Making SAT Scores Optional in Selective College Admissions: A Case Study

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Abstract

Despite heightened scrutiny of the use of standardized tests in college admissions, there has been little public empirical analysis of the effects of an optional SAT score submission policy on college admissions. This paper examines the results of the decision by Mount Holyoke College to make SAT scores optional in the admissions process. We find that students who "under-performed" on the SAT relative to their high school GPA were more likely to withhold their scores; the admissions office rated applicants who withheld their scores more highly than they otherwise would have been rated; and, matriculants who withheld their scores had a lower average GPA than those who submitted their standardized test results.

Introduction

The SAT test has come under increasing scrutiny and pressure recently from many fronts. Perhaps the largest challenge to this standardized test, which is widely used in college admissions, has come from Richard Atkinson, President of the University of California System. He has publicly criticized the SAT and the over-reliance of colleges on this test in granting admission to their institutions. He recommends the elimination of the SAT as an admission requirement in the University of California System.[1] Atkinson, and other critics of the SAT, find fault with the test on a number of levels. One criticism is that individuals can be coached to perform well on the test. Another concern is that in the end the SAT does not provide that much additional information concerning the future academic ability of college applicants. This final criticism may be particularly applicable at smaller institutions, where each application is read by an admissions officer, and high school grade point average, class rank, rigor of high school curriculum, and letters of recommendation taken collectively may provide more than adequate predictive information concerning an applicant's likely success in college.

While the storm brewing in California has garnered a great deal of attention due to the sheer size of the California higher education system and the potential for a rippling effect across the states, it is not the first institutional challenge to the use of the SAT in college admissions. In fact, a number of smaller liberal arts colleges have for years made the submission of one's SAT scores optional in the application process.[2] For over seventeen years Bates has not required standardized tests scores as a criterion of admission (Hiss (2001)). Additionally, Dickinson,

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[1] There are actually two sets of exams. The SAT I, which is a general test of verbal and quantitative abilities, and the SAT II which are a series of topical exams. Throughout this paper the use of the term SAT refers to the SAT I exam.

[2] Most colleges require students to submit either their SAT or their ACT scores. Those institutions that no longer require the SAT also consider the ACT optional.

Muhlenberg, and Union College, among others, no longer require the SAT or ACT for admission. On the other hand, Lafayette College experimented with optional SAT score submission in admissions, and decided to resume the requirement of submission of a standardized test score for admittance.[3]

There are both potential costs and benefits to an institution of following an optional SAT score submission policy in admissions. One of the potential benefits is that an institution may receive additional applicants, as individuals who otherwise would have chosen not to apply may now do so. This is a benefit to institutions for two reasons. The first reason is that there may be students among the additional applicants with desirable characteristics or qualities that the institution would like to attract. For example, the marginal applicant pool may possess additional minority students and students with outstanding academic characteristics other than SAT scores. A second reason institutions may benefit from an increase in applications is that they appear more selective, as they accept the same number of students from a larger applicant base. A lower acceptance rate is one measure used by magazines, students, and admissions counselors to gauge the academic quality of an institution.

Another potential benefit to an institution in implementing an optional SAT score submission policy is that it may result in a higher reported average SAT. In fact, one observer (Yablon (2001)) called the use of optional SAT score submission a "scam", in which institutions use optional SAT score submission as a means of raising their average reported SAT scores of the entering class. Higher average reported scores make an institution appear more selective and of higher quality. Ehrenberg (2001) questions the motivation of these institutions for making

[3] "Lafayette's Comfort Level is Higher With the SAT's." by Barry McCarty. Chronicle of Higher Education, October 26, 2001.

SAT scores optional. He suggests, as does Yablon, that institutions have made this change in policy, at least in part, to bolster their positions in influential rankings such as the *US News and World Report* rankings of colleges. There is prima facie evidence both in support and opposition to this charge. Brownstein (2001) reports that no longer requiring the SAT actually lowered the reported SAT scores of Dickinson and Franklin and Marshall, while raising the average SAT scores of Muhlenberg, despite the fact that Muhlenberg reports the average SAT score over all of their students, including those who blocked their scores during the application process.

On the other hand, there are costs associated with not collecting the SAT scores of all of the applicants. It may be the case that without the SAT scores of a student the admissions office loses an important tool in differentiating the caliber of student they would like to admit from those they would not. In this scenario, admissions officers may respond by assuming that all non-submitters are "lemons" and not admitting any of the students who withhold their SAT scores. Because the admissions process repeats itself every year, and students are able to observe, at least second hand, previous years outcomes, this behavior is not sustainable. Soon no one would apply without submitting one's scores and the policy would be moot.

From the students' perspective, the important question becomes how the institution treats applicants who opt not to submit their scores. A student would only withhold her score if she felt it would improve her chances of being admitted, given her SAT score and other academic characteristics. Similarly, a student would only submit her score if she felt it improved her chances of being admitted. Students who feel that they possess attributes that the college would find desirable, but who did not perform well on the SAT, would be more likely to withhold their SAT scores, while students who performed well on the SAT relative to their other academic credentials would be more likely to submit their scores.

These questions are important from a public policy standpoint for a number of reasons. First, from an efficiency standpoint if institutions are able to accurately ascertain the academic qualifications of its applicants without the use of SAT scores, then students may be devoting un-necessary resources towards achieving maximum scores on this test. In fact, Clotfelter and Vigdor (2001) show that many applicants to selective institutions take the SAT examine three or more times in an attempt to maximize their probability of acceptance. In addition, the popularity of SAT test-prep courses represents a considerable investment in attempting to increase one's score on the SAT. If institutions are able to differentiate among its applicants without the use of SAT scores, then these resources could be devoted elsewhere. Second, in as much as enrollment to selective institutions is limited, how these scarce positions in the enrolling class are distributed among the applicants is an important question of allocative efficiency. The SAT is intended to be a signal of academic potential. If it is a noisy signal, then individuals may be self-selecting not to apply to certain institutions where they feel, based on their SAT scores, they do not have a reasonable chance of admission. This result may be most acute among racial and socio-economic groups that traditionally do not perform as well on the SAT. Making the SAT optional in admissions may result in a different distribution of the limited enrollment seats.

Despite the heightened concern with the use of standardized tests in college admissions and the important institutional and public policy implications of the use of SAT scores in admissions, there has been little public empirical analysis of the effects of an optional SAT score submission policy on admission outcomes and the subsequent academic performance of those students who chose not to submit their scores, but were admitted to the institution. This paper attempts to fill this void by examining the results of the recent decision by Mount Holyoke College, a small, prestigious, New England, women's, liberal arts college, to make SAT score

submission optional in the admissions process. The following analyses focus on the effect of the optional SAT score submission policy on: 1.) the size and racial composition of the applicant pool; 2.) the decision of applicants to either submit or withhold their SAT scores in the admissions process; 3.) the treatment of applicants who choose to withhold their SAT scores by the admissions office; 4.) the yield (percentage of admitted applicants who matriculate) of test submitters versus non-submitters; and finally 5.) the academic performance of the applicants who blocked their scores during the admissions process. The emphases of these analyses are on the individual choice of whether to submit one's scores, and whether the institution can make an informed decision concerning the academic prospects of the candidate for admission without knowing her SAT score.

Data

The data for this analysis are taken from the freshmen class entering in the fall of 2001, the first cohort of applicants for whom the new optional SAT score policy was implemented. For the purpose of this study only applicants for whom admissions decisions were made are considered (individuals with incomplete application materials were excluded from the data). In addition, submitters are defined to be all students who submitted and did not block either an SAT or ACT score and non-submitters are defined to be all applicants for whom the admissions office made an admissions decision based on neither a submitted SAT nor ACT score.[4]

There were 2,627 applicants for this class versus 2,445 applicants for the entering class of 2000 (see Table 1). This represents an increase of 7 percent. In comparison, the median increase

[4] Individuals who submitted ACT scores rather than SAT scores were eliminated from the following analyses in order to avoid problems of accurately converting ACT to comparable SAT scores.

in applications across a set of 12 peer institutions was 1 percent.[5] The increase at Mount Holyoke was the result of a 6 percent increase in white applications and a 21 percent increase in minority and international applications, versus 1 percent and 2 percent increases among our peers, respectively.[6] Table 2 illustrates that among the 2,627 applicants, 24.2 percent chose to block their standardized tests scores from the admissions office. Thirty-three percent of international students did not submit their scores, and 21.9 percent of domestic students did not submit their scores. These results are similar to the percentage of non-submitters reported by Bates College during the first five years under their SAT optional policy (Bradley, 1990).

Table 3 provides a comparison of submitters versus non-submitters based on their application status. As mentioned above, 24.2 percent of applicants did not submit a standardized test score, 19.4 percent of admitted applicants did not submit a test score, and 22.3 percent of the ultimate matriculants did not submit a test score. Based on these summary results it does not appear that the institution changed its policy simply to inflate the number of applicants with no intention of admitting them, in order to increase its reported selectivity. Similarly, it does not appear that the admissions staff viewed all non-submitters as "lemons" and thus did not admit them.

Table 4 compares summary measures of submitter versus non-submitter applicants. As expected, the non-submitters have lower SAT scores.[7] Among applicants the non-submitters

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[5] The 12 peer institutions are Amherst, Barnard, Bryn Mawr, Carleton, Oberlin, Pomona, Smith, Swarthmore, Trinity, Wellesley, Wesleyan, and Williams.

[6] There was a 27.8 percent decline in the number of applications for whom race was unknown, and therefore it is unclear how much of the increase in minority applications is simply due to re-classification.

[7] Average SAT scores for non-submitters are based on the 48.4 percent of non-submitters for whom we were able to obtain SAT scores from the College Board or from their high school transcripts, after the admissions process was complete. There are no statistically significant differences in the average high school GPA or class rank of the non-submitters for whom we

average combined SAT score is 141 points lower than the average combined SAT score for submitters. The non-submitters also have lower average high school GPA and class rank than submitters. The high school GPA gap between submitters and non-submitters is 0.18. The difference in average class rank is 4.8.

It is interesting to note the differences in non-academic characteristics of submitters versus non-submitters. The non-submitters are less likely to be white. Approximately, thirty-four percent of non-submitters versus 49 percent of submitters are white. Non-submitters are also more likely to be non-US citizens. Twenty-eight percent of non-submitters versus 18.5 percent of submitters are non-US citizens. These results coupled with the significant increase in minority applications relative to white applications outlined in Table 1 suggest that the change in policy may have had a positive impact on racial diversity. The non-submitters also have lower average income as reflected in their lower average family contribution (FC) and are less likely to be among the students who do not receive any financial aid (no-need) than submitters. There are no significant differences in the percentage of submitters versus non-submitters who applied (or were admitted) early decision.

These summary measures suggest a number of factors that may contribute to the decision to submit one's standardized test scores. The following section outlines an empirical model of the applicant's decision to submit one's SAT scores, and the related decision by the institution to admit an applicant given that she did or did not submit her SAT score.

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have SAT scores versus those for whom we do not have test scores. This suggests that the sample of non-submitters for whom we have SAT scores is academically comparable to the sample of non-submitters for whom we do not.

Empirical Model

Clearly, there are two application pools present here. One pool of applicants submitted their SAT scores, and the other applicant pool did not submit their scores, which application pool a candidate belonged to is obviously endogenously determined. This is an example of a switching regression model, with endogenous switching. The first equation, whether to submit one's SAT scores or not, determines to which application equation one is assigned.

(1) $S^* = X\beta + \mu$ where S=1 if submit, S=0 if non-submit

(2) $A_1 = Z_1\gamma_1+\varepsilon_1$ if S=1

(3) $A_2 = Z_2\gamma_2+\varepsilon_2$ if S=0

where equation 1 is the dichotomous decision to submit or withhold one's SAT scores , A is a measure of admissions (either admissions rating or the dichotomous variable of admittance or not), Z_1 includes SAT scores of the submitters, and Z_2 does not.

The first step is to estimate the decision to submit one's SAT scores or not (equation 1). It is expected that an applicant would be more likely to submit her SAT score if she felt that it would improve her chances of being admitted. She is likely to feel this way the higher her SAT scores. On the other hand, it is expected that an individual with lower SAT scores would be less likely to submit one's scores. Additionally, conditional on SAT scores an individual with other desirable attributes would be more likely to withhold her SAT scores.

The results of this SAT submission equation can then be used to perform a Heckit correction for self-selection on the sample of applicants that submitted their SAT scores (equation 2). The selectivity corrected coefficients from this regression were then used to predict the admissions rating of the non-submitters. This simulates the admissions rating that would

have been given the non-submitters if they had submitted their scores. Next we estimate the selectivity corrected coefficients for non-submitters (equation 3), and apply the coefficients from this regression to the submitters. This now simulates the admissions rating that would have been given the submitters if they had withheld their SAT scores.

As students are not ultimately interested in their admissions ratings per se, but rather in whether they are admitted or not, we also estimate the above system of equations examining the dichotomous admissions result of admittance or not (A=1 if admitted, zero if not). In order to test for the impact of test score submission on admittance, accounting for the self-selectivity of test score submission, a sequential bivariate probit with partial observability (S=1 if they submitted test scores, S=0 if they did not; A=1 if they were admitted, A=0 if they were not) is estimated on the sample of applicants who submitted their SAT scores. The sequential nature of the bivariate probit comes from the fact the applicants first choose whether to submit their SAT scores or not. The partial observability aspect of the bivariate probit stems from the fact that we only observe the admissions decisions based on SAT scores for those individuals who submitted their SAT scores. Similarly, we only observe the admissions decisions without the use of SAT scores for those individuals who withheld their scores. Following the approach called by Meng and Schmidt (1985) partial, partial observability, the likelihood function to be estimated for SAT score submitters is:

$$(4) \qquad L = \prod_{A_1=1} \frac{F(X\beta, Z_1\gamma_1, \rho)}{\Phi(X\beta)} \cdot \prod_{A_1=0} \frac{\Phi(X\beta) - F(X\beta, Z_1\gamma_1, \rho)}{\Phi(X\beta)}$$

where Φ is the standard normal distribution, and F is the bivariate normal distribution, and ρ is the correlation of the error term in the submission decision equation with the error term in the acceptance equation, for SAT score submitters.

Following the approach outlined above, the coefficients from this acceptance model are then used to predict the probability of admission of the non-submitters had they been treated like SAT score submitters.[8] A similar bivariate probit is also performed for non-submitters and the coefficients from this regression are applied to the characteristics of the submitters to estimate the probability that they would have been admitted had they withheld their SAT scores.

Finally, we attempt to ascertain whether the admissions staff is able to accurately differentiate the academic abilities of the applicant pool without the use of SAT scores for all students. If the admissions staff is able to successfully identify the most able students, then conditional on the admissions rating assigned to each individual, whether they withheld their SAT scores or not should not affect either their yield rates or their academic performance once on campus. To test these hypotheses, we first perform a probit of the decision to enroll or not conditional on admissions rating and a dummy variable for withholding one's score. Next we regress the first year grade point averages of the enrolled students on their admissions rating and a dummy variable for withholding one's SAT score. If the admissions staff can accurately assess the academic caliber of students without the aid of SAT scores, then the coefficient on withholding one's SAT scores should not be statistically significant, conditional on one's admissions rating, in determining a student's probability of matriculating or first year grade point average.

[8] The bivariate probits were identified by excluding family contribution (FC) from the acceptance equation, while including it in the submit equation. As a test of robustness the

Empirical Results

The summary measures and empirical model outlined above suggest that race, citizenship, one's SAT scores, and family income may be influential in determining whether to submit one's SAT scores for admission to Mount Holyoke College. As discussed above, the lower one's SAT score the less likely she would be to submit her score. Second, the higher the probability the student would be admitted based on other attributes without a SAT score the less likely she would be to submit her scores. This would imply that applicants with higher GPA's and better class rank would, ceteris paribus, be less likely to submit a SAT score. To test these hypotheses a probit model of SAT score submission is estimated.

The decision to submit one's SAT scores

Table 5 contains the estimated coefficients from the probit regression of SAT score submission. The two main hypotheses are generally supported. Applicants with higher math and verbal SAT scores are more likely to submit their test scores, and the higher the high school GPA of the applicant the less likely she is to submit her scores.[9] There is no significant effect of class rank on the probability of submitting one's SAT scores. Two other interesting results emerge.

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bivariate probits were also performed including FC in both equations and identifying off of functional form. The results are qualitatively the same.

[9] Individuals with missing values for any of the regressors were excluded from all of the following analyses. Also excluded from the analyses were individuals who submitted ACT scores rather than SAT scores. Alternative specifications were analyzed that included the average class rank, high school GPA, or family contribution for one's group (submitted, non-submitted) if this value was missing, and a dummy variable for missing value of the regressor. The results are qualitatively the same.

First, there is no significant effect of race on the probability of submitting scores. Interestingly, the coefficients on the black and Hispanic indicator variables are positive suggesting that, if anything, blacks and Hispanics are more likely to submit scores than whites, ceteris paribus. This appears to contradict the prediction that applicants with other characteristics that are desirable to the institution would be less likely to submit their scores. If there is affirmative action for minority applicants, then one would expect minority applicants to be less likely to submit their scores. On the other hand, a minority applicant may view a given SAT score as being more meritorious relative to her minority peers than the same score as a white applicant, and she may be more inclined to submit her score. Another interesting result is that the more affluent the applicant, as measured by the family contribution, the less likely one is to submit a score. This result may indicate that applicants from wealthier families either have more a priori confidence that they will be admitted, perhaps because of the quality of the high school they attend. It may also be because a given SAT score may be viewed by an applicant from an affluent area of the country as being less noteworthy, in comparison to her peers, than the same score obtained by an applicant from a less well-to-do area of the country. As a result, the more affluent applicant may be more likely to withhold her test score, while the less affluent applicant submits her score. An alternative explanation is simply that the wealthier applicants may be better informed about the admissions process and perhaps more adept at playing the admissions game and making strategic choices about whether to submit their scores.

The result that the higher the applicant's high school GPA the less like they are to submit an SAT score should be somewhat reassuring as far as the impact of the policy on student quality, because it suggests that it is higher quality applicants as measured by GPA (or presumably other non-quantitative measures of quality) that are less likely to submit scores,

conditional on their SAT scores. It appears that individuals who "under-performed" on the SAT based on their high school achievement are those individuals who are more likely to not submit their test scores. To test this hypothesis we regressed combined SAT scores on high school GPA, class rank, and a dummy variable indicating if the individual did not submit her score (results not shown). The mean SAT scores for submitters was 1250 compared to 1109 for non-submitters. The coefficient on the dummy variable was –130, indicating that non-submitters performed 130 points worse on average than their peers with comparable high school GPA and class rank. Clearly, the non-submitters are individuals who on average performed less well on the SAT than would be expected based on their high school performance. As a group they are "poor test takers".[10] This is similar to the result reported by Bradley (1990) for Bates College.

Treatment of Non-submitters in the admissions process

A primary concern to both individuals and the institution is whether the admissions process works differentially for submitters and non-submitters. Table 6 shows the percentage of each admission rating that were non-submitters both among all applicants, those that were accepted, and matriculants. There are substantial numbers of non-submitters in all rating groups, though they are more heavily concentrated in the lower rating categories among applicants. Forty five percent of those rated 8 (the lowest rating category) among applicants were non-submitters. This tends to give the impression both that some non-submitters were attempting to manage overall bad profiles by not submitting their scores, and that they were not particularly successful in this attempt. We can get a glimpse of the impact of non-submission on admission

[10] It could be the case that non-submitters "over-performed" in terms of class rank and GPA based on their SAT. This distinction is not identifiable. In either case, non-submitters had lower average SAT scores than individuals with comparable high school GPA and class rank.

rating by comparing the non-submitted and submitted SAT scores in each rating group. Figure 1 shows this for accepted applicants (and Figure 1b for all applicants). Two interesting results emerge. First, there remain substantial gaps in the combined SAT score at each admission rating of approximately 100 points, for both applicants and admits. This is consistent with the idea the non-submitters are "poor test takers" and that their scores under predict ability. However the pattern of scores across ratings is remarkably similar. The difference in the mean combined score between ratings 1 and 6 is 304 for submitted scores and 254 for non-submitted scores. One interpretation of this result is that the non-submitted scores are highly correlated with other factors used to rate applicants. If the SAT scores were uncorrelated with other measures of ability for non-submitters we would expect to see no relationship between non-submitted scores and the final rating. This result seems to suggest that SAT scores could have been used to separate the non-submitters into their admission ratings. On the other hand, the admissions office appears to be able to separate non-submitting applicants into rating groups that reflect the underlying scores, without using the scores.

Another test of the ability to rate the students without using the SAT can be obtained by comparing the high school GPA of the submitters and non-submitters by admission rating, among all applicants. Figure 2 shows this relationship. When examining the overall characteristics of the submitters and non-submitters we observed that on average the non-submitters had lower high school GPA (see Table 4). However Figure 2 reveals that there is virtually no difference in high school GPA between the groups within admission ratings. This convergence of GPA's in the presence of a SAT gap is consistent with our evidence the SAT seems to under predict ability as measured by high school GPA for non-submitters and that the final admission rating reflects ability. As a final measure of the effect of the submission or non-

submission of scores on admission rating, a Heckit selectivity corrected regression is estimated on the sample of submitters with admission rating as the dependent variable, as outlined above. Included among the regressors are verbal SAT scores, math SAT scores, high school GPA, class rank, and dummy variables for race (black, Hispanic, Asian, Native American, and unknown race), international student, and region.[11] The actual average admission rating of non-submitters was 4.6. Applying the coefficients from this selectivity corrected regression of submitters to the characteristics of the non-submitters yields a predicted average admission rating for non-submitters, had they been treated the same as those who submitted their scores, of 5.4 (one is the best admission rating and eight is the worst). The overall difference in the average predicted and actual admission ratings was 0.8. This suggests one of two possibilities. That the non-submitted SAT scores are poor measures of the applicants' ability and that the admissions office rates these applicants higher based on other information or that there is a slight benefit to not submitting scores. An additional regression of admission rating was performed for test score submitters excluding SAT scores from the regressors. The coefficients from this regression were again used to predict the admissions rating for non-submitters. This predicted value estimates the average admissions rating non-submitters would have received had they been treated the same as their peers with comparable high school GPA and class rank, but who chose to submit their scores. In this case, the predicted average admissions rating for non-submitters was 3.7, indicating that although non-submitters were given better average admissions ratings than their peers with comparable SAT scores, they were given less favorable ratings than their peers with the same high school GPA and class rank.

[11] We are prevented from presenting the coefficients of the admissions rating regression and admittance probit due to the proprietary nature of the data. As our primary emphasis is on the

Similarly, using the selectivity corrected coefficients from the admissions rating equation for non-submitters to predict the admissions rating for submitters results in a predicted average rating for submitters of 4.4 versus an actual admission rating of 4.1. As expected, on average submitters would have been worse off had they not submitted their SAT scores.

These results suggest that those individuals who chose not to submit their scores were wise to not submit; however, the admissions office gave these individuals lower average ratings than just their high school GPA and class rank would suggest, in a sense discounting their high school performance for not submitting their SAT scores, but not discounting their admissions rating to the point that is justified by their SAT scores.

After applicants are rated, the decision must be made about whether to accept them or not. We have already observed that the accept rate for non-submitters was substantially lower than for submitters (see Table 4), though we have now seen that non-submitters received slightly higher admission ratings than otherwise comparable submitters, conditional on SAT scores. Because the acceptance decision is a dichotomous choice (A=1 if admitted, A=0 if not admitted), the estimation of the selectivity corrected decision to admit an applicant or not becomes a sequential bivariate probit with partial observability, as outlined above. We estimate this bivariate probit for the sample of SAT score submitters and apply the coefficients from this regression to the characteristics of non-submitters in order to predict their probability of admittance had they been treated the same as the submitters. The actual accept rate for the non-submitters was 52.6 percent, while the predicted accept rate was 38.8 percent.[12] Similar to the

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treatment of non-submitters in the application process, we focus on their treatment in this process rather than on the influence of the other determinants in the application decision.

[12] The actual admit rate used here varies from the overall admit rate for non-submitters because we only include those individuals for whom we had SAT scores and who reported their high school GPA and class rank.

results for admission rating, this suggests an advantage towards being accepted for non-submitters, conditional on their SAT scores. Following the approach used to analyze the admissions ratings above, we also estimated the admittance bivariate probit excluding SAT scores from the regressors, and again predicted the accept rate of non-submitters had they been admitted at the same rate as submitters with comparable high school GPA and class rank. The average predicted acceptance rate was 61.7 percent. Fewer non-submitters were actually admitted than would have been the case had they been treated the same as submitters with the same GPA and class rank, but more non-submitters were actually admitted than would have been the case had they submitted their SAT scores.

Applying the coefficients of the bivariate probit for non-submitters to the characteristics of submitters resulted in an average predicted accept rate of 61.2 percent versus an actual acceptance rate of 61.9 percent. Submitters were slightly better off having submitted their test scores than would have been the case had they not submitted. [13]

The matriculation rates of non-submitters

Once accepted, the applicant chooses whether or not to enroll. The yield for non-submitters (40.1 percent) is higher than the yield for submitters (33.1 percent). There may be several factors at work here. One possibility is that because many colleges require SAT scores the non-submitters are either disadvantaged in their applications to other institutions and not accepted, or they choose not to apply to other institutions. In either case, we would expect them to yield at higher rates than submitters. Another explanation is lower student quality. We have

[13] All of the above results on the actual versus predicted acceptance rate of submitters and non-submitters are qualitatively the same when using just univariate probits that do not account for self-selection into the different applicant pools.

already seen that the non-submitters are weaker applicants than the submitters as measured by high school GPA, class rank, and admission rating. This would also lead to higher yields. Table 7 shows yields by admission ratings for submitters and non-submitters. Among regular decision fall admits the non-submitters have a yield of 28.6 percent compared to 23.2 percent for submitters. However, within admission ratings the differences were usually quite small and never statistically significant. The biggest differences were among admits rated 1 and 2, where non-submitters yielded at 33.3 percent and 28.6 percent, and submitters yielded at 18.9 percent and 16.6 percent, respectively, although these differences are not statistically significant due to the small cell sizes within these admission ratings.

To further explore these hypotheses a probit model of the probability of enrolling was estimated. Here the focus is on the probability that non-submitters will matriculate, conditional on having been accepted, and on admission rating. The dependent variable is one if the individual enrolls and zero if they do not. Conditional on the admission rating of the accepted candidate, the coefficient on the dummy variable for not submitting one's standardized tests scores is positive, but not significantly different from zero. There do not appear to be any significant yield differences between submitters and non-submitters conditional on having been accepted and admissions rating.

These results suggest a number of potential conclusions. Since it was not the case that the non-submitters yielded at higher rates after controlling for admission rating, it does not seem likely that they were disadvantaged in their applications to other institutions. This might mean that other institutions while requiring the SAT do not use it too heavily in the admissions process. It also may suggest that the admissions office was able to place the applicants into

admissions rating categories that were appropriate given their overall quality and choice set of competing schools even without direct knowledge of their SAT scores.

The academic performance of non-submitter matriculants

Overall the non-submitters had a slightly lower first year GPA (3.24) than the submitters (3.35). Of course this could be expected given the lower overall admission ratings of the non-submitters and their lower high school GPAs. Figure 3 presents relationship between first-year GPA and admission rating for the submitters and non-submitters. For those in admission ratings 2 and 3 the non-submitters had higher first year GPAs than the submitters and overall the admission rating seems to map well against first-year GPA.

In order to further test this relationship Table 8 presents the results of a regression of first-year GPA against family contribution, variables to measure difficulty of schedule (percent of courses in the humanities, percent of courses taken in math/science, percent of courses taken at the 200 or 300 level), dummy variables for admissions rating, race, international student, region, early decision, and a dummy variable equal to one if the student did not submit her SAT score. The coefficients on the admissions rating dummy variables are positive and statistically significant, indicating that individuals who are rated more highly in the admissions process do indeed perform better academically. Of primary concern here is the coefficient on the non-submission dummy variable. Conditional on one's admissions rating, and demographic characteristics non-submitters performed .08 points worse on average than those who submitted their SAT scores. This is statistically significant at the 10 percent level. Because it appears in Figure 3 that most of the difference between the GPA of submitters and non-submitters occurs at the higher admissions ratings, we estimated the model with separate non-submission dummy

variables, one for students who had admission ratings 1-3 and one for those rated 4-6. In this model the coefficient for those rated 4 to 6 is larger (-0.14) and significant at the 5 percent level.

The impact of the optional SAT policy on average reported SAT

Ignored until this point has been the impact that this policy has had on the reported measures of academic quality of the institution. Table 9 shows changes in the most commonly reported measures of academic quality for the class entering in the fall of 2000 (the year before the change in policy) to the class entering in the fall of 2001 (the year after the change in policy). While year-to-year class differences should not be solely attributed to a single policy change, they do provide a benchmark for assessing the policy. Table 9 outlines the differences in the characteristics of the applicants, admitted students and matriculants from 2000 to 2001. For all three groups, high school GPA is slightly higher, while class rank is slightly worse in 2001 versus the 2000. Submitted SAT scores increase for applicants and accepts, while remaining unchanged for matriculants. Total SAT scores, including both submitted and non-submitted declined for all three groups. Additionally, there appears to be a slight increase in the application and matriculation of minority students. These results are more consistent with the possibility that the change in policy encouraged more applications from individuals with low SAT scores, than that the policy encouraged those with low scores who would have applied anyway to not submit their scores. The end result is that average reported SAT scores did not increase at Mount Holyoke in the first year after the implementation of the optional SAT policy.

Conclusion

The use of SAT I scores in college admissions has come under heightened scrutiny of late. This analysis attempted to examine whether selective college admissions could be successfully performed without the requirement of standardized test scores from all applicants. The primary conclusion from this analysis is that selective college admissions can indeed be carried out under an optional SAT score submission policy. It appears from the case study of Mount Holyoke College that some of the potential benefits of the optional SAT policy may have been achieved. There is some evidence of an increase in applications relative to a set of peer institutions, and there may have been an increase in minority applications, as well. On the other hand, the change in policy did not result in an increase in the average reported SAT. At the same time, it appears that these benefits did come at some costs. The students who withheld their SAT scores and ultimately were admitted and enrolled had a lower average GPA than their peers with comparable admissions ratings but who submitted their SAT scores. So the benefits discussed above were tempered by the loss in information that may have been garnered from the SAT scores of all of the applicants.

It remains to be seen if these preliminary results remain consistent over time. It may be the case that as applicants become better informed about the optional SAT policy at Mount Holyoke, the percentage and profile of applicants choosing to not submit their scores will change rendering the admissions office task more difficult. The experience at Bates College, however, suggests that this will not be the case. Additionally, the long run success of non-submitters in terms of cumulative GPA, graduation rates, and satisfaction of these students with their educational experience is yet to be determined and warrants future examination. The long run impact of this policy on the composition of the student body and the overall academic quality of the institution is also fertile ground for future analysis.

While this analysis suggests that there are both benefits and costs to an institution of pursuing an optional SAT admissions policy these results may not be universally applicable. Mount Holyoke is a small liberal arts college with under 3000 applications. The time and resources it is able to devote to each individual application may not be available at larger institutions with many more applications. Additionally, if more institutions follow this admissions approach the impact on the admissions environment would appear to be minimal. The yield on non-submitters, conditional on admissions rating, is not significantly different from the yield on submitters suggesting that Mount Holyoke College does not appear to be treating these individuals substantially differently than most other comparable institutions. Should more institutions pursue this policy it is not apparent that the admissions and enrollment decisions would be dramatically different.

References

Bradley, Drake R., Committee on Admissions and Financial Aid. 1990. "The Optional SAT Policy at Bates: A Final Report." February. Bates College, Lewiston, Maine.

Brownstein, Andrew. "Colleges Debate Whether Dropping the SAT Makes Them More Competitive." 2001. *Chronicle of Higher Education*. October 26.

Clotfelter, Charles; Vigdor, Jacob. 2001. "Retaking the SAT." Sanford Institute of Public Policy Working Paper SAN01-20. July 2001.

Ehrenberg, Ronald G. 2001. "Reaching for the Brass Ring: How the U.S. News and World Report Rankings Shape the Competitive Environment in U.S. Higher Education." May. Cornell Higher Education Working Paper 17.

Hiss, William. 2001. "Optional Sat's and Bates: Seventeen Years and Counting." *Chronicle of Higher Education*. October 26.

McCarty, Barry. 2001. "Lafayette's Comfort Level is Higher With SAT's." *Chronicle of Higher Education*. October 26.

Meng, Chun-Lo; Schmidt, Peter. 1985. "On the Cost of Partial Observability in the Bivariate Probit Model." *International Economic Review*. vol. 26 (1). p 71-85. February.

Yablon, Marcia. 2001. "Test Flight: The Scam Behind SAT Bashing." *New Republic*. October 30. pp. 24-25.

Table 1

Completed Applications by Ethnic Status

	2000	2001	% Increase
White	1134	1202	6.0%
Black	126	208	65.1%
Hispanic	86	131	52.3%
Asian	223	275	23.3%
Native American	8	19	137.5%
International	532	549	3.2%
Race Unknown	336	243	-27.7%

Table 2
Non-Submitters vs. Submitters
Sample (All applicants for which decisions were made)

	Percent	N
Submitted No Score	24.2	637
Submitted any Score	75.8	1990
Submitted Only SAT	70.7	1856
Submitted Only ACT	2.3	61
Submitted both SAT and ACT	2.8	73
	International	
Submitted No Score	33.0	181
Submitted any Score	67.0	368
	Domestic	
Submitted No Score	21.9	456
Submitted any Score	78.1	1622

Table 3
Distribution of Submitted/Non-Submitters
over Applicants, Accepted students, and Matriculants

	Applicants	Accepts	Matriculants
Submitted No Score	24.2	19.4	22.3
Submitted any Score	75.8	80.6	77.7

Table 4-Differences Between Submitters and Non-Submitters

All Applicants

	Submitters	Non-Submitters	Significant
Family Contribution	$21,742	$19,785	Yes
No-Need	33.0%	27.1%	Yes
Math SAT	617	550	Yes
Verbal SAT	633	558	Yes
Total SAT	1250	1109	Yes
High School GPA	3.61	3.43	Yes
Class Rank	15.6	20.4	Yes
Fall Accept Rate	58.7%	44.3%	Yes
Early Decision	8.1%	10.2%	No
White	49.4%	34.2%	Yes
Black	6.9%	11.1%	Yes
Hispanic	4.7%	5.8%	Yes
Asian	10.2%	11.5%	No
International	18.5%	28.4%	Yes
Race Unknown	9.6%	8.2%	No
Admission Rating	4.2	4.8	Yes

SAT Scores for non-submitters are based on those non-submitters for whom scores are available (48.4 percent of non-submitters). Significance at the 5 percent level.

Table 5
Probit Model for Submitting SAT Scores

Variable	Coeff.	T-Stat.	Significant
Intercept	-3.118	-5.06	**
Family Contribution ($000s)	-0.010	-2.37	**
Math SAT	0.005	6.50	**
Verbal SAT	0.004	6.02	**
Black	0.098	0.51	
Hispanic	0.061	0.30	
Asian	-0.084	-0.52	
Native American	0.267	0.45	
International	-0.054	-0.31	
Class Rank	-0.001	-0.19	
High School GPA	-0.284	-2.14	**

N 1311
Included among the regressors, but not shown, are dummy variables for region and unknown race. Omitted race category is white.
** (*) indicates significance at the 5 percent (10 percent) level.

Table 6
Percent Non-Submitters by Admission Rating

Rating	Applicants	Admits	Matriculants
1	11.5	10.2	16.7
2	12.9	12.7	17.7
3	17.8	15.3	17.8
4	23.8	22.6	22.9
5	27.1	28.0	30.3
6	31.4	22.6	18.6
7	34.0	NA	NA
8	45.6	NA	NA

Table 7
Yield by Admission Rating for Submitters and Non-Submitters
Regular Decision Fall only

Admission Rating	**Submitters**	**Non-Submitters**
1	18.9	33.3
2	16.6	28.6
3	18.2	20.6
4	28.8	29.9
5	28.8	35.9
6	71.4	25.0
Total	23.2	28.6

Note: N for rating 6 is 18 total
None of the within rating differences are statistically significant.

Table 8
Dependent Variable First Year GPA

	Coef.	T-Stat.		Coef.	T-Stat.	
Intercept	2.647	19.63	**	2.658	19.66	**
Non-Submitter	-0.083	-1.94	**			
Non-Submitter (AR1-AR3)				-0.050	-0.93	
Non-Submitter (AR4-AR6)				-0.142	-1.99	**
Percent Humanities	0.280	2.51	**	0.281	2.52	**
Percent Science	-0.236	-2.15	**	-0.243	-2.21	**
Percent 200-300 Level	0.010	0.15		0.009	0.13	
Admission Rating 1	1.102	8.45	**	1.086	8.28	**
Admission Rating 2	0.936	10.07	**	0.919	9.75	**
Admission Rating 3	0.746	10.81	**	0.730	10.31	**
Admission Rating 4	0.539	8.16	**	0.521	7.64	**
Admission Rating 5	0.349	5.02	**	0.357	5.11	**
Black	-0.028	-0.34		-0.031	-0.37	
Asian	0.024	0.38		0.016	0.25	
Hispanic	-0.131	-1.53		-0.136	-1.59	
Race Unknown	-0.056	1.36		-0.059	1.35	
International	0.129	1.35		0.128	1.30	
Family Contribution ($000)	0.002	-0.92		0.002	-0.97	
Early Decision	0.033	0.85		0.034	0.85	

Note: ** (*) indicates significance at the 5 (10) percent level. Also included among the regressors but not shown are regional dummy variables.

Table 9
Comparison of the Class Entering 2000 with the Class Entering 2001

	Applicants			Admits			Matriculants		
	2000	2001	2001 (incl. non-submits)	2000	2001	2001 (incl. non-submits)	2000	2001	2001 (incl. non-submits)
Math SAT	611	617	608	629	636	628	613	616	607
Verbal SAT	630	634	624	656	658	648	646	643	630
Total SAT	1243	1252	1232	1285	1295	1277	1259	1259	1237
GPA	3.55	3.57		3.69	3.74		3.59	3.64	
Rank	16.4	16.7		11.5	11.9		14.2	14.7	
White	46.4	45.8		52.6	47.9		55.01	52.9	
Black	5.6	7.9		4.6	8.8		3.4	5.1	
Hispanic	3.5	5		4.3	6.5		2.8	4.9	
Asian	9.1	10.5		11.8	13.8		10.1	10.1	
International	21.8	20.9		11.8	12.1		13.8	16.6	
Race Unknown	13.7	9.3		14.5	10		14.2	9.5	

Figure 1 - SAT scores by Admission Rating

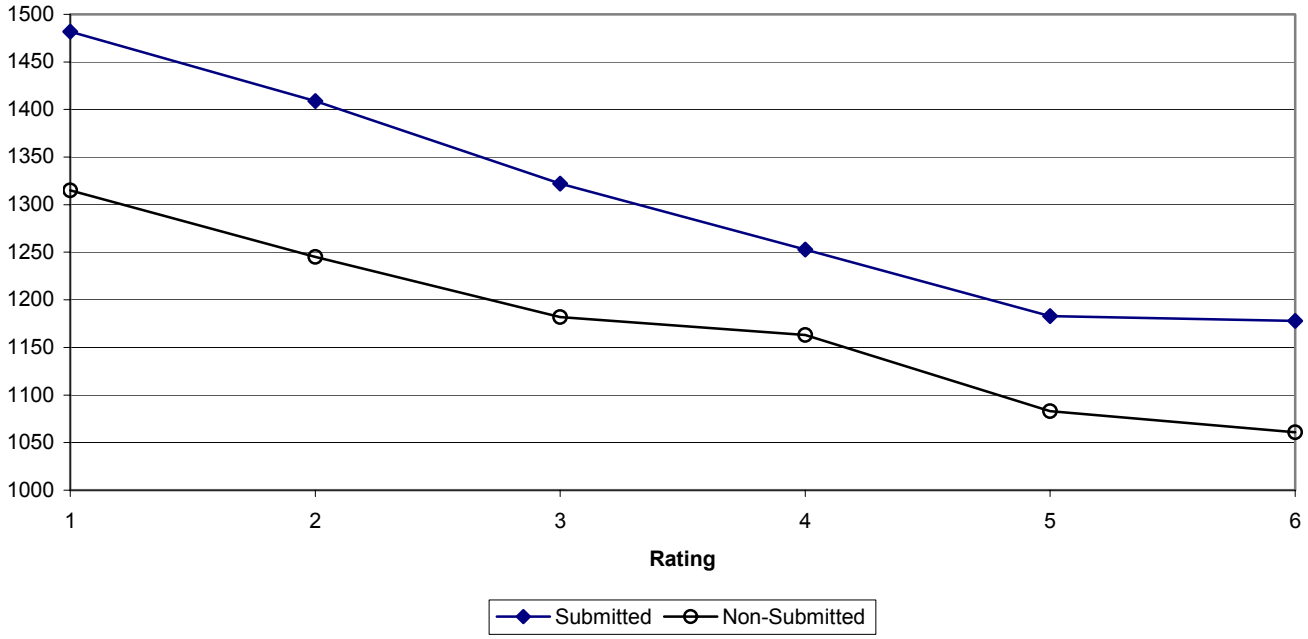

Figure 1b-SAT Scores by Admission Rating-All applicants

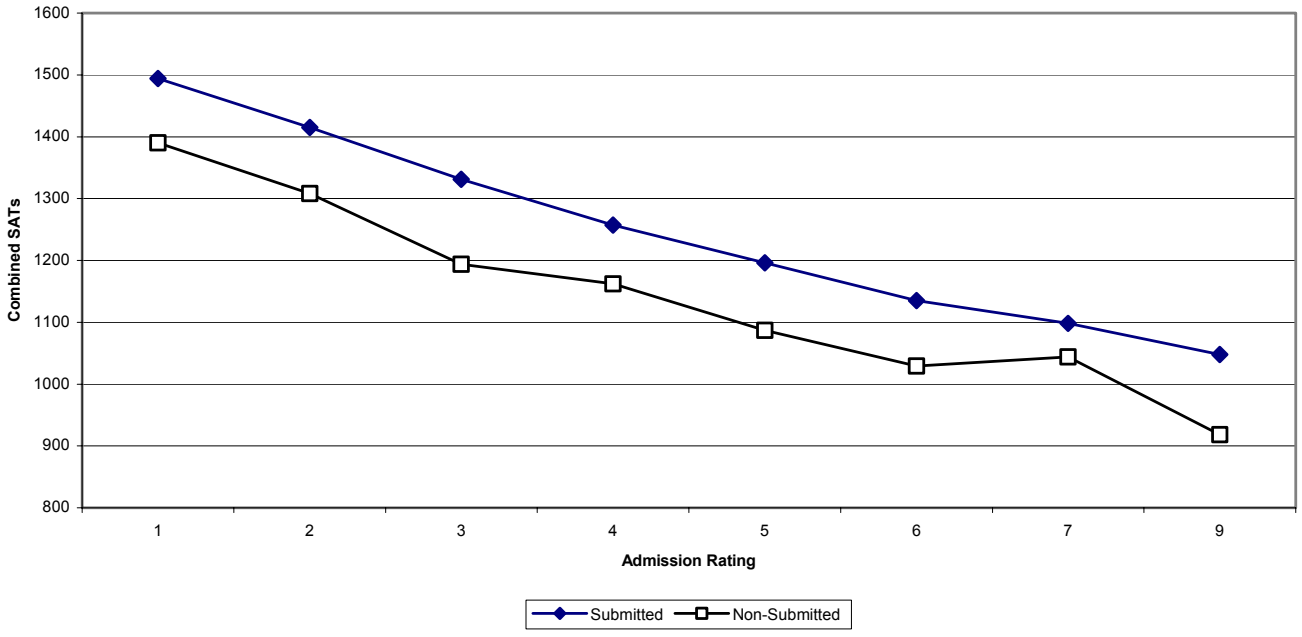

Figure 2 - High School GPA By Admission Rating

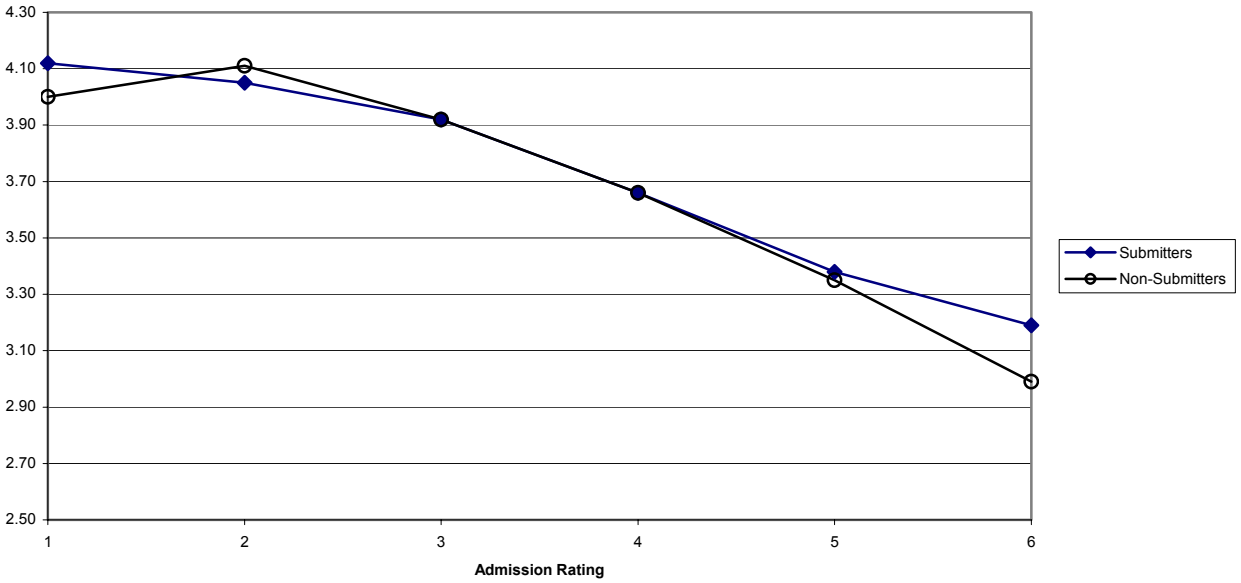

Figure 3 - First Year GPA by Admision Rating for Submitters and Non-Submitters