP Mandate	0.015	-0.001	-0.019	-0.047
	(0.012)	(0.003)	(0.015)	(0.029)
AP Funding	0.010**	0.004*	0.004	-0.006
	(0.005)	(0.002)	(0.008)	(0.013)
Functional Form:	Probit	Probit	Probit	Probit
Observations	969	969	969	969

Note – The table reports regression estimates of the effect of state-level Advanced Placement (AP) program policies in regard to funding and access on the % of high school graduates that enrolled in a postsecondary institution within 12 months of graduating. Timing of state policies (both AP Mandate and AP Funding) are defined in Table 1. Robust standard errors are shown in parentheses. Standard errors are clustered on the state level. Regression includes state-level control variables: log population (15-24), percent of population (15-24) by race, unemployment rate, median household income, poverty rate, and log public four-year tuition rate. *, **, ***, indicate statistical significance at the ten-, five-, and one-percent levels, respectively.

Table 5 — The Effect of Advanced Placement (AP) Program Policies on the Public Four-Year Applications and Admissions

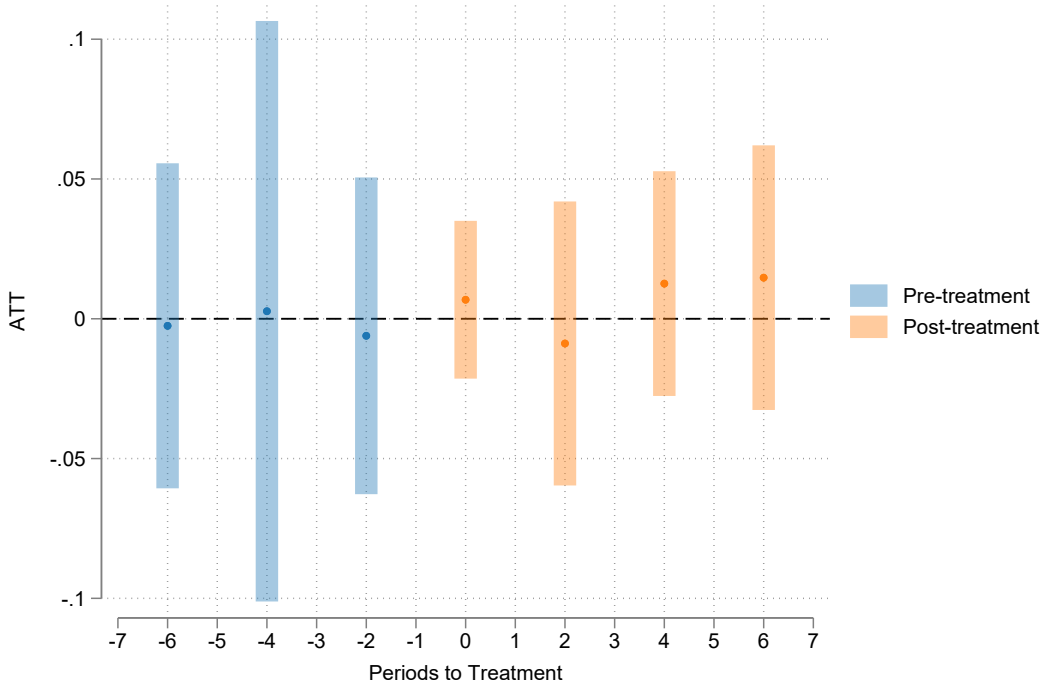
	(1) Applications Per 100 High School Graduates	(2) Admissions Per 100 High School Graduates
AP Mandate	0.360	7.110
	(5.803)	(6.891)
AP Funding	8.000**	1.393
	(3.466)	(2.298)
Functional Form:	Linear	Linear
Observations	882	882

Note – The table reports regression estimates of the effect of state-level Advanced Placement (AP) program policies in regard to funding and access on the % of high school graduates that enrolled in a postsecondary institution within 12 months of graduating. Timing of state policies (both AP Mandate and AP Funding) are defined in Table 1. Robust standard errors, clustered at the state-level, are shown in parentheses. Regression includes state-level control variables: log population (15-24), percent of population (15-24) by race, unemployment rate, median household income, poverty rate, log public four-year tuition rate, and other state policies that may influence the outcome. Due to data properties, sample excludes D.C. and Alaska. *, **, ***, indicate statistical significance at the ten-, five-, and one-percent levels, respectively.

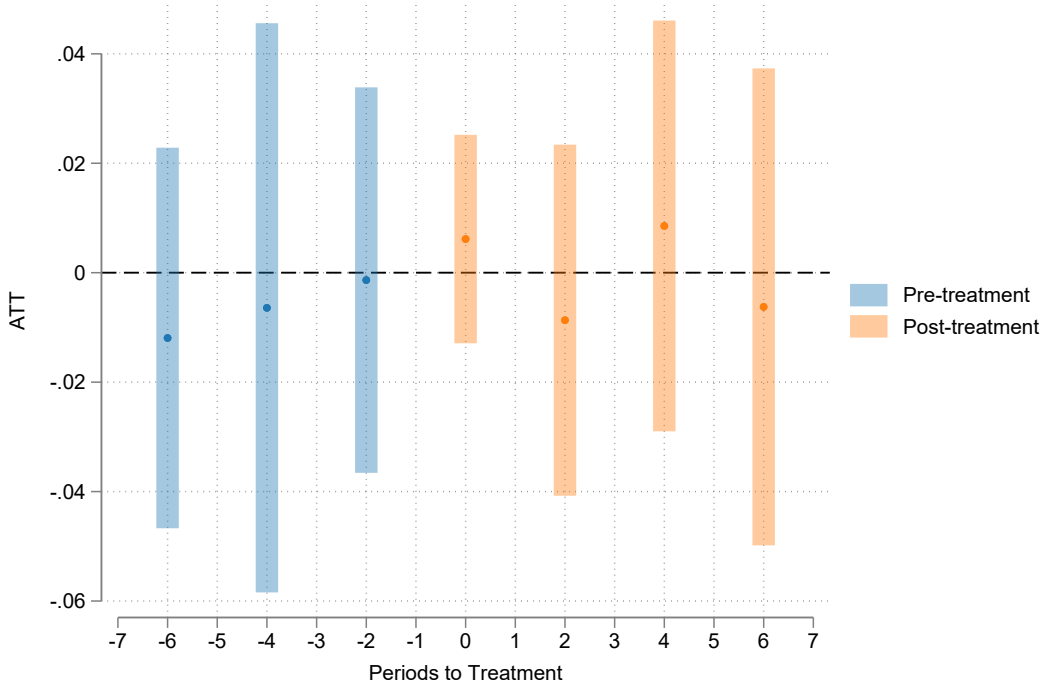
A — Appendix A. Figures and Tables

Figure A1 — Callaway and Sant'Anna (2021) Estimates for the Immediate College-Going Rate

(a) Immediate College Going Rate – Mandate Effects



(b) Immediate College Going Rate – Funding Effects



Note - Each figure presents estimates using the alternative estimator proposed by Callaway and Sant'Anna (2021). All regressions include state and year-fixed effects, time-varying controls, and state-linear time trends. All standard errors are clustered at the state level. Plots include all years in the sample period and include instances where the panel is unbalanced.

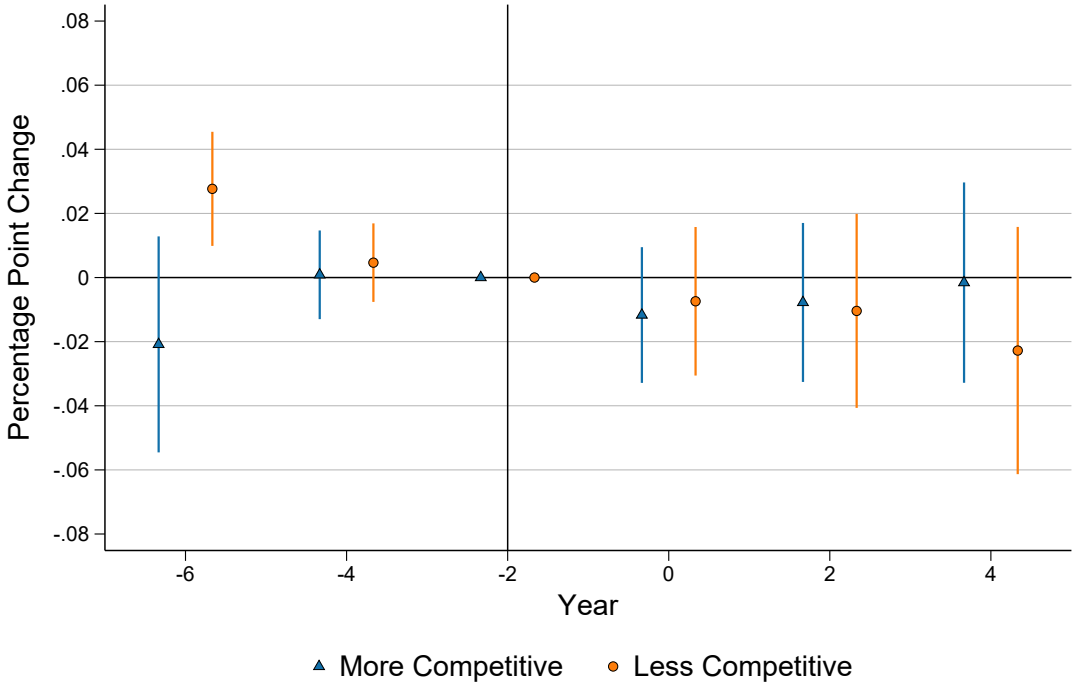
Table A1—The Effect of Advanced Placement (AP) Program Policies on the Immediate College-Going Rate (by Selectivity)

	(1)	(2)	(3)
	4-yr	Barrons Competitive (1-3)	Less Competitive
AP Mandate	-0.022	-0.004	-0.016
	(0.019)	(0.010)	(0.014)
AP Funding	0.002	0.007*	-0.002
	(0.009)	(0.004)	(0.010)
Functional Form:	Probit	Probit	Probit
Observations	714	714	714

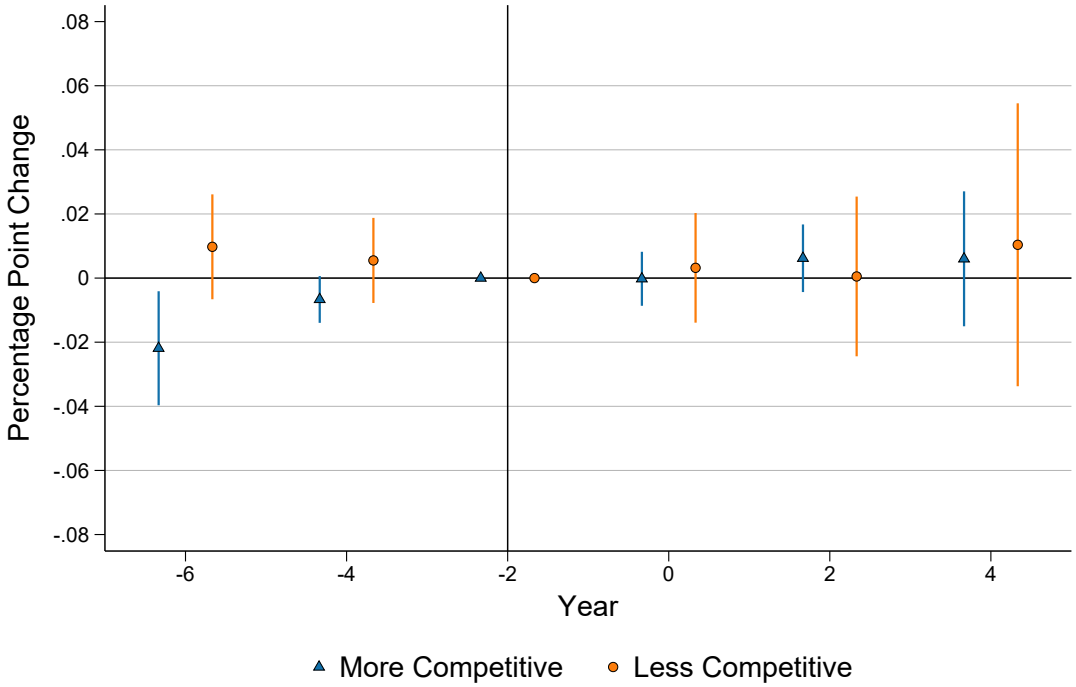
Note – The table reports regression estimates of the effect of state-level Advanced Placement (AP) program policies in regard to funding and access on the % of high school graduates that enrolled in a postsecondary institution within 12 months of graduating. Timing of state policies (both AP Mandate and AP Funding) are defined in Table 1. Robust standard errors, clustered at the state-level, are shown in parentheses. Regression includes state-level control variables: log population (15-24), percent of population (15-24) by race, unemployment rate, median household income, poverty rate, log public four-year tuition rate, and other state policies that may influence the outcome. *, **, ***, indicate statistical significance at the ten-, five-, and one-percent levels, respectively.

Figure A2 — Event Study Estimates for Immediate College-Going Rates (by Selectivity)

(a) Immediate College Going Rate – Mandate Effects



(b) Immediate College Going Rate – Funding Effects



Note -