How To Predict Success In College

by

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Abstract

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This paper examines the Union College system for determining the academic quality of its applicants. Currently, Union College uses five criteria: high school GPA; rank; strength of schedule; quality of high school; and SAT/ACT scores, if available. Using data on about 1600 students, I examine the predictive power of these criteria for the performance of a student at Union. As a measure of performance I use cumulative GPA at Union and whether or not the student is still enrolled in Spring 2011. I find that the five criteria predict about 25% of the variation in GPA at Union. With the exception of high school GPA, none of the criteria predict retention. I find that students who submit their SAT have a higher Union GPA, although once I control for the other four criteria SAT submitters do no better. However, SAT scores predict GPA even after controlling for the other four criteria. Finally, I find that the current weighting of each of the five criteria maximizes the predictive power of the overall rating on student's GPA at Union.

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CHAPTER ONE

Introduction

A. The Importance of Admissions Criteria

Acceptance rates to many colleges and universities are currently at an all time low. For decisions for Fall 2012, the common application alone had received 2.2 million applications, up 22% from 2010. Stanford received 32,022 applications, accepting only 7%. Brown received 30,135 applications, accepting 9%. (Leonhart, 2011). Some institutions have even created an alternative acceptance option, which gives the students the option to enroll in the university 1 or 2 years later. In effect, students accepted under this policy must attend another school for between 1-2 years and obtain a predetermined GPA at the other institution before enrolling. Some schools such as Cornell and University of Maryland have employed this option as a way of dealing with the excessive amount of applicants, in addition to the waitlist**.** How ethical this policy is however, is questionable. Schools are basically recruiting from other schools and students seeking back-up schools during the years leading up to the entrance of an institution, using the alternative acceptance option, are taking spots of potential 4-year students.

A never-ending circle is beginning to form as a result of the steadily increasing number of applicants. As admission rates decline, students no longer apply only to their 5 favorite schools. Instead the number of applications per student are skyrocketing with hopes that the more schools being applied to, the more likely a chance of admission. This is in turn increasing the number of applications, which again lowers the acceptance rates, and the cycle continues.

The question arises as whether or not colleges are implementing the proper admissions policies. What admission criteria best represent a student's capabilities and future achievements? Are universities accepting the most deserving students? With an increasing number of applicants it has become more important that schools are actually accepting students who will succeed at college. But what predicts success at college? What are the trade-offs that colleges must make which may or may not skew the quality of the accepted class? For instance, universities cannot accept all students who are academically fit. They must also accept students who can pay the tuition, but have a lower academic standing.

B. *The Current Admissions Policy At Union College*

Union College is a small private liberal arts college in Schenectady, New York, that is comprised of 2,133 students. The fall 2010 acceptance rate was 42%, classifying Union College as a selective school. One of the major variables considered during the admissions process at Union is the applicant rating. The applicant rating is created by Union based on academic criteria. The question at hand is whether or not this rating scale is as effective as it could be in predicting success at Union College. If alterations to the rating formula can better predict success in college, a modified applicant rating can be implemented, increasing the performance of Union's average student.

The ideal class however is not feasible given the requirements an institution must fulfill. Some students who are less qualified but more affluent must be accepted in order to fund the necessities required to run a successful college. Institutions must also create diversity within their class and a balanced male to female ratio. These factors may affect

the ultimate decision as to whether or not a student is admitted. The proper applicant rating, however, can help a school determine which students are most likely to be successful and if the trade-offs the institution is making are worth it. Here we focus on whether or not the academic rating predicts the academic performance at Union, without addressing the financial aid decisions or the trade-off the college makes between academic quality and ability to pay.

C. The Contribution and Organization of This Paper

This paper will determine if Union is running its admissions program the way it has expected using standard economic and probit regressions. It will address whether or not it would be beneficial for Union to remain SAT/ACT optional, how to weigh high school quality, and determine if a "finer" scale would be beneficial to the current academic rating scale system Union uses during its admissions process. Finally this paper will determine if there is a better way of weighing Union's admissions criteria when predicting academic performance at Union.

CHAPTER TWO

Literature Review

Many studies have been performed to find which admissions criteria have best predicted college success. The most common variable used to determine college success is the 4-year cumulative GPA. This shows how well the student has performed in total, and is used by all colleges and universities, so suits best for comparison. Other studies have used retention rates as well as fellowship/scholarship awards as variables for college success. The most commonly used independent variables, representing admission criteria, regressed against college success are high school GPA, high school class rank, race, socioeconomic status, gender, and standardized test scores.

A. Standardized Testing

The biases of standardized test scores are the key source in the lack of predictive power they have on success at college. This test is often mandatory, expensive to take, as well as costly to submit to schools during the application process. During such economically hard times, this can be very problematic on less affluent applicant. This can limit students in how much they can prepare, as well as which schools they can apply to. Colleges and universities take the best scores that a student receives on a standardized test, be it the ACT, SAT, SAT subject test, or others. This factor gives an automatic advantage to those students who can afford to take a standardized test as many times as necessary until the overall scores are satisfactory to the student. It also produces a bias in the indication of whether or not one student is smarter than the next. The increased scores could merely be due to the number of times a student was able to take the exam.

Prep classes such as the Princeton review also factor into the biases hidden in standardized test scores.   More affluent families can afford to pay the couple hundred dollars for a set of prep test classes or a private tutor. Less affluent families on the other hand do not have these opportunities. Niu and Tienda (2010) state, "As far as future performance is concerned, what high ranked students from disadvantaged social backgrounds lack is not merit, but the opportunity to succeed, which is precisely what the uniform admission criterion based on class rank provides." Long (2007), concurs, following the belief that SAT scores can be attributed to the amount of times a student has taken the SATs and whether or not a student is able to afford SAT prep courses.

The discrepancies about standardized test scores, has led to even further studies on various standardized tests, specifically the SATs, and the relationship between the SATs and affirmative action. Espenshade and Chung (2010) showed how socioeconomic class and underrepresented minorities performed poorer on the SATs than more affluent classes. They state "SAT scores are correlated not only with race, but also with parental income and education, which produced and upward social class bias in the profile of admitted students." They conclude however, after running several simulations, that by not requiring SAT scores as an admission criterion, the university's average SAT scores drop, average high school GPA drops, as well as average high school class rank for admitted students. The authors leave an open-ended question as to whether or not the unfairness of the standardized test scores to minorities would be worth creating an optional SAT policy. By creating an SAT optional policy, Espenshade and Chung insinuate that diversity in schools will lower.

Disregarding the biases hidden in the scores of standardized testing, there is still a correlation between standardized test scores and success in post-secondary schools. John Gehring (2001) performed meta-analysis study that looks at more than 1,700 studies over the past 50 years, determined that as with the correlation between test scores and academic performance, the predictive power diminishes over time.

B. High School GPA's

The general consensus when testing the predictive power of standardized tests scores versus the predictive power of a student's high school GPA on college success, determines that high school GPA has a higher correlation with a student's achievements in post-secondary schools than standardized test scores. These regressions also contribute to much of the conclusions drawn about the biases of standardized test scores. Geiser (2007), determined that high school GPA is a better predictor then standardized test scores. Geiser finds that standardized test scores are largely influenced by the economic strata of the student. Those who live in more affluent areas can afford standardized test prep classes, which largely correspond to higher SAT scores. Geiser also found that the predictive weight of high school GPA actually increased after freshmen year, while the predictive weight of standardized test scores diminish. These results correspond with the results of Hoffman (2005). Hoffman used a sample of 531 students, regressing various combinations of race, religion, sex, SAT scores, and housing on hours worked in class, involvement on campus, college GPA, retention, as well as satisfaction. Hoffman concluded that for both racial and religious minorities, high school grades were better indicators of success than standardized test scores.

Betts (1999), showed the effects of high school GPA on university GPA, using over 5,000 students from the University of California. She found, as other researchers have, that high school GPA and high school tests scores do positively correlate with future academic success. Betts, however, finds that more complex models that control for personal background, type of high school, and other additional information about the student's home environment would be a more powerful. Betts states that students from economically disadvantaged areas or underrepresented groups are more likely to have lower grades in college, even when controlling for high school grades and test scores. A model of this sort, Betts thinks, would show that even more variables affect college GPA, and will more accurately display the predictive power of each variable.

C. High School Quality

Few studies depict the direct correlation between high school quality and a student's college GPA and retention rates. Pike (2002) conducted at a research university in the Midwest, analyzed 8,674 students who went through a selective admissions process and the effects of these students' high schools on bachelor degree attainment and university grade point average. When ACT, class rank, and a measure on the completion of high school requirements were regressed on grade point average, the 3 variables explained 34.1 percent of variation. When the regression was run again, with the inclusion of where each student went to high school, the additional variable increased the predictive power by 7%. This study depicts a correlation between quality of high school and a student performance in college.

Fletcher and Tienda (2008:19) ran a similar study focusing on the effect of high school quality of minorities on college performance, using 10 years of data from 4 public Universities in Texas, varying in selectivity. They determine that when looking at quality of high schools attended by freshmen, the black-white and Hispanic-white differences in college achievement largely disappear or even reverse, throughout all ranges of selectivity. Fletecher and Teinda also point out "high school quality does not explain group difference in post-collegiate achievement, partly because post-secondary enrollment is a voluntary decision that selects from the most accomplished students and partly because analysts have not clearly specified which high school inputs carry over to college."

D. High School Class Rank

High school class rank not only represents a student's academic performance compared to his/her fellow students, but also encompasses a student's drive to succeed and competiveness as well as characteristics of what it takes for a student to perform well in a selective college or university. Niu and Tienda (2010) looked at the effects of high school economic strata, high school class rank, and standardized test scores on college GPA, freshmen year attrition, and the 4-year graduation rate performed. They determined that high school class rank was the best determinant of college success. Niu and Tienda also found that students who were in poor high schools and received relatively low test scores, while maintaining a high class rank were very likely to be successful in selective colleges. Class rank can be viewed as a behavioral measure of achievement, which often is not accounted for enough in the admission process.

E. Schedule Strength

Different studies have produced opposing results with how advanced placement courses during high school affect early college grades and retention. Klopfenstein (2006) preformed a study using a sample consisting of 28,000 high school graduates who attended 31 4-year Texas public schools in fall of 1999. The students were analyzed to determine the difference in performance between students with AP courses and students without. The study concludes that there is no evidence that the average student obtains a positive benefit from taking AP courses beyond that of a curriculum rich with math and sciences, but no AP's. The study also draws the conclusion that other studies that find a correlation, do so because they fail to control for the students non-AP curriculum.

Dougherty (1998) conducted a study whose results oppose that of Klopfenstien's. Dougherty explored the relationship between the participation and success in AP courses and graduation rates, as well as income. It is determined that low-income students who successfully passed at least one AP exam have a 39 percentage point higher college graduation rate then low income students who did not participate in an AP course in high school. The study also examined a group of hypothetical students who were considered to have the same student and schooling characteristics, however differ in whether or not they had enrolled in an AP course, took an AP exam, and passed an AP exam using a hierarchical linear modeling regression. It was established that when controlling for academic achievement, school poverty rates, as well as other academic characteristics, the effects of taking an AP course on graduation rate drops, however still exists. It is important to remember the personality traits that can be hidden in these variables. "The

willingness of a student to enroll in an Advanced Placement course and take an advanced placement exam conveys information about that student that predicts that the student is more likely to graduate from college."(Dougherty, 1998: 7)

When looking at a student's high school curriculum in general, not solely AP courses, studies have shown that high school curriculum displayed a more powerful influence on attaining a bachelors degree, then test scores, high school class rank, and high school GPA. (Pike, 2002)

F. Early Admission Processes

Early admission is an admissions program in which a student submits their application earlier than the regular admissions deadline, and receives his/her decision earlier as well. The perks to applying under early admissions for a student are that the applicant pool is usually smaller than the applicant pool for regular decision. The benefit the college or university receives from this type of admissions program is that the school will have a sense of what its incoming freshmen class will look like before accepting regularly admitted students. The students are also displaying increased interest in the school, giving them an advantage. In most schools, the percent of students accepted during early admissions exceeds the percent accepted during the regular admissions process.

A study performed by Jensen and Wu (2010) show the differences in the performance of students who were accepted early versus students who were accepted regularly. The study concluded that those students who applied through the early decision program had lower GPAs, were less likely to receive honors, and were also less likely to

receive fellowships or other scholarships. Although there was no real explanation for this occurrence, Jensen and Wu tie this occurrence with the possibility of a personality flaw. The student who applied early decision could be displaying a lack of motivation. This assumption is supported by a survey taken on students that showed that those who applied under early decision spent less time on homework and more time on leisure activities. Wu and Jensen did not however state if those students who applied through early decision had lower high school GPA's or class rank upon admittance. Often times a school will lower its admittance criteria for early decision students. Christopher Avery conducted a study on over 7,000 students at over 28 elite schools in the United States, analyzing the characteristics of admitted students as opposed to other studies that look at performance of these students later on in their college career.   Avery found that colleges were more likely to favor the early applicants. These early admissions students actually had a 17-20 percent point increase in admission probability. This is relevant because the students who were less qualified had an advantage by applying early admissions, however they later on they do not perform as well as students who applied through regular admissions.

CHAPTER THREE

Analyzing the Data Compiled From Union College's
Admissions Office: What Drives Retention and GPA At Union

A. Summary of Current 2012 Union College Admission Data

Compiled from the Admissions Department of Union College, the data is a sample of 2,231 undergraduate students currently enrolled at Union College. This sample was chosen because these students were admitted under the current admissions policy that will be examined in this paper. Prior students were admitted under a different set of admissions policies. The measure of performance is the Fall 2011 cumulative GPA's. Since the freshmen class has no existing GPA as of Fall 2011, they were removed from the data set resulting in 1,653 relevant students for the study. The second dependent variable is retention at Union college, determined by whether or not the students were still here as of spring 2011. The independent variables provided by the admission office are comprised of academic, socioeconomic, geographic, as well as personal characteristic traits, such as race and gender. The academic variables consist of high school GPA, high school class rank, SAT/ACT scores, schedule strength, and high school quality. High school GPA, schedule strength, standardized test scores, high school quality, and high school class rank are used to determine the variable "applicant rating", which is calculated by the admissions office for each applicant. The socioeconomic variables are comprised of financial need, while the geographic variables are determined based on hometown. The characteristic traits used to analyze the make-up of Union College, are race, gender, and home country.

B. The Applicant Rating

The "applicant rating" is the rating given to a student from the admissions department based on 5 admissions criteria: High School GPA, quality of the high school attended, SAT/ACT scores, high school class rank, and strength of schedule. High School GPA is the cumulative GPA of applicants from their freshmen year until the time of his or her application. Class rank is determined by the official rank the high school provides Union, as a percentage of where the student falls in their class relative to their classmates. Quality of applicants high school is based on an index from 0-1, 1 being the highest quality. Finally schedule strength is determined based on the rigor of the courses taken by each applicant. Each variable is weighed based on the scales seen in Table 2.1.

Table 3.1. Current Union College Admissions Scale for Determining Applicant Rating

Scale	High School GPA	High School Class Rank	High School Quality	SAT/ACT Score	Schedule Strength
	2-10	2-10	1-5	2-10	2-10

High School GPA, high school class rank, SAT/ACT scores, and schedule strength are all on a scale of 2-10 in intervals of 2. Each score is assigned to a specific range. The score is assigned to each criterion based on what range the applicant falls in. The higher the academic quality, the higher the admission criterion scores. High School quality is based on a scale of 1-5 in intervals of 1, in which again the student is assigned a score based on which range they fall in.

From these ratings, a total score is determined and then averaged, with a highest possible score being a 9, and a lowest possible score being a 1.8. The scores are then multiplied by 10, resulting an applicant rating ranging from 18-90. If a student decides to not have his or her SAT/ACT scores considered, the scores are dropped from the mix

and the applicant rating is the total value of the remaining 4 criteria divided by 4. Any

missing variable is dropped from the equation, and the average is taken from what is

available. The table below represents how many students had each number of admissions

criteria.

Table 3.2 Total Number Of Admissions Criteria For Each Applicant

Number Of Criteria	Total Applicants
1	10
2	119
3	594
4	642
5	282

C. Analysis of ACT/SAT Data

Because Union does not require the consideration of SAT or ACT scores,

occasionally students submit their scores, yet decline consideration of them during the

admissions process. These scores are on file at the admissions office, however they are

not viewed by the admissions committee when considering a student's acceptance. To

determine whether or not it is beneficial for Union to maintain the SAT/ACT optional

policy, a dummy was created representing the students who have their SAT/ACT scores

on file but did not have them considered. This variable, "SAT not considered", can then

be used to show how the students who have not had their SAT/ACT considered are

performing versus the students who have had their scores taken into account.

D. Determination of Retention At Union College

Retention rates at Union College were determined by calculating the number of

students who were not registered at Union in the spring of 2011, but were registered in

previous terms. About 7.4% of the 1653 students were no longer registered in spring of 2011. Although a student could be on dean's vacation, medical leave, etc., I consider this a measure of retention. Even when a student is on a term abroad, they are still registered. The only students who do not show up in 2011 are students who are no longer affiliated with Union for the time being.

E. Descriptive Statistics

Table 3.3 (Pg. 42) shows the descriptive statistics of the current sophomore, junior, and senior class at Union College. 40% of students at Union college were admitted under the early admissions policy; 26% were admitted through early decision 1, while the remaining 15% were admitted under early decision 2. The current male to female ratio is 51 to 49. Unions student body is 75% white, 5% Black/African American, 5% Hispanic, 6% Asian, and 9% other (i.e. two or more races, native American/Alaskan, or race unknown). Overall 4% of students are foreign, non-residents of the United States. The average GPA at Union College is a surprisingly high 3.13 out of 4.0, which may depict grade inflation. Union College is a non-need blind school, meaning that it considers a student financial need when considering their admittance. 60% of students receive some sort of financial or merit award.

The remaining statistics display the mean, median, standard deviation, minimum and maximum high school GPA, high school class rank, high school quality, standardized test scores, and the average financial aid package received from a student with financial need. The table also depicts that 39% of students decide to have their standardized test scores not considered, being that Union holds an SAT/ACT optional policy.

F. What Drives GPA At Union

Each admission criteria used in the applicant rating has a different predictive power in determining expected Union GPA. In order to see which criteria have the most predictive power, I regress each variable independently against Union GPA, seen in Table 3.4(Pg. 43). The least predictive of the 5 criteria are high school quality, which only explains 1.2% of variation in Union GPA, and schedule strength, which explains 1.3%. The most predictive criterion is high school GPA, which explains 18% of variation in Union GPA. Class rank explained 15% of variation on its own, while total SAT scores explains 9% of variation independently. There is a potential bias that might exist in this measure of performance. A small variation of Union GPA may be partly functions of one's major. Each department grades differently, as some put more weights on grades then others. This paper however does not address this bias, as it became to complicated to divide each student up by major and adjust the GPAs, especially in the case of interdisciplinary majors, in which students construct their own major.

G. What Drives Retention At Union

In order to determine the drivers of retention at Union, I estimate a probit regression, seen in Table 3.5 (Pg. 43). The only significant driving criteria that predict the likelihood of a student to stay at Union is high school GPA and schedule strength. Schedule strength however showed a higher significance than high school GPA. This means that total SAT scores, high school class rank, and high school quality have no effect on the likelihood of staying at Union College, when standing alone.

CHAPTER FOUR

Do SATs Predict Performance at Union?

A. Overview and Contribution of this Paper to the SAT Debate

Whether or not colleges should require SAT scores as part of the admissions process is subject of an intense debate. On the one hand, standardized test scores are often considered a poor representation of a student's academic abilities because of their underlying socioeconomic bias (Espenshade, 2010). On the other hand, SATs are viewed as one of the only admissions criteria that can directly measure one student's academic ability against another's, as every student who applied has taken the same test under the same guidelines. (Gehring, 2001)

This section is an attempt to contribute to the SAT debate by asking two questions. First, I ask whether students who submit SATs perform better than students who do not. Secondly, I ask whether higher SAT scores correlate with better performance among those students who submitted them. Out of 1,653 students in my sample, 65% (1,074) had submitted their SATs, while 17.7% (190) of those who submitted their scores requested that they were not considered. Thus, only a little more than half of students in my sample submitted SATs and had them considered

B. Do SAT Submitters Have Higher GPAs?

The following model is used in order to determine if SAT submitters have higher GPAs than non-SAT submitters:

$$Union\_GPA = \beta_0 + \beta_1 SAT\_Submitted + \beta_2 HS\_GPA + \beta_3 Class\_rank + \beta_4 Schedule\_strength$$

Dependent Variable for Performance

Union_GPA   Cumulative GPA as of Fall 2011, of each Union student since the time that they started attending

Independent Variables

SAT_Submitted   1 if the student submitted SATs, 0 otherwise

HS_GPA   Cumulative High School GPA of each student

Class_Rank   The official rank of each student in their high school compared to the rest of their student body

Schedule_Strength   The strength of each students high school schedule in regards to AP/IB and honors courses, determined by Union College

Because not every student has all of the criteria submitted, the number of observations are drastically different when regressing each criteria against Union GPA. This applies to all of the regressions and probits within this chapter.

   Table 4.1 (Pg. 44) shows that students that submitted their SATs show a better performance than students who did not. On average, students who submitted their SATs and had them considered during the admissions process have GPAs of 0.126 points higher than those who did not submit their GPA or did not have them considered. This is about a 4% difference and it is statistically significant. However, controlling for a student's high school GPA, students who submitted and had their SATs considered did no better than students who either did not submit or did not have their SATs considered. Similarly, controlling for class rank made whether or not a student submitted their SATs insignificant. This means that when Union takes into account a student's high school GPA or class rank, a student who submitted their SATs does not perform better or worse than a student who did not submit their SATs.

C. Are SAT Submitters More Likely to Stay At Union?

The following model is used in order to determine if SAT submitters are more likely to stay at Union:

$$Retention = \beta_0 + \beta_1 SAT\_Submitters + \beta_2 HS\_GPA + \beta_3 Class\_rank + \beta_4 Schedule\_strength$$

Dependent Variable for Performance

Retention   1 if the student was here as of Spring 2011, 0 if the student was no longer registered with Union in Spring 2011

Independent Variables

SAT_Submitted   1 if the student submitted SATs, 0 otherwise

HS_GPA   Cumulative High School GPA of each student

Class_Rank   The official rank of each student in their high school compared to the rest of their student body

Schedule_Strength   The strength of each students high school schedule in regards to AP/IB and honors courses, determined by Union College

To determine whether or not a student who submitted their SATs was more likely to stay at Union than a student who did not, I estimated a probit regression, seen in Table 4.2 (Pg. 44). The dependent variable is whether or not a student is still at Union as of spring term 2011. When measuring performance based on retention rates, a student who submitted their SATs is no more or less likely to drop out than a student who did not submit their SATs. This is true even when controlling for a student's high school GPA and class rank. In fact, it appears that the only predictor of whether or not a student will stay at Union all four years is high school GPA.

D. Among SAT Submitters, Do SAT Scores Predict A Higher GPA?

The following model is used in order to determine if total SAT scores predict a

higher GPA:

$$Union\_GPA = \beta_0 + \beta_1 Total\_SAT + \beta_2 HS\_GPA + \beta_3 Class\_rank + \beta_4 Schedule\_strength$$

Dependent Variable for Performance

Union_GPA	Cumulative GPA as of Fall 2011, of each Union student since the time that they started attending

Independent Variables

Total_SAT	Total SAT score, as a combination of reading and math sections
HS_GPA	Cumulative High School GPA of each student
Class_Rank	The official rank of each student in their high school compared to the rest of their student body
Schedule_Strength	The strength of each students high school schedule in regards to AP/IB and honors courses, determined by Union College

Table 4.3(Pg. 45) shows that among students who submitted their SATs, and had

their scores considered, the higher the SAT score a student had, the higher the GPA at

Union. Not only is this significant when looking solely at the effect of SAT scores on

Union GPA, but it is also significant when controlling for high school GPA and class

rank. This means that a student at Union who has the same high school GPA and the

same high school class rank as other students, but higher SAT scores, is likely to have a

higher GPA at Union. Thus, SAT scores seem to contain information beyond that

contained in high school GPA and other admissions criteria. The magnitude of the effect

appears modest. For example, a 100-point increase in SAT leads to a 0.1 increase in

expected Union GPA.

E. Among SAT Submitters, Are Students with Higher SAT Scores More Likely to Stay?

The following model is used in order to determine if students with higher total SAT scores are more likely to stay at Union:

Retention= β_0 + β_1Total_SAT+ β_2HS_GPA + β_3Class_rank + β_4Schedule_strength

Dependent Variable for Performance

Retention   1 if the student was here as of Spring 2011, 0 if the student was no longer registered with Union in Spring 2011

Independent Variables

Total_SAT   Total SAT score, as a combination of reading and math sections

HS_GPA   Cumulative High School GPA of each student

Class_Rank   The official rank of each student in their high school compared to the rest of their student body

Schedule_Strength   The strength of each students high school schedule in regards to AP/IB and honors courses, determined by Union College

When using retention as a measure of performance, total SAT scores did not determine the likelihood of whether or not a student was to drop out of Union, displayed in Table 4.4 (Pg. 45). This may be because retention could be bimodal. Students who perform poorly academically could have an equal tendency to leave Union as students who have outstanding performance, and leave Union for a more challenging institution. Again, the only predictor in the criteria of whether or not a student is more or less likely to stay at Union is high school GPA, in which a higher GPA correlates with an increased likelihood to stay at Union. Because higher GPA may correlate with higher SAT scores, it could be suggested that SATs are not bimodal in regards to retention.

F. Analysis of the Results

Based on the above findings, there are mixed results as to how SAT scores affect performance at Union. On the one hand, those who submitted their SATs and had them considered perform no better or worse than those who did not submit their SAT scores once we controlled for high school GPA or class rank. This means that as long as Union takes into account either high school class rank or high school GPA, submitting SAT scores does not indicate better future performance. On the other hand, among SAT submitters, SAT score is a significant predictor of a student's GPA at Union. The higher the SAT scores, the higher a student's GPA at Union, even if the student's high school class rank and GPA are the same. This shows that if all students were required to submit their SAT scores, Union would have a better prediction of how well one student would perform in relation to another.

Overall, the predictive power of SAT sores seems limited. They predict only 7% of Union GPA, and when added to high school GPA, they only increase the R2, or predictive power, by 0.02. Union would need to weigh the modest benefit of better information about the applicant, against the potential loss of applicants who may be deterred by the requirement, to make the decision as to whether or not Union should require SATs.

G. Long-term Considerations

The correlation coefficient between total sat scores and Union GPA is 0.3. In contrast, the correlation coefficient between high school GPA and Union GPA is 0.42. It is clear that throughout the past 3 classes in this study, the average SAT score has

increased. It is possible that the higher the scores, the smaller the number of students who chose to submit them, due to the fear that the scores do not properly represent the students academic abilities. As time goes on however, it is possible that fewer students will opt to not have their scores considered, as the number of applicants per year increases. Many students may feel their SAT scores could negatively affect their chances of admission, as it is currently optional. It is not clear whether this could develop into a sustainable trend. Since SATs have some predictive power for performance, if there is an increasing trend of students not submitting their scores, it could be cause for some concern for the Union admissions committee.

CHAPTER FIVE

Does the Quality of an Applicant High School Matter?

A. Overview of High School Quality as an Admission Criterion

One of the five criteria Union College uses when determining whether or not to accept an applicant is the quality of the school they came from. Students from high schools of higher quality are more likely to be admitted than students from a school of lesser quality because they receive fewer points on the high school quality score that goes towards the total applicant rating. However, previous studies have shown that we cannot conclude that a student from a lower-quality high school would not have excelled, had they been placed in a higher-quality school (Niu, 2010). Poor areas are surrounded by poor schools, which do not have the classes or opportunities offered by schools located in more affluent areas. There is no way to tell how a student who was not given those opportunities would perform. On the other hand, more affluent schools, which are more likely to be of a higher quality, have more resources and are to better able to teach students. The students who apply to Union from these schools then come with more knowledge and preparation for college. Moreover, high school GPAs from low quality school are more easily acquired than a high quality school. Thus, taking high school quality into account enables the admissions staff to put the schools GPA into perspective, as not all schools grade the same.

B. Contribution of this Paper to Unions View of High School Quality

In this section I ask, whether or not a higher-quality high school will produce students with higher Union GPAs than their counterparts from lower-quality high

schools, holding class rank constant. I attempt to access the magnitude of the effect of high school quality on performance at Union and how it compares to class rank. In other words, will a student in the middle 50% of their class at the highest-ranked school be able to perform better at Union than a student ranked in the middle 50% at a lower-quality high school?

The average high school quality that students attended at Union College is 0.83. The High School for Enterprise Business & Technology in Brooklyn is the lowest-quality school, with an index of 0.0345, while St. Stephen's School and the United World College Atlantic were the top-ranked high schools, with an index of 0.9978. Locust Valley Middle-High School would be considered an average high school that students have attended before entering Union, with an index of 0.83. The high school is in a small town in Locust Valley New York, of a little under 700 students. It has an athletics program, and offers both AP and IB courses.

C. Estimating Effects of High School Quality on Union GPA

I estimated 3 regressions with Union GPA as the dependent variable and high school quality and rank as the independent variables, seen in Table 5.1 (Pg. 46). The results show that high school quality explains much less then high school class rank. A 1-point increase in high school quality index results in a 0.288 increase in expected Union GPA. When controlling for class rank, a 1-point increase in high school quality results in a 0.6 increase in class expected Union GPA.

To get a better understanding of the effects of high school quality on GPA, I calculated expected Union GPA of students from various schools with the same class

rank. Union looks primarily at schools of 0.75 or higher. All schools that have a quality

index below 0.75 receive a rating of 1 in Union's applicant-rating process, meaning that

Union view schools ranked 0.75 or below equally as the poorest-quality school. Table

5.2, seen below, shows the effects of high school quality on Union GPA between students

who have the same class rank from high schools with qualities of 1, 0.83, 0.85, and 0.75.

1 is the highest possible rank, 0.88 is the cutoff between receiving a 2 and a 3 on the high

school quality rating, 0.83 is the average index of my sample at Union and 0.75 is the

point at which Union stops differentiating between high school qualities. The table shows

that the better the quality of the high school, the better the Union GPA, even when we

hold students' class rank constant.

Table 5.2: Matrix of the Effects of High School Quality on GPA

		High School Quality			
		1	**0.88**	**0.83**	**0.75**
Class Rank	**50**	2.70	2.63	2.60	2.55
	25	3.14	3.07	3.04	2.99
	10	3.41	3.34	3.31	3.26
	5	3.50	3.43	3.40	3.35

The table shows that class rank has more of an effect on expected Union GPA

than high school quality. For example, a students GPA from the middle 50% of their

class is 0.44 points lower than a student from the 25% of their class from a school with

the same index, while a students GPA from a school with the index of 0.75 is only 0.15

points lower than a student of the same rank from a school with an index of 1. Union

views the difference of 0.75 to 0.88 in high school quality equal to the difference of top

10% to the top 25% in class rank. Quality however does play an apparent role in expected

Union GPA. A student in the top 5% of their class who attends a high school with an

index of 0.75 is expected to do better off than a student in the top 25% of their class, from a high school of the highest quality.

Below is a comparison between students from a high school with an index of 0.54, equivalent to Schenectady High School, and students from a high school with an index of 0.93, equivalent to Andover High School, with the same class rank. Table 5.3 below, depicts that a student who came from Andover High School has an expected GPA of 0.33 higher than that of a student with equal class rank who came from Schenectady High School.

Table 5.3: Expected GPAs of Students from Andover High School vs. Schenectady High School

		High School	
		Andover High School	**Schenectady High School**
Class Rank	**50**	**2.70**	**2.37**
	25	**3.14**	**2.81**
	10	**3.41**	**3.08**
	5	**3.50**	**3.16**

In Union's academic quality rating, a student from Andover High School receives 4 out of 5 on the high school quality score, while a student from Schenectady High School receives a 1. Consider a student from Andover High School ranked 25% of their class and another student from Schenectady High School entering Union. In order for the student from Schenectady High School to overcome their handicap, they must be in the top 5% of their class. Using these 2 criteria, this would create and internal rating of 10 for the student from Andover High School, and a rating of 11 for the student from Schenectady High School.

D. Analysis of The Results

When analyzing the internal rating between the student from Andover High School in the top 25% of their class and the student from Schenectady High School in the top 5% of their class, it is apparent that the high school quality is properly weighted. The students received relatively the same internal rating, and displayed relatively the same expected GPA. Currently, high school quality is weighted half as much as the other 4 admission criteria. High school quality was one of the least predictive of the criteria, displaying that it is beneficial to weight it less in comparison with the other 4. High school quality is, however, significant which is why it should still be taken into consideration.

CHAPTER SIX

Should Union Determine Its Applicant Rating on a Finer scale?

A. Analysis of Current Scale

Currently Union College rates its applicants on a step-wise scale. If an admission criterion fall into a certain range, the applicant is assigned a certain number of points. For instance, a student who has a high school GPA of 89 will receive 4 points, as the GPA falls into the range of 85-89. A student with a GPA of a 89.1 will receive 6 points. Although the students are fairly close in their GPA, one receives half as many points as the other. Similarly, a student with a GPA of 89 receives the same number of points as a student with a GPA of 85, even though the two are arguably further apart.

In this section I ask whether there are significant benefits to using a finer scale. I will test this in two ways. First I will test whether or not a continuous scale will be more predictive, determining the applicant score much like a teacher grades a student. By doing so, each student will receive a score directly related to their high school performance, and will differentiate students that are currently in the same range. Secondly, I will test if the applicant rating becomes more predictive when the scales of the criteria have smaller intervals. By increasing the number of intervals, it simultaneously decreasing the interval size. This will increase the number of ranges that each criterion has so that each range has students who are more alike in that specific criterion.

B. Effects of Continuous Scale on the Predictive Power of Applicant Rating

        Instead of a step-wise correspondence between the numerical value of a criterion and the number of points in the academic rating, I created a linear function that gives the number of points in the academic rating as a function of the numerical value of a criterion. The function is such that the range of points is similar to that in the step-wise scale. In order to create a continuous scale for each admissions criterion, I turned the scale into a linear equation represented by the following graph:

Table 6.1: Continuous Scale vs. Current Step-wise Scale
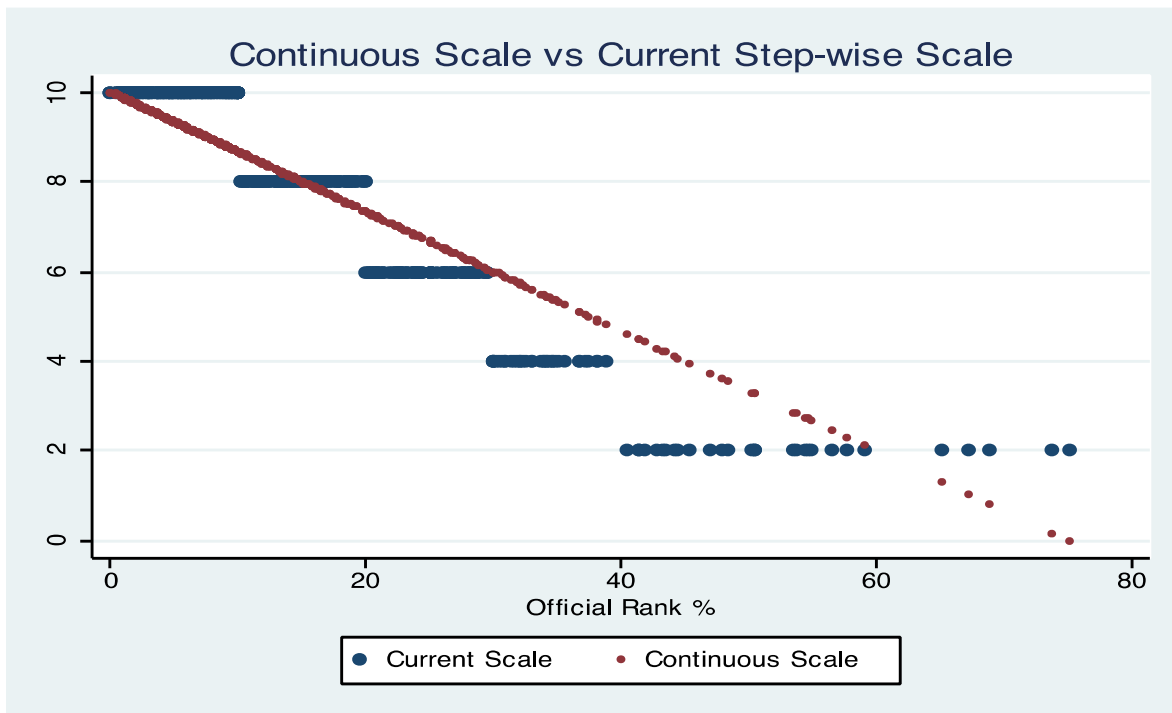

        The linear equation was solved by plugging in two points to solve for the equation, y= mx+b . The first point was determined by taking the lowest possible score, as the x-value, and the lowest possible grade as the y-value. The second point was determined by taking the highest possible score, as the x-value, and the highest possible grade as the y-value.

Once I have the new scores for each criterion, I then calculated the average and multiply by 10, as the current system does. Schedule strength, however was not recalculated, as I was only given the total schedule strength score, and not the inputs that determined the score.

To determine the predictive power of the step-wise scale versus the continuous scale, I regress the new applicant grade that is based on a continuous scale against Union GPA. As table 6.2(Pg.46) depicts, the continuous scale actually explains less variation in Union GPA then the current applicant grading system. The current scale explains 22% of variation in student's performance, while a continuous scale only accounts for 18.6% of variation in performance. On the current applicant scale, a 1 point increase in a student's applicant rating will result in a 0.016 point increase in expected Union GPA.

C. Effects of A Finer Scale On The Predictive Power of Applicant Rating

Here I ask if a scale with smaller intervals will be more predictive. A scale with smaller intervals will decrease the range that each criteria grade is assigned to, so that the students with the same criteria grade are more alike. I adjust the intervals from 2, on a scale of 2-10, to 1, on a scale of 2 to 10. The following graph represents the high school class rank scale with smaller intervals. The red represents the current scale, while the purple represents that scale with decreased intervals.

Table 6.3: "Finer" Intervals vs. Current Step-wise Scale
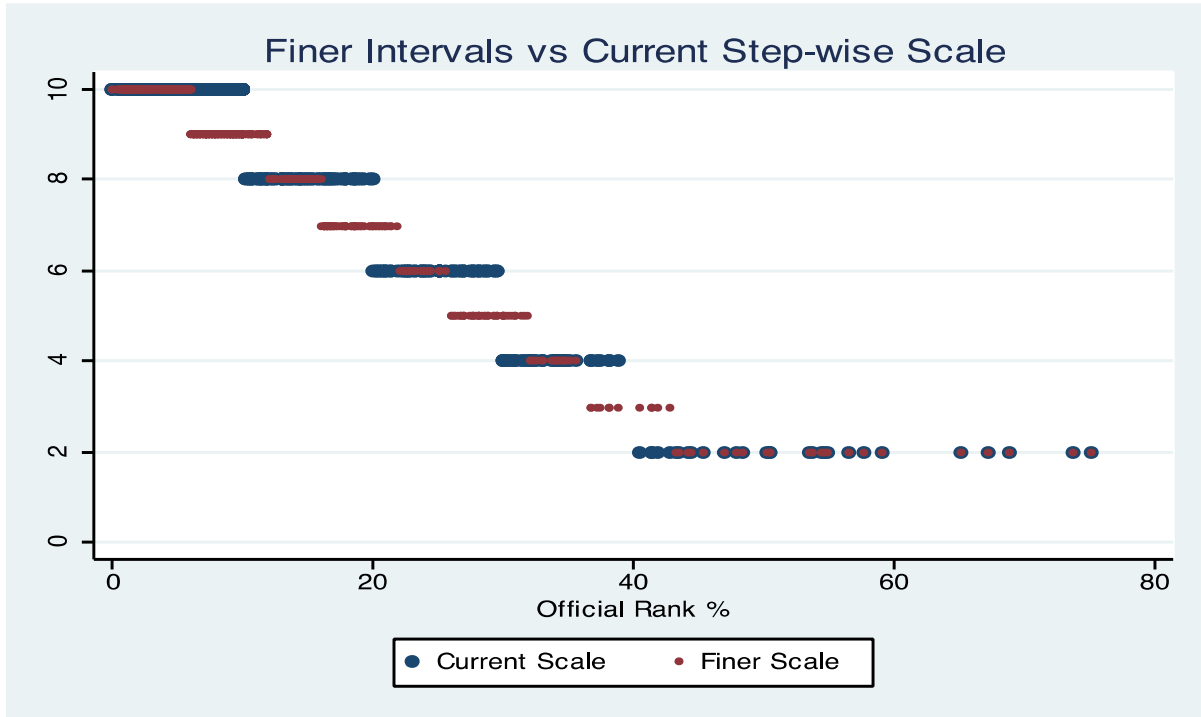
The new scale takes the applicants who fall on the lower side of a range of one score, and an applicant who falls on the higher side of a range on the score below, and puts them in an intermediate score. Essentially, the high 2's and the low 4's get put into a new range and receive a 3. Because it is already apparent that the high school quality rating is effective, the scale was not adjusted. Schedule strength was also left as is, again because there is no underlying quantitative criterion. Therefore there was no way to manipulate the scale.

Table 6.4 (Pg. 47) shows that a change in the scale from intervals of 2, from 2-10, to intervals of 1, from 1-10, does not increase the predictive power of the applicant rating. The current scale explains 22% of the variation in Union GPA, as does the rating with the adjusted intervals. The predictive power does not change when any one criterion is adjusted alone when determining the applicant grade.

D. Is There a More Predictive Applicant Criteria Scale?

It appears that the "finer" scales perform no better (and in the case of continuous scale worse) than the current scale. In a sense, the continuous scale was splitting hairs, which explains the decrease of predictive power. Therefore, there seems to be no gain in making the scale "finer."

CHAPTER SEVEN

Is There A Better Way Of Weighting The Criteria?

A. Analysis of the Current Academic Rating Weights

Currently, the overall academic rating is calculated by combining each criteria score, and dividing by the number of criteria each applicant has. Given that a continuous scale, or a scale with finer intervals, shows no improvement to the academic rating, the rating is best calculated using the admissions departments current system. Union assessment of academic quality is based on which range each applicant falls into, in regards to high school GPA, high school class rank, high school quality, schedule strength, and SAT/ACT scores. For each criterion, each range is assigned a different score. As previously stated, the scores are then averaged, and multiplied by 10 in order to determine the applicant rating.

The current system implies some weights on the criteria. High school GPA, rank, schedule strength, and SAT/ACT scores are assigned scores on a scale of 2-10, while high school quality is on a scale of 1-5. The smaller scales for high school quality means that being from a top school as opposed to a middle of the road school does not increase the applicant rating as much as having high SAT scores rather then average SAT scores.

In this section I ask whether different combinations of weights on the five criteria can produce a more predictive applicant rating. I construct alternative applicant ratings by multiplying the existing scores by various numbers and thus increasing or decreasing the implied weight on the criteria. For instance, if Union wanted to increase the weight of high school GPA it could multiply the current score by 1.5. As a result, a candidate

could receive as many as 15 points for being in the top category for GPA. The new

overall applicant rating would be calculated as follows:

Applicant rating= (SAT_score * 1)+ (Schedule_score*1)+(Rank_score*1)+

(GPA_score* 1.5)+ (Quality_score*1)

The current system simply adds the criteria together. Therefore, we can consider

the *baseline* "weight" on each criterion to be 1/5=0.2.[1] In the alternate applicant rating

(where GPA is multiplied by 1.5), the "weight" on GPA is 1.5/5.5=0.3. The "weight" on

the other four criteria is 1/5.5=0.18. We can think of them as weights relative to the

current system in which the baseline "weight" is 0.20. When the alternative "weight" is

lower than 0.2 we "weigh" the criterion less than the current system, and vice versa. To

measure the predictive power of the new applicant rating, I regress Union GPA on the

new applicant rating.

There is infinite number of ways the five criteria can be combined. I consider

multiplying each score by either 0, 0.5, 1, 1.5, ..., 3.5, 4. Thus, there are 9 possible ways

to multiply a score (from zero to four), and there are five scores/criteria. As a result there

are 9^5=59,049 number of combinations.

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[1] This is not a weight in the traditional sense of the word because the correspondence
between the numerical value of each criteria and number of points already implies some
weight.

B. Methodology and Results

In order to determine the combination of weights that maximizes the applicant rating predictive power, I ran nearly 60 thousand regressions of Union GPA on a different applicant rating created from different combinations of the five admissions criteria. I take the current scheme as the starting point, in which each criterion is multiplied by 0.20. By adjusting the weight of one admissions criterion, there must be adjustments in the other admissions criteria. The results are graphed below, with the r-squared of the applicant rating on the y-axis and the weight of the criterion in the academic rating on the x-axis. The peak on each graph represents the weight associated with the highest predictive power in the applicant grade. The red line represents where each score is currently weighed.

Table 7.1: Effects of different weight combinations on R2

Predictive power of different combinations of criteria weights
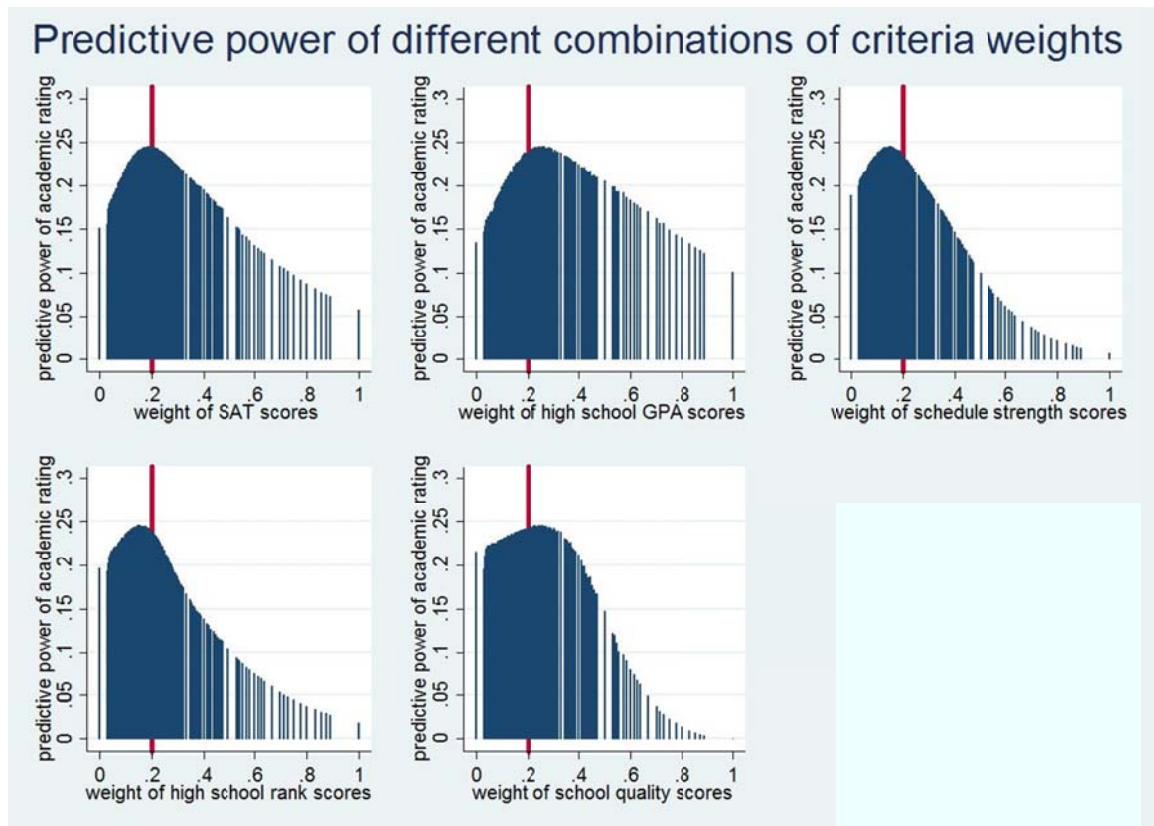
The peak of each graph represents the most predictive applicant rating. The x-coordinate represents the weight applied to the criterion when determining the applicant rating, and the y-coordinate of the peak represents the R^2 associated with the rating. At a weight of zero, the height of the bar depicts the highest possible R^2 that can be created *without* including that criterion. When the "weight" is at one the height of the bar shows the R^2 when only that one criterion is used. When examining each graph, it is clear that each criterion adds to the predictive power, as no criterion by itself has a more predictive applicant rating than when combined with other criteria.

C. What Is The Optimal Weighing System?

When analyzing the peaks of each graph, it is apparent that each admission criterion is currently weighted remarkably close to the optimal level in determining the applicant rating. Each criterion's optimal weight falls right around 0.2. Although they are not perfectly along the peaks, if the weight was adjusted to the optimal performance of one criterion, another criterions weights would also have to be changed, which would alter the other graph. Union College's applicant rating seems most predictive when equally weighing each admissions criteria score.

CHAPTER EIGHT

Conclusion

A. Do SAT Scores Predict Performance?

  SAT scores are positively correlated with Union GPA from the students who submitted their scores and opted to have them considered. Even when controlling for high school GPA, schedule strength, and class rank, SAT scores are still significant, showing that there are attributes of the Standardized Aptitude Test that are not explained by the other criteria. When analyzing the effects of multiple weight combinations on the predictive power of the applicant rating, not considering SAT scores in the applicant rating lowers the predictive power. Students who chose to not have their scores considered in effect have a less predictive applicant rating then students who did chose to have their scores considered in the admissions process.

B. How Should Union Weigh the Quality of Applicant's High School?

  Quality of an applicant's high school has an underlying weight that is half of the other admissions criteria. This means that coming from a school ranked in the middle 50% has less of an impact on applicant rating than having a class rank that falls in the middle 50%. When analyzing the expected GPAs of students in terms of class rank and school quality, students must overcome their handicap of applying from a weaker school with a higher class rank. Higher class rank displays a stronger correlation to expected Union GPA than high school quality. Students with equal expected Union GPA receive the same internal rating, showing that the current scaling system is accurate.

C. Should Union Adopt a "Finer" Criteria Score Scale?

There are no benefits to adopting a "finer" criteria score scale. When implementing a continuous scale, the predictive power of the applicant rating decreased. When increasing the amount of intervals in the scales in the attempt to create more like ranges, there was no change to the predictive power of the applicant rating. Therefore the current scaling system is optimal.

D. Should Union Change the Weights Assigned to Each Criterion?

There is no need for Union to alter the weights assigner to each criterion. Each admission criterion is currently weighted remarkably close to the optimal level in determining the applicant rating. Each criterion's optimal weight falls right around 0.2. Although they are not perfectly weighted individually, when looking at Table 6.1, if the weight was adjusted to the optimal performance of one criterion, other criterions weights would also have to be changed, which would alter the other graph. The applicant rating seems most predictive when equally weighing each admissions criteria score, despite the variation of predictive power each criterion holds.

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yale-researchers-develop-new-sat-test-could-better-predict-college-success>

Appendix

Table 3.3 Descriptive Statistics of Union Colleges Current Students

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Males	0.51	1	0.5	0	1
Females	0.49	0	0.5	0	1
White	0.75	1	0.44	0	1
Black/African American	0.05	0	0.22	0	1
Hispanic	0.05	0	0.23	0	1
Asian	0.06	0	0.24	0	1
Other race/ Unknown Race	0.09	0	0.28	0	1
Foreign	0.04	0	0.2	0	1
Union GPA	3.13	3.2	0.51	0.5	4
Admitted on Early Decision Total	0.41	0	0.49	0	1
Admitted on Early Decision E1	0.26	0	0.44	0	1
Admitted on Early Decision E2	0.15	0	0.36	0	1
Total SAT Score	1237.96	1250	131.37	760	1550
ACT Score	27.54	28	3.3	18	35
SAT Submitted	0.65	1	0.48	0	1
ACT Submitted	0.25	0	0.43	0	1
Test Scores not Considered	0.39	0	0.49	0	1
High School GPA	90.42	90.5	4.5	73.64	116.4
High School Class Rank	13.07	9.07	12.53	0	75.23
High School Quality	0.83	0.91	0.2	0.03	1
On Financial Aid	0.6	1	0.49	0	1
Average Financial Need	19358	12967.5	20186.67	0	58628

Table 3.4. Which Criteria Has the Most Predictive Power On Union GPA

	(1)	(2)	(3)	(4)	(5)
Dependent Variable: Union GPA					
total_sat	0.001***				
	(10.41)				
schedule_strength		0.013***			
		(4.69)			
hs_quality			0.288***		
			(4.45)		
hs_gpa				0.048***	
				(18.87)	
class rank					-0.016***
					(-10.49)
Constant	1.728***	3.072***	2.889***	-1.211***	3.390***
	(12.37)	(175.36)	(52.33)	(-5.26)	(123.88)
Observations	1,076	1,653	1,603	1,624	638
R-squared	0.092	0.013	0.012	0.180	0.147

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 3.5: Which Criteria Has the Most Predictive Power on Retention

	(1)	(2)	(3)	(4)	(5)
Dependent Variable: Retention					
total_sat	-0.000				
	(-0.41)				
schedule_strength		0.074***			
		(5.92)			
hs_quality			-0.103		
			(-0.42)		
hs_gpa				0.021**	
				(2.04)	
class rank					-0.008
					(-1.36)
Constant	1.674***	1.194***	1.540***	-0.473	1.614***
	-3.05	-20.08	-7.27	(-0.50)	-14.43
Observations	1076	1653	1603	1624	638

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 4.1: Effect of Submitting SATs on Union GPA

	Dependent Variable: GPA (Using all current students)				
	(1)	(2)	(3)	(4)	(5)
sat_submitted	0.126***	0.036	0.051	0.125***	0.040
	(4.80)	(1.47)	(1.21)	(3.68)	(0.80)
hs_gpa		0.047***			0.033***
		(18.32)			(4.56)
officialrank			-0.016***		-0.008***
			(-10.37)		(-3.26)
schedule_strength				0.041***	0.010
				(7.75)	(1.61)
Constant	3.048***	-1.174***	3.352***	2.746***	0.125
	(143.88)	(-5.07)	(81.07)	(61.95)	(0.18)
Observations	1,653	1,624	638	948	396
R-squared	0.014	0.181	0.149	0.086	0.191

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 4.2 Effect of Submitting SATS on Retention

	Dependent Variable: Retention (Using all current students)				
	(1)	(2)	(3)	(4)	(5)
sat_submitted	0.008	-0.064	-0.101	0.219	0.232
	(0.08)	(-0.64)	(-0.58)	(1.41)	(0.90)
hs_gpa		0.023**			0.014
		(2.12)			(0.35)
officialrank			-0.008		-0.004
			(-1.41)		(-0.33)
schedule_strength				-0.005	-0.002
				(-0.20)	(-0.05)
Constant	1.443***	-0.545	1.691***	1.702***	0.478
	(18.59)	(-0.57)	(9.68)	(8.65)	(0.13)
Observations	1,653	1,624	638	948	396

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 4.3. Effect of SAT Scores on Union GPA

Dependent Variable: GPA (Using students who Submitted SATs & had them considered)

	(1)	(2)	(3)	(4)	(5)
total_sat	0.001***	0.001***	0.001***	0.001***	0.001***
	(8.18)	(5.03)	(5.50)	(5.50)	(3.99)
hs_gpa		0.043***			0.001
		(12.25)			(0.08)
officialrank			-0.015***		-0.020***
			(-6.89)		(-5.02)
schedule_strength				0.017***	0.000
				(2.67)	(0.01)
Constant	1.577***	-1.719***	1.869***	1.464***	1.823*
	(7.89)	(-5.15)	(6.38)	(4.95)	(1.91)
Observations	885	866	348	474	208
R-squared	0.07	0.202	0.234	0.082	0.233

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 4.4 Effect of SAT Scores on Retention

Dependent Variable: Retention (Using students who Submitted SATs & had them considered)

	(1)	(2)	(3)	(4)	(5)
total_sat	0	-0.001	0	0	0.001
	(-0.50)	(-0.84)	(-0.16)	-0.13	(0.31)
hs_gpa		0.033**			-0.001
		(2.22)			(-0.01)
officialrank			-0.007		-0.02
			(-0.85)		(-1.05)
schedule_strength				0.021	0.008
				-0.36	(0.13)
Constant	1.831**	-0.823	1.762	1.514	1.348
	(2.38)	(-0.59)	(1.41)	(1.01)	(0.23)
Observations	885	866	348	474	208

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 5.1 Effects of High School Quality on GPA, Controlling For Class Rank

| | Dependent Variable: Union GPA | | |
	(1)	(2)	(3)
hs_quality	0.288***		0.605***
	(4.45)		(7.38)
officialrank		-0.016***	-0.018***
		(-10.49)	(-12.00)
Constant	2.889***	3.390***	2.982***
	(52.33)	(123.88)	(48.77)
Observations	1603	638	619
R-squared	0.012	0.147	0.22

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 6.2: Continuous Applicant Rating Scale vs. Current Applicant Rating

| | Dependent Variable: Union GPA | |
	(1)	(2)
Current Applicant Rating	0.016***	
	(21.57)	
Rating on Continuous Scale		0.014***
		(15.63)
Constant	2.251***	2.493***
	(53.40)	(57.6)
Observations	1,635	1073
R-squared	0.222	0.186

***,**,* indicates significant at 1, 5, 10 % respectively.

Table 6.4: Finer Scale vs. Current Scale

	Dependent Variable: Union GPA				
	(1)	(2)	(3)	(4)	(5)
Current Applicant Rating	0.016***				
	(21.57)				
Rating With Finer GPA Scale		0.016***			
		(21.75)			
Rating With Finer Rank Scale			0.016***		
			(21.70)		
Rating With Finer SAT/ACT Scale				0.016***	
				(21.39)	
Rating With All Finer Scales					0.016***
					(21.70)
Constant	2.251***	2.245***	2.243***	2.240***	2.226***
	(53.40)	(53.21)	(53.06)	(52.10)	(51.59)
Observations	1,635	1,648	1,635	1,635	1,648
R-squared	0.222	0.223	0.224	0.219	0.222

***,**,* indicates significant at 1, 5, 10 % respectively.