Surprising ripple effects:
How changing the SAT score-sending policy for low-income students impacts college access and success[1]

Michael Hurwitz
The College Board

Preeya P. Mbekeani
Harvard University

Margaret M. Nipson
Harvard University

Lindsay C. Page
University of Pittsburgh

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Abstract:

A growing economics literature reveals that small and subtle policy adjustments can induce relatively large "ripple effects." We contribute to this literature by evaluating a College Board initiative, launched in the fall of 2007, which increased the number of free official SAT score reports afforded to low-income students and changed the time horizon over which these free score sends could be used. By resetting the default number of free SAT score reports from four to eight for SAT fee-waiver recipients, the College Board hoped to increase the number of college applications submitted by these students and to improve their college match. Using a difference-in-differences analytic strategy, we show that low-income students took advantage of this policy and were roughly 10 percentage points more likely to send eight or more score reports. We find that this policy achieved its intended goal of increasing college access and that it also favorably impacted college completion rates. Specifically, we estimate that inducing a low-income student to send one more score report, on average, increased on-time college attendance by nearly 5 percentage points and five-year bachelor's completion by slightly more than 3 percentage points. The policy impact was driven entirely by students who, based on SAT scores, were competitive candidates for admission to four-year colleges.

[1] mhurwitz@collegeboard.org; pkp682@mail.harvard.edu; meg_nipson@gse.harvard.edu; lpage@pitt.edu. We are grateful to the College Board and the Center for Education Policy Research at Harvard University for providing data access and financial support to make this research possible. We thank Christopher Avery, Jon Fullerton, George Loewenstein, Jessica Howell and Jon Smith for helpful suggestions on earlier versions of this paper. The views expressed in this paper do not reflect the views or opinions of the College Board. All errors are our own. Authorship order was determined alphabetically.

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I. Introduction

A stark contrast exists between the college application and subsequent college enrollment behavior of lower-income students, compared to their similarly capable but wealthier peers (Hoxby & Avery, 2013; Hoxby & Turner, 2013). Many factors contribute to the sub-optimal college exploration and selection process of lower-income students, including confusion about financial aid availability, poor access to high quality college guidance, "micro-barriers" such as college application fees, and familial obligations or cultural norms which limit the scope of colleges that students might consider (Radford, 2013; Avery & Turner, 2010; Ross et al, 2013; Smith, Hurwitz & Howell, 2013). In recent years, the College Board has implemented a number of policy changes in an effort to encourage a broadening of college possibilities for low-income students. One policy shift, which we investigate here, targeted the SAT score sending behavior of low-income students who took the SAT with a fee waiver.

College entrance exam score sending is a college-exploration step in which students from low-income backgrounds may not optimally engage. Yet, it is a key component of the college search, application and selection process. Among recent cohorts, about 90 percent of first-time, degree-seeking students enrolling at traditional BA/BS granting institutions are either required or recommended to submit official college entrance exam scores with college applications, making entrance exam score sending a key component of the college search.[2] Given this, limited score sending may translate into fewer, or fewer successful, college applications, in turn decreasing the likelihood of prospective college students being admitted to any college or to an institution that represents a sound match on academic, financial and other dimensions. Importantly, some of these dimensions, such as affordability, may be uncertain at the time of college application.

The SAT is a college entrance exam taken by about 1.7 million high school graduates annually. When registering for the SAT, and for a short duration after sitting for the exam, students can select up to four colleges to receive their official SAT score report free of charge.

[2] This statistic is calculated for first-time degree-seeking students entering college in the fall of 2009, our final cohort of students.

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This process requires students to know where they would like to apply and feel confident enough in their exam performance to select colleges without knowing whether their scores are high enough to meet institution-specific admissions standards. Students from low-income backgrounds may especially face uncertainty. Nine days after the SAT administration and several weeks before students receive their scores, this free score-send window closes. Students must then pay $11.25 per score send.[3] While modest, the cost of these additional score sends may nevertheless stand as a real barrier to low-income students sending scores and applying to an optimal number and range of post-secondary institutions.

To combat this potential barrier, in the Fall of 2007, the College Board implemented a new SAT score-sending policy whereby all low-income students who took the exam with a fee waiver were afforded four additional free and flexible score sends to be used at any time during their high school careers. This policy shock allowed lower-income students to send SAT scores for free to as many as eight colleges, compared to higher-income students who continued to receive the standard four free score sends. In addition, this policy changed the time horizon over which eligible students could take advantage of the additional four free score sends, allowing students to receive and react to their SAT performance before selecting institutions to which to send their scores.

To understand the impact of such a policy shift on the college search, application and college-going behavior of students from low-income backgrounds, we would ideally conduct an experiment. In such an experiment, we would identify all students eligible by virtue of registering for the SAT with a fee waiver and then we would randomize the opportunity to make use of the flexible score send policy. Such an experimental approach would ensure comparability of treated and control students prior to policy assignment and would allow us to examine the downstream impacts of the policy on a variety of outcomes and investigate heterogeneity in those impacts by student characteristics, such as SAT performance. We hypothesize that this policy shock would influence students' college search and application behavior both by encouraging students to send scores (and apply) to more schools and by encouraging them to apply to schools that represented a better fit, at least academically, given their ability to respond to information about their own SAT performance prior to score reporting. Further, we

[3] For more information on the SAT score sending process, see: https://sat.collegeboard.org/scores/send-sat-scores. In addition to colleges, students may send SAT scores to scholarship organizations or to the National Collegiate Athletic Association (NCAA).

hypothesize that such shifts in student behavior at the college search and application stage could lead to downstream improvements in degree completion.

Because the College Board implemented this policy shift systematically for an entire cohort of SAT takers, we are unable to examine its impact in an experimental framework. Instead, we capitalize on a differences-in-differences (DID) analytic strategy to investigate the policy's impact on college access, college quality and bachelor's degree attainment outcomes for low-income students. As is standard with the DID estimation strategy, we measure the change in outcomes for fee-waiver students before and after the introduction of the enhanced score-send policy and compare this change to that occurring among students who did not use SAT fee waivers and therefore were not afforded four free and flexible score sends.

Our investigation is informed by and builds on the work of Pallais (2015), who examined how students changed their score-sending behavior after the ACT, another college entrance exam, increased the default number of free score reports from three to four (with no change in the timing with which such free score reports could be utilized). Pallais find that this small policy shift contributed to increases in score sending, in the range of institutions to which students sent scores, and in the selectivity of institutions attended by low-income ACT takers. While Pallais considers impacts on score sending and initial college enrollment, we are able to examine students over a longer time horizon by linking all sampled students directly to college enrollment, persistence and completion data via the National Student Clearinghouse (NSC). These data allow us to document substantial downstream ripple effects of a seemingly subtle policy shift not only on initial college access but also on college completion outcomes for low-income SAT takers.

We corroborate Pallais's (2015) finding that students are responsive to the option of sending more scores for free. Specifically, we estimate that, this shift in College Board policy resulted in an increase of 0.4 in the number of score reports sent by fee-waiver recipients, on average. As we illustrate in the left panel of Figure 1, much of this change was driven by the fraction of fee-waiver recipients sending exactly four score reports falling by 10 percentage points and an offsetting 10 percentage point increase in the probability of sending eight or more score reports. Further, we find evidence that this policy increased the likelihood that higher-achieving, lower-income students, in particular, applied to highly selective colleges. Considering longer-term impacts, the flexible score report policy also increased both on-time college-going

and bachelor's completion rates (within five years) by 2 and 1.4 percentage points, respectively. Using an instrumental variables strategy to simultaneously consider the policy's influence on volume of score reports and the downstream enrollment and completion effects, we estimate that inducing students to send one additional score report, on average, leads to a 4.9 percentage point increase in the probability of attending college on-time and a 3.3 percentage point increase in the probability of earning a bachelor's degree within five years of high school completion. Our estimates are robust to a number of different model specifications and sample restrictions that allow us to rule out potential threats to validity. The impacts of the flexible score report policy on bachelor's completion are markedly larger than would be expected based on the number of students enrolling in college and shifting into more selective colleges as a result of the policy. The unexplained portion of the completion effects likely results from improvements in non-academic fit between students and the postsecondary institutions in which they enroll that are not easily assessed given the data available.

We structure the remainder of the paper as follows. In Section II, we situate our study within the relevant literature and describe the College Board policy shift that we examine. Then in Section III, we detail our data and analytic strategy. We present results in section IV and conclude with a discussion in Section V.

II. Background

Whether and where students attend college are important drivers for college completion and subsequent labor market outcomes (Baum, Ma, and Payea, 2013; Card, 1999; Goodman, Hurwitz and Smith, 2015; Howell & Pender, forthcoming). Despite the importance of these decisions, students' processes for college search, application and selection can be quite haphazard (Avery, Howell & Page, 2014; Radford, 2013). Even among those who do attend college, many undermatch, primarily because they did not apply to any institutions that aligned well with their own academic qualifications (Dillon & Smith, 2013; Smith, Pender & Howell, 2013). While this might be surprising at first, in fact, a growing body of research in both psychology and behavioral economics reveals that individuals often veer from decisions that we would predict based on rational models of behavior. This is especially so when decision-makers must parse complex options, when they are poorly informed and when they are inexperienced and young

(Thaler & Mullainathan, 2008; Thaler & Sunstein, 2008; Casey, Jones, & Somerville, 2011; Milkman, Beshears, Choi, Laibson, & Madrian, 2012; Ross, White, Wright & Knapp, 2013).

The college search and selection process is rife with complex decisions, and students often lack appropriate support (Hurwitz & Howell, 2014; see Page & Scott-Clayton, 2015, for a recent review). This complexity, itself, may be a barrier to students achieving college access and success at greater rates. Given this, greater support and guidance can improve students' postsecondary access and success by facilitating their decision-making processes (Ross et al., 2013). In addition to comprehensive supports, the behavioral economics literature has revealed that even small "tweaks" to the process can have meaningful downstream impacts (e.g., Castleman & Page, 2014; Castleman, Page & Schooley, 2014; Lavecchia, Liu & Oreopoulos, 2014).

From this growing body of literature, three studies are particularly relevant to our research focus. First, Smith (2013) utilizes an instrumental variables (IV) analytic strategy to examine the causal impact of the number of college applications a student completes on successful college enrollment. Descriptively, Smith observes a strong relationship between being accepted to college and the number of colleges to which a student applies. For example, those who apply to only one school are rejected by that school 35 percent of the time, whereas students who apply to a greater number of schools are less likely to be rejected from all of the schools to which they apply. Capitalizing on exogenous variation in the adoption rates of the Common Application and the Common Application's impact on college application behavior, Smith finds that the probability of college enrollment increases when students are prompted to submit more applications. Smith reasons that there are at least two potential mechanisms at play in the result that he observes. First, additional college applications may translate into a higher probability of being accepted. Second, additional applications may increase students' chances of being accepted into a college that is a good fit along a number of dimensions that may be uncertain at the time of application (e.g., where their friends will be attending school). To the extent that SAT score sending is an ingredient of successful college applications, we hypothesize that we would also see increases in college access as a result of additional college score sends.

This hypothesis is also informed by recent work examining the impact of policy shifts in the number of free score sends afforded by the ACT (Pallais, 2015). In the late 1990s, the ACT shifted the number of free score sends available to test takers from three to four. Pallais finds

through quasi-experimental methods that this seemingly minor shift in policy induced students to send their scores to more schools and to schools of a wider range of quality. She finds that low-income students also were more likely to attend more selective colleges as a result.

Third, Bond, Bulman, Li and Smith (2016) find that SAT performance is hard to predict. Even controlling for prior measures such as PSAT performance, residual variation in SAT scores is substantial. Further, Bond and colleagues observe that student score sending behavior does differ before and after students know their SAT scores, and that students who perform well on the SAT are more aggressive in shifting the types of institutions to which they send their scores once equipped with information on their own performance. These three studies, together, point to the potential for relatively large and potentially heterogeneous ripple effects from small and inexpensive policy adjustments that enhance the college search and selection process.

In this study, we capitalize on a policy shift that was enacted by the College Board's Board of Trustees in the summer of 2007 to "help low-income students achieve equity in score reporting opportunities."[4] Beginning in the fall of 2007, low-income students who took the SAT using a fee waiver received four free score reports that they could utilize at any point in their high school careers, in addition to the standard four free score reports that must be used between test registration and nine days after sitting for the exam or else forfeited. To qualify for SAT fee waivers, students must meet income guidelines specified by the National School Lunch Program or they must face other unique circumstances, such as living in subsidized public housing or enrollment in Federal TRIO or Upward Bound programs. Students living in foster homes, homeless students, orphans and wards of the state are also eligible for SAT fee waivers. Although students may take the SAT twice with fee waivers, they are only granted one set of four flexible score reports.

To investigate the college-related outcomes associated with this policy shift, we focus on the following three research questions:

1. Does the provision of four free flexible score reports change the number and quality of colleges to which low-income students send scores?
2. Does the provision of four free flexible score reports increase the probability of college attendance and shift where low-income students enroll?
3. Does this policy shift have downstream effects on college completion?

[4] Cited from The College Board's Draft Minutes from the June 21-22, 2007 Board of Trustees Meeting.

III. Research Design

3.1. Data Sources and Sample

To answer our research questions, we draw on two main data sources. Our first source of data is student-level microdata from the College Board. These data include student SAT scores, the colleges to which students sent their score reports, and a rich set of demographic data including student race and gender and the identity of each student's high school. Beginning with the graduating cohort of 2007, all of whom graduated from high school before the flexible score report introduction, these data also include information on whether students took the SAT using a fee waiver. For earlier cohorts, we are unable to identify which students took the SAT with fee waivers.

We merge these records to data from the National Student Clearinghouse (NSC) which provide semester-level information on whether and where students are enrolled in college. Data from the NSC allow us to track students beyond high school and through college completion. These data track students through the summer of 2014. Approximately, 98 percent of all college students enroll in NSC participating institutions, although the actual coverage is lower than 98 percent due to imperfect matching and suppression of student records (Dynarski, Hemelt & Hyman, 2015).

We utilize several rules for inclusion in our main analytic sample, and we construct several different analytic samples to ensure that our results are consistent and robust to alternate specifications. Since the vast majority of students last take the SAT in either the spring of their high school junior year or in the fall of their senior year, and since our research design relies on cross-cohort comparisons, we restrict our sample to only these students. This restriction allows us to remove students who may have been categorized into the wrong high school cohort. Nearly ninety percent of students in each cohort meet this requirement. Next, we limit our sample to students who graduated from high school prior to or in 2009 for three main reasons. First, a central outcome in this research is five-year bachelor's completion – relatively few fee-waiver students complete college within four years. Given the NSC data to which we currently have access, cohorts graduating after 2009 would be excluded from analyses investigating this outcome. Second, some higher-achieving students from the 2010, 2011 and 2012 cohorts were included in the Expanding College Opportunities project (Hoxby & Turner, 2013), which had similar aims to the flexible score report initiative. To avoid possible confounding, we omit these

students from our sample. Finally, and perhaps more importantly, beginning in the Spring of 2009, the College Board introduced *Score Choice*, a second policy shock that impacted score reporting. Under *Score Choice*, students are afforded the option to "put their best foot forward" by strategically sending scores from the SAT administration on which they performed best. Prior to *Score Choice*, official score reports included test results from all SAT administrations. Ultimately, *Score Choice* provided strong incentives for students to withhold scores from colleges until they completed all testing, which means forgoing the use of the standard four fee waivers. Without separately conducting an analysis of the impacts of *Score Choice*, we risk confounding the impacts of this policy with the flexible score reporting policy for low-income students which is our focus here. Fortunately, even with the exclusion of these later cohorts, we are able to obtain precise estimates of the impact of the flexible score-sending policy.

In response to the flexible score report policy, it is possible that students who ordinarily would not take the SAT with a fee waiver would be tempted to seek these waivers more aggressively. Shifts in the composition of fee-waiver or non-fee-waiver students after this policy shock might, therefore, bias our results. To address this potential threat, we identify in our sample the subset of students from high fee-waiver use high schools and the subset from high schools where no students utilize fee waivers. In high fee-waiver use high schools, the majority (or all) of SAT test-takers were already using fee-waivers before the new policy, so this particular source of bias is minimized. Nevertheless, as we show, our results are robust to whether we include in our sample all US high school students who take the SAT or whether we restrict our examination only to students who attended high schools with no fee-waiver use or the highest fee-waiver use before the implementation of the flexible score report policy.

To verify that the differential impacts between fee-waiver and non-fee-waiver students that we document are due to the flexible fee-waiver policy rather than an extension of differing pre-existing trends between students in these two groups, we also incorporate into our analyses students from the 2004 through 2006 cohorts. Since we are unable to identify students as SAT fee-waiver recipients in cohorts prior to 2007, for these longer-trend analyses we focus on high schools where either all or no students from the 2007 through 2009 cohorts used SAT fee waivers. In these high schools, we assume identical participation rates for students in the 2004 through 2006 cohorts. For example, if a student from the 2005 cohort attended a high school

where all SAT test-takers from the 2007 through 2009 cohorts used a fee-waiver, she was designated as also having used a fee waiver.

3.2. Measures

We focus on outcomes within three domains: volume and quality of score sending, college attendance and college completion. For purposes of comparability, in many instances our definitions of these measures are influenced by the choices made by Pallais (2015). For example, we exclude from the main analyses students who did not send any scores. We hypothesize – as did she – that many of these non-score senders also took an alternate college entrance examination (e.g., the ACT) and may have instead opted to send those scores to colleges. Increasing the number of free SAT score reports available to students would not increase their total number of score sends if the students were never planning to reveal their SAT scores to colleges. We define college quality, both among score sends and among enrollment choices, using the SAT scores for all enrolled students, as reported within the Integrated Postsecondary Data System (IPEDS) in 2007.[5] As was done by Pallais, we treat this college-level characteristic as time invariant to avoid mistaking changes in college selectivity over time with the policy impacts of interest. We supplement this selectivity measure by also considering as an outcome the fraction of students enrolling in a Most Competitive, or Highly Competitive college, as defined by the NCES-Barron's admissions competitiveness index data files from 2008.[6]

With data from the NSC, we construct student-level college enrollment, as well as completion metrics for students attending these colleges. While we create separate outcome measures for students enrolling at two- and four-year institutions, it is crucial to emphasize that the distinction between these two sectors has become increasingly blurry over time. Some colleges historically considered two-year institutions have recently introduced a small number of bachelor's degree programs, while many four-year institutions also offer associate's degrees (Bidwell, 2014; Radwin & Horn, 2014). As relatively few SAT test-takers earn associate's degrees, our completion outcome of primary interest is bachelor's degree attainment. We are able to track this outcome through August of 2014.

[5] For more information on IPEDS, see: https://nces.ed.gov/ipeds/.
[6] For more information on the NCES-Barron's admissions competitiveness index, see: http://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=2010331.

3.3. Analysis

We obtain all estimates of the impact of the flexible score report policy using the difference-in-differences analytic framework specified by equation 1, where $FeeWvr_i$ is an indicator variable specifying whether a student took the SAT with a fee waiver, $postSpring2007_i$ is an indicator specifying whether the student last took the SAT after the formal rollout of the flexible score report policy, $SATDate_i$ is a vector of fixed effects for the date on which the student last took the SAT and X_i represents a vector of student covariates including race, gender and SAT scores.[7] As was done by Pallais (2015), we include fixed effects for the student's high school to ensure that results are not driven by disproportionate growth in the number of SAT test-takers at high schools where students are predisposed towards certain outcomes.

$$Eq\ (1)\ Y_i = \propto + \beta_1 FeeWvr_i + \beta_2 postSpring2007_i * FeeWvr_i + \beta_3 SATDate_i + \beta_4 X_i + \varepsilon_i$$

Parameter β_2 in Equation 1 represents the unbiased impact of the flexible score report policy on outcome, Y_i. Considering the potential effects on college enrollment and completion, we conjecture that these downstream outcomes are driven by increases in score sends that result directly from the flexible score report policy shock. Therefore, we also conduct analyses where we link the changes in college-success outcomes to the increases in score sends from the flexible score report policy shock. We accomplish this through a two-stage least squares approach (Equations 2 and 3) where we instrument the number of score sends submitted by student *i* with the *postSpring2007*FeeWvr* interaction term. Parameter β_6 in Eq(3) represents the change in downstream outcome resulting from one additional score send.

$$Eq(2)\ ScoreSendCount_i = \propto + \beta_1 FeeWvr_i + \beta_2 postSpring2007_i * FeeWvr_i + \beta_3 SATDate_i + \beta_4 X_i + \varepsilon_i$$

$$Eq(3)\ CollegeOutcome_i = \propto + \beta_5 FeeWvr_i + \beta_6 Score\hat{S}endCount_i + \beta_7 SATDate_i + \beta_8 X_i + \mu_i$$

[7] Note that we do not include an indicator for *postSpring2007* in our model specification. This is because such an indicator is completely collinear with the fixed effects that we have included for SAT date.

IV. Results

4.1 Descriptive Statistics

In Table 1 (columns 1 – 4), we provide descriptive statistics on score sending behavior, student demographics, SAT score performance and collegiate outcomes, disaggregated by whether a student last took the SAT prior to the flexible score report rollout and whether she used a fee waiver to take the SAT. In columns 5 – 8, we provide an extended cohort view of these data, focusing on the subset of students within schools where all students or no students in the 2007 through 2009 cohorts utilized fee waivers to take the SAT. As noted previously, we assume that the fee-waiver usage of students from the 2004 through 2006 cohorts matched that of students from the same high schools in the 2007 through 2009 cohorts.

Unsurprisingly, stark contrasts exist between fee-waiver users and non-fee waiver users. In contrast to non-fee waiver students, the majority of students using fee waivers belong to underrepresented minority groups. On both the mathematics and the critical reading sections of the SAT, fee-waiver students score nearly 100 points (or a full standard deviation) lower than do non-fee waiver students. Fee-waiver students are nearly 20 percentage points less likely to a attend a four-year college on-time (e.g., within 180 days of high school graduation); they attend colleges where the average matriculant performs worse on the SAT and are as much as 40 percentage points less likely to have earned a bachelor's degree within five years of high school completion.

Despite these differences, the number of SAT score reports sent by these two groups is fairly similar. For example, among score-sending students from the 2007 through 2009 cohorts who last took the SAT prior to the flexible score report rollout (columns 1 and 2), the average number of score reports was 5.48 for non-fee waiver students and 5.14 for students who took the exam using a fee waiver. After the flexible score report policy, the modest gap in score sends between these two groups vanished, and fee-waiver students modestly edged out non-fee waiver students on this metric (columns 3 and 4). Comparing the score sending statistics in the first four columns provides a preview of what we will soon show through statistical models. After the policy shock, fee-waiver recipients increased their number of score reports by about 0.40 above

and beyond the increase among non-fee waiver students who were not impacted by the flexible score-send policy.[8]

4.2 Impacts on Score Sending

In Table 2, we present results from fitting Eq(1) to the entire sample of students from the 2007 through 2009 cohorts. In addition, we present results from restricted sub-samples of students from high schools with either consistently high fee-waiver use or no fee-waiver use to minimize inclusion of any students who pursued fee waivers in response to the flexible score report policy. In each of the samples presented in Table 2, addition of covariates and high school fixed-effects minimally changes the parameter estimates. This serves as reassuring evidence that the composition of fee-waiver students and non-fee waiver students are not changing over time in a way that might jeopardize the validity of our conclusions.

The parameter estimates in Table 2, panel A indicate increases in the number of score sends from the flexible score report policy of about 0.4. Using the baseline data shown in Table 1, this increase translates to an 8 percent increase in score sends. Comparison of Column 3 with Column 12 reveals that fitted models using the entire sample of students generates a parameter estimate of the policy's impact on score sending nearly identical to that for the sub-sample least susceptible to students maneuvering into the treatment group (i.e. using a fee waiver only to receive the flexible score report benefits). Any presence of students entering into the treatment group only to receive extra free score reports should lead to larger parameter estimates in the full sample than in the subsample containing only students from consistently 0% and 100% fee-waiver usage schools. We find no evidence of such strategizing.

In this table, we also offer some weak evidence that the quality of score sends changed modestly in the wake of the flexible score report policy. Panel B shows that the maximum SAT score among all score sends increased by up to 20 points, though the significance and magnitude of this estimate are sensitive to both the sample selection and covariates incorporated into the model. Since we favor models which include high school fixed effects and a comprehensive set of covariates, and estimates from these models are of the lowest magnitude, we conclude that the evidence in Table 2 does not support strong conclusions about shifts in quality of score sending from the flexible score report policy. Despite the highly significant estimates that some models

[8] In Appendix Figure 1, we additionally provide graphical evidence of the sudden convergence of score-sending behavior after the policy shock.

yield, we argue that even the largest point estimates in Panel B are of limited substantive significance. For example, the 20 point difference in SAT scores referenced above is equivalent to the difference in SAT scores between matriculating students at Harvard and MIT. There exists greater consistency in terms of statistical significance in Panel C, yet the changes in range between the highest and lowest SAT scores within a student's score-send portfolio are of similar magnitudes to those shown in Panel B and similarly lack substantive significance. Our largest estimates in Panel B (approximately 20 SAT points) are roughly equivalent to the 0.5 ACT point boost that Pallais documents after ACT's increase in the default number of score sends. Our estimates on range of SAT scores (Panel C) are considerably smaller than the comparable estimates that Pallais presents of about 0.9 ACT points.[9]

In Table 3, we show changes in the distribution of number of score reports using the 2007-2009 sample as well as the expanded 2004-2009 cohort sample containing only students from 0% and 100% usage high schools. We further divide the sample into SAT terciles based on the SAT scores of students in the 100% fee-waiver usage schools between 2004 and 2009. We motivate the discussion of this table by graphically showing the distribution of score sends for fee-waiver and non-fee waiver students in both the pre and post policy shock periods (Figure 1).

The left panel in Figure 1 depicts a sharp decline in the fraction of fee-waiver students sending exactly four score reports after the enactment of the flexible fee-waiver policy. This decline is primarily offset by a spike in the fraction of students sending exactly 8 score reports, with smaller positive changes in the fraction of students sending more than 8 score reports. In the right-hand panel of Figure 1, we show changes in the distribution of score sends among non-fee waiver students who did not benefit from the flexible score report policy. Among these students, there was a considerably smaller decline in the share of students sending exactly four score reports that was balanced out by tiny increases in the fraction of students sending 5, 6 or 7 score reports. This group experienced no change in the fraction of students sending 8 score reports. In Figure 2, we show that the reshuffling of score-send counts were most pronounced among those with top tercile SAT performance, e.g., students with SAT scores at or exceeding 880.

[9] As a rule of thumb, one ACT point is the equivalent of 40 SAT points on the 1600 scale. See the concordance tables published by the College Board for more details. (http://research.collegeboard.org/sites/default/files/publications/2012/7/researchnote-2009-40-act-sat-concordance-tables.pdf)

The difference-in-difference parameter estimates in which we estimate changes in the distribution of score reports due only to the flexible score policy by netting out the changes among non-fee waiver students clearly show that about 10 percent of fee-waiver students increased the number of score sends from 4 to 8. The declines in the fraction of students sending exactly four reports (Table 3, Column 5) ranges from about 6 to 13 percentage points and are offset by increases in the fraction of students sending 8 or more score reports of 7 to 14 percentage points. A smattering of smaller, but highly statistically significant negative coefficients also exist for models estimating outcomes of 5, 6 and 7 score sends, suggesting that even students who were not simply using the default 4 score reports took advantage of the opportunity to send more scores.

A final detail relayed through both Figures 1 and 2 and Table 3 is that the flexible score report policy had considerably smaller, but statistically significant, positive, impacts on the percentage of students sending exactly 1, 2 and 3 scores. The flexible score report policy relaxed some of the pressure on students to send SAT scores to colleges at the time of registration. Some students may have planned to send more score reports after learning their SAT scores, but opted against such actions after discovering that their previous college aspirations were unrealistic. The fact that impacts of the highest magnitude are localized among students with the lowest SAT scores adds some credence to this conjecture. Alternatively, some students intending to send SAT scores after the window for free registration score sends had closed may simply have forgotten to follow through with their intentions.

4.3 College Enrollment and Completion

In Table 4, we show DID estimates of the flexible score report's impact on college attendance and completion using the overall sample (Panel A) and samples restricted only to those students least likely to alter their fee-waiver status in response to the policy (Panels B-D). All four panels convey similar stories. The policy shock increased on-time college-going rates by 2 to 4 percentage points (column 2), and all models (except for Panel D) suggest that the majority of this increase was driven by students enrolling at four-year colleges (column 4). Consistent with the previously discussed finding that this policy shock had at most a minor effect on the selectivity of colleges to which students sent scores, we find no statistically significant changes in the average SAT scores of the colleges in which students enrolled (column 5). This finding, however, does not allow us to discount the possibility that some students may have shifted from

less selective institutions into more selective ones. Students on the margin of college attendance whose decisions were ultimately tipped by the shift in the score-send policy likely enrolled in less selective institutions; this may have muted any effects of other students switching into institutions with higher average SAT scores. In Column 6 of Table 4, we show evidence of a small effect on upward shifting, with students one-half of a percentage point more likely to enroll in colleges in the top two Barron's categories (Most Competitive and Highly Competitive).

The final three columns in Table 4 show the DID estimates on college completion, with the 2009 cohort eliminated from the six year bachelor's completion estimates. In all but one specification, parameter estimates on the percentage of students earning bachelor's degrees with four, five or six years of high school graduation are positive and statistically significant. The magnitude of impact on bachelor's completion within four years is 1-2 percentage points, within five years is 1.5 to 3, and within six years is 2 to 4 percentage points.

Some of these completion effects are obviously attributable to the observed increases in on-time college attendance presented in Column 2, though the completion impacts are too large to be driven only by the influx of students into the college pipeline. In order for the boost in completion to be determined solely by the shifts on enrollment margins, roughly 75 percent of the students induced to enroll would need to complete their bachelor's degrees within 5 years.[10] If we made the generous assumption that induced students entered college with an average SAT score of 880, only one-third would be expected to earn bachelor's degrees within five years.[11] Since no overwhelming shifts in college enrollment selectivity are evident, these surprisingly large completion impacts may reflect improvements in college non-academic fit. With more score reports sent to colleges, fee-waiver students may benefit from an expanded set of college options once they receive college acceptances. New college options might include affordable alternatives, academic programs that are better aligned with the students' interests, locations that students find more palatable, and other features of college fit uncertain at the time of college application (e.g., Smith, 2013). All of these factors could favorably influence completion.

In Table 5, we disaggregate college attendance and completion by terciles of student SAT performance. These results incorporate all students from the 2007 through 2009 cohorts, and we include appendix tables (Appendix Table 1 and Appendix Table 2) that separately present these

[10] We obtain this figure by dividing the 1.4 percentage point estimate in Panel A, column 7 by the 2.0 percentage point estimate in Panel A, column 2.

[11] This figure is based on authors' calculations using fee-waiver recipients from the 2007 through 2009 cohorts.

parameter estimates for the 2004 through 2009 cohorts (0% and 100% fee-waiver sample) and again for the 2007 through 2009 cohorts (0% and 100% fee-waiver sample). All results are robust to the alternate sample restrictions in these appendix tables.

In the first column of Table 5, we show an intriguing relationship between the policy's impact on average number of score reports and student academic ability, as measured by SAT scores. Most notably, the policy impact increases with academic ability. For students in the 400-720 SAT score range, the flexible score report policy increased the average score reports sent by 0.26. Among students with SAT scores at or exceeding 880, the impact was more than twice as large. The policy induced these relatively higher-achieving students to send approximately 0.55 more score reports to colleges, on average. Appendix Tables 1 and 2 suggest that our main specifications may actually represent a lower bound on the differential policy impact between relatively higher and relatively lower-achieving students. When we restrict the sample to only those high schools with consistently 0% or consistently 100% usage, we estimate average impacts on volume of score reports in the vicinity of 0.9 for relatively higher achieving students (e.g., Appendix Table A1, Panel D, Column 1). This is on par with the intent-to-treat impact of the Expanding College Opportunity intervention on actual college applications (Hoxby & Turner, 2013, Table 1).

Perhaps unsurprisingly, we find that the overall policy impact on four-year college-going is driven entirely by students in the highest SAT tercile (Table 5, Column 4). These students have the academic qualifications for admissibility to at least some four-year institutions that are primarily baccalaureate granting. Students with slightly lower academic qualifications (SAT scores between 730 and 870) would be less compelling candidates to four-year institutions, and so increased score sending would be less likely to translate into a heightened probability of four-year college attendance for such students. However, we do find some evidence that the flexible score report policy increased attendance at primarily two-year institutions for students in the 730-870 range.

As with college-going, the positive bachelor's completion effects of the policy are limited only to the students with SAT scores at or above 880. For these relatively higher-achieving students, the policy impacts on four- and five-year bachelor's completion are 1.5 pp and 1.8 pp respectively, both of which are virtually identical to the impact on four-year college-going. For completion effects to be driven entirely by the marginal students drawn into the four-year college

pipeline, every single one of these marginal students would need to complete their bachelor's degrees within four years. This scenario is highly unrealistic. Under the generous assumption that 37 percent of these relatively high-achieving induced students earn a bachelor's degree in four years and 58 percent earn a bachelor's degree in five years, at least half of the overall completion effects in Table 5 remain unexplained by the shifting college enrollment behavior.[12]

For the relatively higher-achieving students, there was no impact on the average institutional SAT scores of the colleges where they matriculated; however, there was a modest impact of 0.6 percentage points on the probability of attending a college in the top two Barron's selectivity categories. Students are substituting more selective colleges for less selective ones, but the magnitude of this shifting suggests only second-order contributions to the increases in bachelor's completion rates. To give a concrete example, if about 0.6 percent of students shift upward into colleges where the probability of bachelor's completion increases by one-third, overall bachelor's completion rates would only increase by 0.2 percentage points. Instead, for this group of students in particular, a substantial fraction of the bachelor's completion impact may be driven by improvements in non-academic fit.

The final two columns in Table 5 show the results of fitting the instrumental variables specifications (Equations 2 and 3) to examine the impact of increased score sending on on-time college-going and five-year bachelor's completion. Parameter estimates in these two columns are simply the Column 2 (on-time college-going) or Column 8 (five-year BA completion) parameter estimates divided by the Column 1 parameter estimates.[13] For the entire sample, inducing students to send one additional score report, on average, increases the probability of on-time college enrollment by 4.9 percentage points and five-year bachelor's completion by approximately 3.3 percentage points.[14] Both of these results are driven primarily by the relatively higher achieving students.

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[12] The average completion percentages of 37 and 58 percent correspond to the outcomes of the average fee-waiver recipient in the top SAT fee-waiver tercile from the 2007 through 2009 cohorts who started at a four-year college-on time. We refer to this assumption as generous because the student on the margins of enrollment likely had a lower SAT score than this group's average of 1050, and would also have other academic characteristics that would be expected to depress completion rates.

[13] For the sake of parsimony, we do not show all 2SLS results in table 5, but as with the example above, they are simply equal to the second-stage outcome parameter estimate divided by the Column 1 parameter estimate.

[14] This estimate may actually understate the true impact of inducing students to send additional scores because our estimates only apply to students who were already sending at least one score prior to the flexible score report policy. We find little evidence that this policy influences whether students switch from non-score-senders to score-senders (See Table 3, Column 1). Smith (2013) documents that inducing students to apply to additional colleges is most

The Expanding College Opportunities Project (ECO), initiated by Caroline Hoxby and Sarah Turner, (2013) has provided compelling evidence that very high achieving low-income students engage in sub-optimal college search processes and that these processes can be improved through low-cost nudges, such as the provision of free college application fee-waivers and semi-customized lists of potential colleges to consider. These students, who have SAT scores – or the ACT equivalent – of 1300 (Mathematics and Critical Reading combined) or higher, would be highly desirable candidates for admission at virtually all postsecondary institutions across the nation. Expanding a student's college search horizon to include more selective colleges, colleges that offer more generous financial aid packages and colleges that better match the student's extracurricular and academic interests are only effective if colleges are willing to enroll the student. Since the highest achieving students are least likely to confront this issue, they stand to gain the most from expanded college opportunities.

In Table 6, we further parse the relatively higher achieving students into two groups: higher achieving non-ECO eligible students (e.g., those with SAT scores between 880 and 1290) and ECO-eligible students with SAT scores at or above 1300. Since relatively few fee-waiver students achieve SAT scores in the 1300+ range, estimates from this subgroup are less precise. Nevertheless, Table 6 demonstrates that ECO-eligible students experienced the largest benefits in terms of college enrollment and college choice from the flexible score report policy. These very high-achieving students experienced a 3.7 percentage point increase in the probability of enrolling at a four-year college on-time and a 1.7 percentage point increase in the probability of enrolling at college in the top two Barron's categories. Since the baseline four- and five-year bachelor's completion rates for these very high-achieving fee-waiver students were already higher than their lower-achieving peers, there is less room for the policy to move the needle on these college completion metrics.[15] Completion parameter estimates for these students are about 1 percentage point, but estimated imprecisely. Collectively, the evidence in this table is consistent with Hoxby and Turner's (2013) conclusions that the highest-achieving low-income students are particularly receptive to nudges to improve college search and selection.

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beneficial for students not planning to apply to any colleges. Therefore, if the flexible score report policy were able to change student behavior on this margin, our 2SLS estimates would likely be larger than those shown in Table 5.

[15] Among sampled fee-waiver students from the 2007 through 2009 cohorts with SAT scores between 880 and 1290, 25 percent earned bachelor's degrees within four years of high school graduation and 41 percent earned bachelor's degrees within five years. Among students with SAT scores of 1300+, 58 percent and 73 percent earned bachelor's degrees within four- and five-years of high school graduation, respectively.

Importantly, these results also provide evidence that such nudges can benefit college-eligible students who are not as high performing.

4.4 Threats to Validity

Thus far, we have shown that estimates are generally insensitive to the removal of high schools where students have the highest likelihood of altering fee-waiver status only to reap the benefits of the flexible score report policy. In addition to this threat to validity, it is also possible that the flexible score report policy induced students to take the SAT, perhaps in lieu of or in addition to the ACT. The direction of bias from this threat is ambiguous. An influx of higher-achieving students using SAT fee-waivers would likely yield upwardly biased estimates, while the bias would be downwards if the composition of induced students was primarily students who otherwise would not have taken any college entrance exam.

In Table 7, we test whether the flexible score report policy increased the fraction of high school seniors taking the SAT. Increased SAT participation rates in high fee-waiver usage high schools without comparable increases in high schools with zero usage might raise suspicion of bias. To formally test for this, we simply collapse individual SAT test-taking data into a high school by cohort data set, and regress the fraction of seniors (from the Common Core of Data) taking the SAT on cohort fixed effects and an interaction between an indicator for whether the high school fell into the high fee-waiver usage category and an indicator for whether the cohort was exposed to flexible score report policy.[16] None of the Table 7 parameter estimates on this interaction term are statistically significant or of a magnitude to suggest test taking increases in response to the policy. As such, we dismiss this as a source of bias.

V. Discussion

In this study, we investigate the impact of an exogenous shift in the College Board's score-sending policy focused on low-income students who took the SAT with a fee waiver. Beginning in the fall of 2007, the College Board provided these low-income test takers with four additional free and flexible score-send reports. This policy shock had an immediate impact on student SAT score sending, a proxy measure for actual college applications. Relating this policy shift to previous literature that causally links the number of college applications to college enrollment

[16] In these regressions, we omit students from the 2008 high school cohort because some of these students took the SAT under the new policy, while others did not.

(Smith, 2013), we predict and indeed find that the seemingly minor policy change yielded downstream ripple effects on initial college access and ultimate bachelor's degree attainment. Across different sample specifications and using a differences-in-differences estimation strategy, we estimate impacts on on-time college enrollment between 2 and 4.4 percentage points, and impacts on five-year bachelor's degree attainment of 1.4 to 3 percentage points. Given the low-cost and subtle nature of the policy change itself, impacts of this magnitude are surprising and reveal a sub-optimal college-choice process among low-income student that can be partially remedied with small nudges.

Further, we observe that these impacts are concentrated primarily among the subset of low-income students who are comparatively higher achieving, i.e., those students who are best positioned to take advantage of the increased postsecondary access resulting from the policy shock. With these findings, we contribute both to the economics of education literature revealing that even small interventions at the college exploration and application stages can shift postsecondary outcomes for lower-income students and, more generally, to the growing behavioral economics literature on the relatively large "ripple effects" that can be induced by small policy adjustments, such as those that change defaults around SAT score sending.

A comparative strength of this analysis is our ability to follow students over a long time horizon and to consider not only college access but also college completion outcomes, as a result. This provides stable ground for back-of-the envelope calculations of the potential returns to the simple and inexpensive change of affording low-income students additional free and flexible score reports. Given the impacts cited above, we estimate that, from each high school cohort, the number of bachelor's degree recipients increases by about 3,000 as a result of the policy change at a total cost that has an upper bound of approximately $2.4 million, or about $800 per additional bachelor's degree recipient.[17] The typical bachelor's degree recipient enjoys

[17] Based on the two right-hand columns of Table 4, we assume that 2 percent of the 150,000+ fee-waiver recipients from the 2009 cohort earned bachelor's degrees as a direct result of the flexible score report policy. Prior to the policy change, we estimate from College Board administrative data that approximately 80 percent of scores sent by fee-waiver recipients in a given cohort were free "registration score sends." Assuming a true cost of a fee-waiver send of $11.25, for a typical cohort of approximately 150,000 fee-waiver recipients, the total cost of score sending for these students prior to the policy shift was 5.1*$11.25*150,000= $8,606,205. Of this amount, 80 percent (or $6,885,000) was shouldered by the College Board, and the remaining $1,721,250 was collected from students. After the policy shift, we assume that, in the most extreme case (in terms of revenue) for the College Board, that fee-waiver recipients did not shoulder any costs associated with score sending. Then, the total cost of score sending to the College Board was 5.5*$11.25*150,000=$9,281,250. In sum, we estimate the additional cost to the College

a lifetime earnings premium of nearly $300,000 over the typical high school graduate (Baum & Ma, 2014). While this figure is not causally estimated, for at least two reasons, we might reason this to be an underestimate of the overall returns to bachelor's degree attainment. First, Card (1999) reports that causal estimates of the effect of education on earnings are typically 20 to 40 percent larger than observed differences. Second, the lifetime earnings premium does not capture the many other public and private benefits that accrue as a result of higher education (Baum, Ma & Payea, 2013). Even so, given the low-cost nature of the policy shift, earnings premiums of substantially lower magnitudes would still translate into a favorable return on investments from the flexible score report policy.

Recent research has shed light on differential college search, application and enrollment behavior by socioeconomic status, even among the highest achieving high school students (Hoxby & Avery, 2013) and that among low-income, high achieving students, these behaviors can be improved by relatively straightforward and inexpensive interventions (Hoxby & Turner, 2013). Given that the students targeted by the Expanding College Opportunity (ECO) interventions represent a small minority of all low-income students, questions remain about whether the "nudging" strategies to improve the college search process, such as those employed in the ECO interventions may also be beneficial for low-income students who are college ready but not among the highest performers. Our results provide evidence in the affirmative. Many small steps add up to postsecondary access and success. Our results provide further justification for the fact that policy makers should have particular interest in not only whether, but how students navigate these many individual steps.

Board of this policy shift to be ($9,281,250-$6,885,000) or approximately $2.4 million per cohort. In Board of Trustee meeting minutes, the associated revenue loss was estimated at a much lower $1 million.

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Tables and Figures

Table 1: Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	2007-2009 HS Cohorts				2004-2009 HS Cohorts (Only High Schools with 0% and 100% Fee Waiver Usage)			
	Last SAT Before Fall 2007		Last SAT Fall 2007 or Later		Last SAT Before Fall 2007		Last SAT Fall 2007 or Later	
	Fee Waiver	No Fee Waiver	Fee Waiver	No Fee Waiver	Fee Waiver	No Fee Waiver	Fee Waiver	No Fee Waiver
Fraction Sending SAT scores	0.717	0.745	0.751	0.779	0.744	0.776	0.727	0.794
Mean Number of Score Sends Among Senders	5.136	5.483	5.555	5.515	4.894	5.298	5.441	5.563
Male	0.371	0.470	0.379	0.467	0.421	0.470	0.417	0.472
Female	0.627	0.529	0.621	0.533	0.576	0.529	0.583	0.528
Black	0.305	0.067	0.314	0.074	0.352	0.034	0.312	0.037
White	0.154	0.716	0.141	0.692	0.094	0.809	0.067	0.782
Hispanic	0.352	0.076	0.368	0.085	0.387	0.047	0.490	0.059
Asian	0.118	0.092	0.115	0.102	0.042	0.060	0.056	0.077
SAT Critical Reading	439.332	543.072	442.168	536.245	403.852	566.898	399.746	561.395
SAT Math	452.756	553.939	453.633	548.447	406.272	567.408	405.806	563.646
Attended Two Year College On-time	0.203	0.124	0.216	0.135	0.172	0.078	0.217	0.089
Attended Four Year College On-time	0.518	0.733	0.540	0.737	0.421	0.757	0.426	0.761
Average SAT score of College Attended	1063.320	1140.226	1059.947	1129.193	1038.578	1162.036	1038.643	1152.366
Bachelors in Four Years	0.168	0.414	0.179	0.409	0.092	0.439	0.123	0.450
Bachelors in Five Years	0.296	0.579	0.313	0.576	0.182	0.602	0.215	0.610
Bachelors in Six Years	0.347	0.627	0.378	0.625	0.218	0.648	0.244	0.653
Observations	137,469	1,085,997	260,276	1,352,967	5,628	305,640	3,784	105,828

Notes: The "0%" and "100%" fee waiver high schools were identified as those where 0 percent and 100 percent of SAT test takers from the 2007 through 2009 cohorts used fee waivers to cover exam fees. For earlier cohorts,we assume that all students from the "100%" fee waiver high schools received fee waivers and that none of the students from the "0%" fee waiver high schools received fee waivers. Students from the 2004 cohort are tracked through 2011 and all other cohorts are tracked for 6 years, except for the 2009 cohort, which is tracked through 2014. Time to bachelor's degree receipt is marked by whether a student has earned this degree by August, four, five and six years after high school graduation. All descriptive statistics, except for those presented in the first row, are for students who sent at least one SAT score.

Table 2: Impacts of the Four Free Flexible Score Sends on Score-Sending Behavior (2007-2009 cohorts)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	US High Schools			US High Schools with Consistent 0% and 70%+ Fee Waiver Usage			US High Schools with Consistent 0% and 80%+ Fee Waiver Usage			US High Schools with Consistent 0% and 100% Fee Waiver Usage		
	A. Dependent Variable: Number of Score Sends											
PostxFeeWaiver	0.459***	0.450***	0.410***	0.283***	0.340***	0.311***	0.259**	0.325***	0.291**	0.293*	0.491***	0.412**
	(0.054)	(0.054)	(0.060)	(0.096)	(0.092)	(0.103)	(0.108)	(0.105)	(0.119)	(0.166)	(0.166)	(0.189)
Observations	2,836,709	2,836,709	2,836,709	291,918	291,918	291,918	265,532	265,532	265,532	206,482	206,482	206,482
R-squared	0.015	0.169	0.229	0.018	0.185	0.241	0.018	0.192	0.247	0.016	0.209	0.263
Student Covariates	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
High School Fixed Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	B. Maximum College-Reported SAT score (1600 pt scale) among Score Sends											
PostxFeeWaiver	8.341***	5.856***	1.987**	10.933***	3.358**	-0.426	12.620***	4.829**	0.283	21.294***	11.847**	4.449
	(1.119)	(0.732)	(0.946)	(2.169)	(1.648)	(1.890)	(2.382)	(2.128)	(2.378)	(5.518)	(5.109)	(5.032)
Observations	2,751,058	2,751,058	2,751,058	279,555	279,555	279,555	254,503	254,503	254,503	199,775	199,775	199,775
R-squared	0.024	0.160	0.373	0.036	0.216	0.379	0.033	0.224	0.393	0.023	0.255	0.450
Student Covariates	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
High School Fixed Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	C. Range of College-Reported SAT score (1600 pt scale) among Score Sends											
PostxFeeWaiver	7.322***	8.821***	6.946***	5.132**	6.368***	4.478*	5.567**	7.087***	4.844*	16.259*	16.479**	13.414*
	(1.048)	(1.226)	(1.483)	(2.243)	(1.902)	(2.359)	(2.388)	(2.048)	(2.686)	(8.770)	(6.999)	(7.782)
Observations	2,751,058	2,751,058	2,751,058	279,555	279,555	279,555	254,503	254,503	254,503	199,775	199,775	199,775
R-squared	0.021	0.092	0.152	0.053	0.147	0.193	0.050	0.147	0.194	0.012	0.130	0.185
Student Covariates	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
High School Fixed Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with *PostxFeeWaiver* indicate the impact of the four free flexible policy shock on the outcomes listed in Panels A, B and C. Standard errors are clustered by state. All regressions include indicator variables for the date of last SAT administration. Student covariates include student race, student gender and student SAT scores on the math and critical reading sections of the exam. We linked college-level data on SAT scores of incoming students from IPEDS 2007 to student score send data, estimating the college-reported average SAT score as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year. In this table, we classify high schools by the consistency of fee waiver usage. So, for example, in order to qualify as a 70% + fee waiver high school, 70 percent or more of students last taking the SAT during the spring of their junior year and during the fall of their senior year must have used SAT fee waivers.

Table 3: Impacts on Distribution of Number of Score Sends

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	At Least 1 Score	1 Score	2 Scores	3 Scores	4 Scores	5 Scores	6 Scores	7 Scores	8 or more Scores
	A. All US High Schools; Cohorts 2007-2009								
PostxFeeWaiver	-0.002	0.012***	0.009***	0.007***	-0.080***	-0.022***	-0.021***	-0.014***	0.109***
	(0.005)	(0.003)	(0.001)	(0.002)	(0.012)	(0.003)	(0.003)	(0.003)	(0.010)
Observations	3,732,863	2,836,709	2,836,709	2,836,709	2,836,709	2,836,709	2,836,709	2,836,709	2,836,709
R-squared	0.172	0.046	0.026	0.022	0.090	0.015	0.015	0.017	0.183
	B. All US High Schools; Cohorts 2007-2009 (SAT=400-720)								
PostxFeeWaiver	0.001	0.019***	0.008	0.004	-0.088***	-0.000	-0.016***	-0.009**	0.081***
	(0.010)	(0.007)	(0.005)	(0.004)	(0.011)	(0.003)	(0.003)	(0.004)	(0.008)
Observations	259,195	138,631	138,631	138,631	138,631	138,631	138,631	138,631	138,631
R-squared	0.191	0.182	0.117	0.105	0.143	0.092	0.088	0.083	0.137
	C. All US High Schools; Cohorts 2007-2009 (SAT=730-870)								
PostxFeeWaiver	-0.005	0.005	0.008***	0.008***	-0.079***	-0.018***	-0.015***	-0.014***	0.105***
	(0.007)	(0.005)	(0.002)	(0.002)	(0.016)	(0.003)	(0.004)	(0.003)	(0.011)
Observations	619,626	378,994	378,994	378,994	378,994	378,994	378,994	378,994	378,994
R-squared	0.133	0.084	0.059	0.052	0.094	0.046	0.046	0.046	0.115
	D. All US High Schools; Cohorts 2007-2009 (SAT>=880)								
PostxFeeWaiver	0.007*	0.006***	0.004***	0.004**	-0.073***	-0.030***	-0.025***	-0.014***	0.128***
	(0.004)	(0.002)	(0.001)	(0.002)	(0.014)	(0.004)	(0.004)	(0.003)	(0.010)
Observations	2,854,042	2,319,084	2,319,084	2,319,084	2,319,084	2,319,084	2,319,084	2,319,084	2,319,084
R-squared	0.138	0.041	0.027	0.024	0.084	0.016	0.015	0.017	0.188
	E. US High Schools with Consistent 0% and 100% Fee Waiver Usage; Cohorts 2004-2009								
PostxFeeWaiver	-0.016	0.033*	-0.006	-0.006	-0.085***	-0.014*	0.000	-0.018**	0.095***
	(0.016)	(0.018)	(0.008)	(0.011)	(0.026)	(0.007)	(0.007)	(0.008)	(0.018)
Observations	539,717	420,880	420,880	420,880	420,880	420,880	420,880	420,880	420,880
R-squared	0.177	0.070	0.048	0.042	0.153	0.031	0.032	0.033	0.197
	F. US High Schools with Consistent 0% and 100% Fee Waiver Usage; Cohorts 2004-2009 (SAT=400-720)								
PostxFeeWaiver	0.052***	0.050*	-0.027	0.018	-0.134***	-0.002	0.006	0.017	0.072**
	(0.018)	(0.026)	(0.022)	(0.019)	(0.035)	(0.012)	(0.018)	(0.012)	(0.034)
Observations	18,836	10,372	10,372	10,372	10,372	10,372	10,372	10,372	10,372
R-squared	0.389	0.431	0.362	0.363	0.393	0.290	0.249	0.240	0.288
	G. US High Schools with Consistent 0% and 100% Fee Waiver Usage; Cohorts 2004-2009 (SAT=730-870)								
PostxFeeWaiver	-0.031	0.011	0.011	-0.009	-0.073**	-0.022	0.013	-0.013	0.081***
	(0.020)	(0.019)	(0.015)	(0.012)	(0.031)	(0.018)	(0.012)	(0.012)	(0.024)
Observations	52,909	32,852	32,852	32,852	32,852	32,852	32,852	32,852	32,852
R-squared	0.247	0.235	0.211	0.206	0.283	0.169	0.164	0.154	0.229
	H. US High Schools with Consistent 0% and 100% Fee Waiver Usage; Cohorts 2004-2009 (SAT>=880)								
PostxFeeWaiver	-0.020	0.011	-0.006	-0.011	-0.055*	-0.036***	-0.012	-0.036*	0.144***
	(0.021)	(0.013)	(0.010)	(0.009)	(0.029)	(0.012)	(0.011)	(0.018)	(0.027)
Observations	467,972	377,656	377,656	377,656	377,656	377,656	377,656	377,656	377,656
R-squared	0.155	0.065	0.048	0.043	0.155	0.033	0.033	0.033	0.199

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with PostxFeeWaiver indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. For cohorts before 2007, we do not have data on fee waiver usage, and instead assign all students from the 100% usage high schools as having taken the SAT with fee waivers. We similarly assign students from the 0 % usage high schools as having taken the SAT without using fee waivers. All regressions include indicator variables for date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. All regressions include only those students who sent at least one SAT score (except for Column 1) and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year. Terciles are defined based on the students taking the SAT from 100 percent fee-waiver high schools from the 2004 through 2009 HS cohorts.

Table 4: Impacts of the Four Free Flexible Score Sends on College Enrollment/Completion (2007-2009 cohorts)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Attends College	Attends College On-time	Attends Two-Year College On-Time	Attends Four-Year College On-Time	Average SAT of College Enrolled	Attends Top 2 Barron's Category	Earned Bachelor's Degree in 4 Yrs.	Earned Bachelor's Degree in 5 Yrs.	Earned Bachelor's Degree in 6 Yrs.
	A. All US High Schools								
PostxFeeWaiver	0.010***	0.020***	0.007**	0.013***	1.345	0.005***	0.008***	0.014***	0.023***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.852)	(0.002)	(0.002)	(0.002)	(0.003)
Observations	2,836,709	2,836,709	2,836,709	2,836,709	2,030,448	2,836,709	2,836,709	2,836,709	1,879,742
R-squared	0.056	0.086	0.143	0.185	0.483	0.237	0.202	0.200	0.190
	B. US High Schools with Consistent 0% and 70%+ Fee Waiver Usage								
PostxFeeWaiver	0.023***	0.043***	0.017***	0.026**	1.764	0.005**	0.011***	0.024***	0.038***
	(0.006)	(0.010)	(0.004)	(0.010)	(2.334)	(0.002)	(0.003)	(0.005)	(0.007)
Observations	291,918	291,918	291,918	291,918	194,816	291,918	291,918	291,918	196,381
R-squared	0.120	0.168	0.175	0.263	0.514	0.232	0.277	0.295	0.296
	C. US High Schools with Consistent 0% and 80%+ Fee Waiver Usage								
PostxFeeWaiver	0.025***	0.043***	0.013**	0.031**	2.289	0.004**	0.016***	0.027***	0.039***
	(0.009)	(0.013)	(0.006)	(0.012)	(2.839)	(0.002)	(0.004)	(0.007)	(0.010)
Observations	265,532	265,532	265,532	265,532	181,606	265,532	265,532	265,532	178,674
R-squared	0.123	0.173	0.180	0.264	0.510	0.236	0.270	0.289	0.293
	D. US High Schools with Consistent 0% and 100% Fee Waiver Usage								
PostxFeeWaiver	0.025***	0.044***	0.032**	0.012	9.661	0.006	0.022*	0.030**	0.019
	(0.006)	(0.014)	(0.016)	(0.024)	(8.433)	(0.007)	(0.012)	(0.014)	(0.015)
Observations	206,482	206,482	206,482	206,482	154,962	206,482	206,482	206,482	140,588
R-squared	0.138	0.182	0.200	0.234	0.490	0.244	0.218	0.222	0.229

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with PostxFeeWaiver indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. Each panel indicates the restrictions that we specified for sample inclusion based on percentage of SAT test takers at the student's high school who use fee waivers. These sample selections are intended to remove students from schools where the probability of SAT fee waiver usage is influenced by the policy. All regressions include indicator variables for date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. We define the average SAT of the enrolled college using IPEDS 2007 data, estimating this metric as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year.

Table 5: Impacts of the Four Free Flexible Score Sends on Score-Sending/Enrollment/Completion (2007-2009 cohorts), by Student SAT Scores- All high schools

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Number of Score Sends	Attends College On-Time	Attends Two-Year College On-Time	Attends Four-Year College On-Time	Average SAT of College Enrolled	Attends Top 2 Barron's Category	Earned Bachelor's Degree in 4 Yrs.	Earned Bachelor's Degree in 5 Yrs.	**IV** Attends College On-Time	**IV** Bachelor's Degree in 5 Yrs.
	A. Full Range of Student SAT Scores									
PostxFeeWaiver	0.410***	0.020***	0.007**	0.013***	1.345	0.005***	0.008***	0.014***	0.049***	0.033***
	(0.060)	(0.003)	(0.003)	(0.004)	(0.852)	(0.002)	(0.002)	(0.002)	(0.013)	(0.005)
Observations	2,836,709	2,836,709	2,836,709	2,836,709	2,030,448	2,836,709	2,836,709	2,836,709	2,833,669	2,833,669
R-squared	0.229	0.086	0.143	0.185	0.483	0.237	0.202	0.200		
	B. Students Scoring in the Lowest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=400-720)									
PostxFeeWaiver	0.257***	-0.001	0.005	-0.006	-5.637*	0.000	-0.006**	-0.004	-0.003	-0.014
	(0.073)	(0.007)	(0.007)	(0.006)	(3.238)	(0.000)	(0.002)	(0.003)	(0.027)	(0.012)
Observations	138,631	138,631	138,631	138,631	33,517	138,631	138,631	138,631	135,904	135,904
R-squared	0.187	0.178	0.154	0.176	0.439	0.149	0.135	0.146		
	C. Students Scoring in the Middle SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=730-870)									
PostxFeeWaiver	0.416***	0.014**	0.012*	0.002	-0.137	0.001	0.002	0.000	0.034*	0.001
	(0.076)	(0.006)	(0.006)	(0.008)	(1.140)	(0.001)	(0.002)	(0.003)	(0.018)	(0.007)
Observations	378,994	378,994	378,994	378,994	176,422	378,994	378,994	378,994	376,010	376,010
R-squared	0.145	0.101	0.132	0.147	0.259	0.055	0.102	0.111		
	D. Students Scoring in the Highest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=>880)									
PostxFeeWaiver	0.548***	0.014***	-0.002	0.017***	1.681	0.006**	0.015***	0.018***	0.026***	0.034***
	(0.053)	(0.002)	(0.003)	(0.004)	(1.114)	(0.002)	(0.003)	(0.002)	(0.006)	(0.003)
Observations	2,319,084	2,319,084	2,319,084	2,319,084	1,820,509	2,319,084	2,319,084	2,319,084	2,316,158	2,316,158
R-squared	0.230	0.054	0.115	0.109	0.442	0.255	0.156	0.133		

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with *PostxFeeWaiver* indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. All regressions include indicator variables for date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. We define the average SAT of the enrolled college using IPEDS 2007 data, estimating this metric as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year. Terciles are defined based on the students taking the SAT from 100 percent fee-waiver high schools from the 2004 through 2009 HS cohorts.

Table 6: Impacts of the Four Free Flexible Score Sends on Score-Sending/Enrollment/Completion (2007-2009 cohorts), among higher-achieving students All high schools

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Number of Score Sends	Attends College On-Time	Attends Two-Year College On-Time	Attends Four-Year College On-Time	Average SAT of College Enrolled	Attends Top 2 Barron's Category	Earned Bachelor's Degree in 4 Yrs.	Earned Bachelor's Degree in 5 Yrs.	**IV** Attends College On-Time	**IV** Bachelor's Degree in 5 Yrs.
					A. SAT=880-1290					
PostxFeeWaiver	0.564***	0.013***	-0.002	0.015***	1.415	0.003*	0.013***	0.017***	0.023***	0.031***
	(0.052)	(0.002)	(0.003)	(0.004)	(1.298)	(0.002)	(0.003)	(0.002)	(0.006)	(0.003)
Observations	1,937,636	1,937,636	1,937,636	1,937,636	1,473,128	1,937,636	1,937,636	1,937,636	1,934,714	1,934,714
R-squared	0.187	0.056	0.112	0.111	0.299	0.113	0.133	0.119		
					B. SAT >=1300					
PostxFeeWaiver	0.500***	0.025***	-0.012**	0.037***	3.885	0.017**	0.010	0.010	0.050***	0.021
	(0.121)	(0.007)	(0.005)	(0.008)	(2.772)	(0.008)	(0.008)	(0.008)	(0.018)	(0.015)
Observations	381,448	381,448	381,448	381,448	347,381	381,448	381,448	381,448	378,421	378,421
R-squared	0.219	0.085	0.085	0.085	0.333	0.250	0.101	0.088		

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with *PostxFeeWaiver* indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. All regressions include indicator variables for date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. We define the average SAT of the enrolled college using IPEDS 2007 data, estimating this metric as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year.

Table 7: Threats to Validity

	(1)	(2)	(3)	(4)
	Change in Share of Seniors Taking SAT After Implementation of Four Free Flexible Score Send Policy			
	0% and 70%+ Fee Waiver Usage Schools: Cohort 2007,2009	0% and 80%+ Fee Waiver Usage Schools: Cohort 2007, 2009	0% and 100% Fee Waiver Usage Schools: Cohort 2007, 2009	0% and 100% Fee Waiver Usage Schools: Cohort 2004-2007, 2009
PostxHighFeeWvrUse	0.004	0.008	-0.008	0.017
	(0.015)	(0.015)	(0.024)	(0.019)
Observations	8,725	8,481	7,805	18,389
R-squared	0.966	0.965	0.964	0.905

Notes: The unit of observation is a high-school, by cohort. We regress the fraction of seniors who took the SAT (senior fall and junior spring takers) on cohort indicator variables, and an interaction term (*PostxHighFeeWvrUse)* between the 2009 cohort indicator variable and an indicator for whether the high school was a high fee waiver usage high school, flexibly defined by the column headers. We continue to include fixed effects for high schools. In these regressions, we omit students from the 2008 high school cohort because some of these students took the SAT under the new policy, while others did not. Standard errors are clustered by state. High school senior enrollment is collected from the Common Core of Data. In rare instances, the number of SAT test takers in a cohort exceeds enrollment. We cap the fraction of seniors taking the SAT at 1.0.

Figure 1: Distribution of Score Sends, by Fee-Waiver Use and Policy Exposure

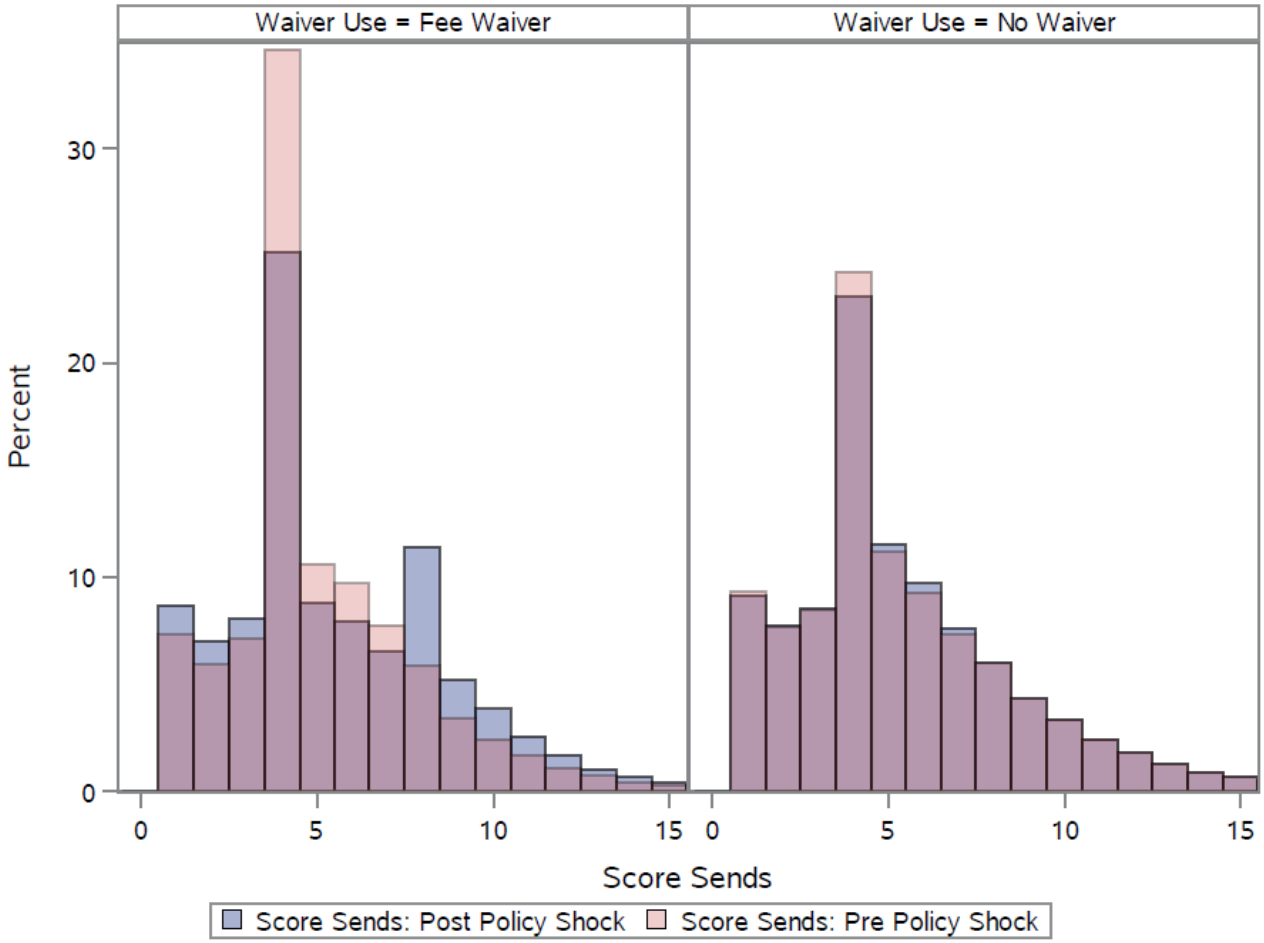
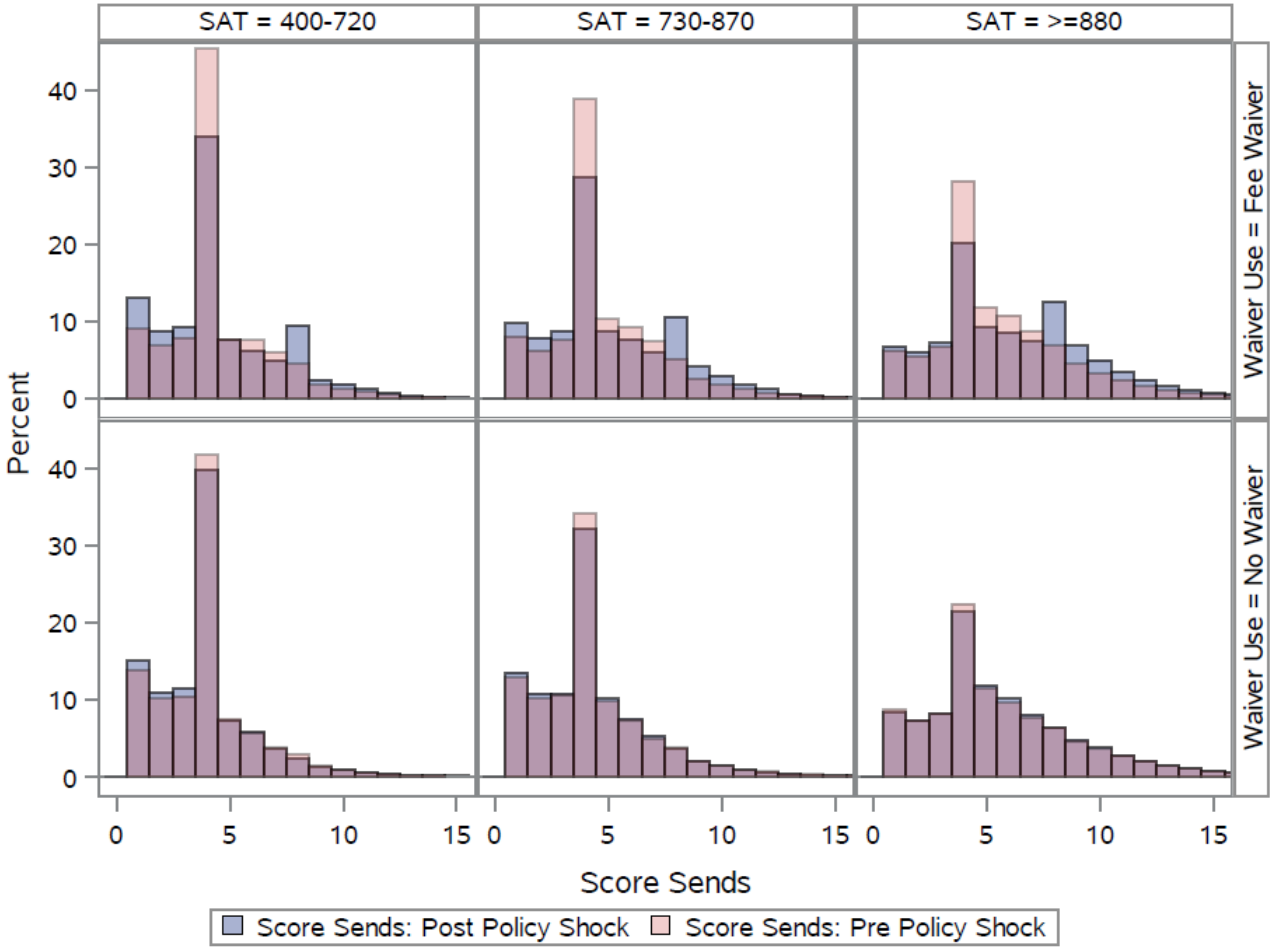


Figure 2: Distribution of Score Sends, by Tercile of SAT performance, Fee-Waiver Use and Policy Exposure



Appendix Table 1: Impacts of the Four Free Flexible Score Sends on Score-Sending/Enrollment/Completion (2007-2009 cohorts), by Student SAT Scores

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Number of Score Sends	Attends College On-Time	Attends Two-Year College On-Time	Attends Four-Year College On-Time	Average SAT of College Enrolled	Attends Top 2 Barron's Category	Earned Bachelor's Degree in 4 Yrs.	Earned Bachelor's Degree in 5 Yrs.	**IV** Attends College On-Time	**IV** Bachelor's Degree in 5 Yrs.
	A. Full Range of Student SAT Scores									
PostxFeeWaiver	0.412**	0.044***	0.032**	0.012	9.661	0.006	0.022*	0.030**	0.107	0.072*
	(0.189)	(0.014)	(0.016)	(0.024)	(8.433)	(0.007)	(0.012)	(0.014)	(0.075)	(0.042)
Observations	206,482	206,482	206,482	206,482	154,962	206,482	206,482	206,482	203,596	203,596
R-squared	0.263	0.182	0.200	0.234	0.490	0.244	0.218	0.222		
	B. Students Scoring in the Lowest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=400-720)									
PostxFeeWaiver	0.226	0.029	0.051	-0.022	16.870	-0.001	-0.001	0.024	0.129	0.104
	(0.339)	(0.044)	(0.036)	(0.048)	(18.196)	(0.003)	(0.020)	(0.027)	(0.193)	(0.117)
Observations	5,312	5,312	5,312	5,312	1,310	5,312	5,312	5,312	4,074	4,074
R-squared	0.461	0.484	0.451	0.479	0.752	0.387	0.478	0.490		
	C. Students Scoring in the Middle SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=730-870)									
PostxFeeWaiver	0.329*	0.025	0.037	-0.013	-3.813	-0.005	0.018	0.009	0.075	0.028
	(0.179)	(0.034)	(0.023)	(0.020)	(11.273)	(0.003)	(0.011)	(0.021)	(0.108)	(0.059)
Observations	16,748	16,748	16,748	16,748	8,042	16,748	16,748	16,748	14,587	14,587
R-squared	0.342	0.381	0.350	0.378	0.486	0.219	0.304	0.327		
	D. Students Scoring in the Highest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=>880)									
PostxFeeWaiver	0.944***	0.062*	0.020	0.042	9.482	0.031**	0.051	0.070**	0.066	0.074***
	(0.261)	(0.032)	(0.022)	(0.043)	(10.210)	(0.014)	(0.034)	(0.034)	(0.046)	(0.027)
Observations	184,422	184,422	184,422	184,422	145,610	184,422	184,422	184,422	181,764	181,764
R-squared	0.263	0.165	0.179	0.191	0.466	0.257	0.189	0.180		

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with PostxFeeWaiver indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. Sample includes only the high schools with either 0% or 100% SAT fee waiver use for the 2007 through 2009 cohorts. All regressions include indicator variables for date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. We define the average SAT of the enrolled college using IPEDS 2007 data, estimating this metric as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year. Terciles are defined based on the students taking the SAT from 100 percent fee-waiver high schools from the 2004 through 2009 HS cohorts.

Appendix Table 2: Expanded Cohort Impacts of the Four Free Flexible Score Sends on Score-Sending/Enrollment/Completion (2004-2009 cohorts)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Number of Score Sends	Attends College On-time	Attends Two-Year College On-Time	Attends Four-Year College On-	Average SAT of College Enrolled	Attends Top 2 Barron's	Earned Bachelor's Degree in 4 Yrs.	Earned Bachelor's Degree in 5 Yrs.	**IV** Attends College On-time	**IV** Bachelor's Degree in 5
	A. Full Range of Student SAT Scores									
PostxFeeWaiver	0.320*	0.047**	0.032***	0.015	4.671	0.004	0.007	0.018	0.148	0.055
	(0.190)	(0.019)	(0.009)	(0.019)	(4.935)	(0.004)	(0.012)	(0.014)	(0.133)	(0.057)
Observations	420,880	420,880	420,880	420,880	314,608	420,880	420,880	420,880	419,311	419,311
R-squared	0.238	0.138	0.171	0.199	0.467	0.227	0.194	0.195		
	B. Students Scoring in the Lowest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=400-720)									
PostxFeeWaiver	0.268	0.007	0.045*	-0.038	19.414	-0.000	-0.017	-0.011	0.025	-0.042
	(0.279)	(0.036)	(0.023)	(0.036)	(12.813)	(0.003)	(0.015)	(0.025)	(0.119)	(0.102)
Observations	10,372	10,372	10,372	10,372	2,609	10,372	10,372	10,372	8,754	8,754
R-squared	0.375	0.415	0.394	0.405	0.665	0.314	0.366	0.388		
	C. Students Scoring in the Middle SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=730-870)									
PostxFeeWaiver	0.281	0.027	0.039*	-0.011	-6.114	-0.004*	0.004	0.000	0.097	0.001
	(0.187)	(0.031)	(0.022)	(0.020)	(6.492)	(0.002)	(0.011)	(0.023)	(0.139)	(0.073)
Observations	32,852	32,852	32,852	32,852	15,365	32,852	32,852	32,852	30,621	30,621
R-squared	0.266	0.296	0.281	0.304	0.425	0.152	0.226	0.249		
	D. Students Scoring in the Highest SAT Tercile, Defined by SAT Fee Waiver Recipients (SAT=>880)									
PostxFeeWaiver	0.735***	0.048**	0.008	0.041	6.404	0.021**	0.036	0.055**	0.066	0.075**
	(0.193)	(0.022)	(0.016)	(0.031)	(6.685)	(0.009)	(0.027)	(0.027)	(0.040)	(0.037)
Observations	377,656	377,656	377,656	377,656	296,634	377,656	377,656	377,656	376,004	376,004
R-squared	0.237	0.121	0.149	0.154	0.443	0.240	0.165	0.153		

*p<0.10; **p<0.05; ***p<0.01 Notes: The parameter estimates associated with PostxFeeWaiver indicate the impact of the four free flexible policy shock on the outcomes listed in the table columns. Standard errors are clustered by state. Sample includes only the high schools with either 0% or 100% SAT fee waiver use for the 2007 through 2009 cohorts. For earlier cohorts, we do not have data on fee waiver usage, and instead assign all students from the 100% usage high schools as having taken the SAT with fee waivers. We similarly assign students from the 0 % usage high schools as having taken the SAT without using fee waivers. All regressions include indicator variables for high school cohort and date of last SAT administration, fixed effects for the student's high school and a vector of student covariates including student race, student gender and student SAT scores on the math and critical reading sections of the exam. We define the average SAT of the enrolled college using IPEDS 2007 data, defining this metric as the sum of the 25th and 75th percentiles for math and critical reading divided by a factor of 2. Regressions include only those students who sent at least one SAT score and who last took the SAT either in the spring of their HS junior year or the fall of their HS senior year. Terciles are defined based on the students taking the SAT from 100 percent fee-waiver high schools from the 2004 through 2009 HS cohorts.

Appendix Figure 1: Mean Number of Score Sends, by Fee-Waiver Status