

Competitive Colleges and Graduation Rates in American Universities

Jamie Tkach

Professor Paul Winters

Economics Department

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Abstract

The purpose of this paper was to find out whether acceptance rates at a college or university have an effect on the graduation and retention rate of students at the institution. Every institution that receives federal money is required to report their statistics, and thus the Department of Education had the data. This study performed a simple linear regression with the independent variable of acceptance rate and dependent variable of graduation rates, while controlling for a variety of other school specific variables that may have also had an effect on graduation rates. Across approximately 1750 different American universities, there was a negative correlation between the acceptance rate and the graduation rate. In addition it was found that the percentage of in-state students and the percentage of minority students were correlated with graduation rates. Recommendations were made to Universities about how to increase their retention, such as increasing the rigor of the application process based on these findings.

Key Words: Higher education, graduation rates, American universities, acceptance, retention

1. Introduction

In President Obama's first speech to Congress in 2009, he said that "by 2020, America will once again have the highest proportion of college graduates in the world" (Scheider 2010). Currently today in the United States, less than 60% of students who enter a four year college or university graduate in less than six years (Scheider 2010). Those who enter college as degree seeking students are assumed to be intending to earn a degree. Graduation within 150% of the expected completion time is the standard used in the United States, outlined by the Institution for Education Sciences within the Department of Education (NCES 2013).

This statistic is a concerning indicator for the future of education within the United States, and it is important to figure out reasons behind why this graduation rate is so shockingly low and contrastingly see what factors can indicate a higher graduation rate. The study of higher education standards and schools that are successful in graduating students is important.

Studies have examined the effects of school quality (Light and Strayer 2000) and the effects on graduation and whether competition for education has actually increased learning (Bound et al 2009). There is not enough done to see whether admissions rigor can effectively serve as an indication. The admissions decision and process for determining and separating high achieving students could also indicate increased likelihood of graduation.

In order to understand how an admissions decision can indicate future academic success in higher education, it is important to know what goes into admissions decisions and ultimately acceptance rates. The basic components of their applications: SAT or ACT scores, GPA, class rank, extracurricular involvement, and advanced course work completed.

The Scholastic Aptitude Test (SAT) measures a student's skills in mathematics, reading and writing. The ACT "is a curriculum- and standards-based educational and career planning tool that assesses students' academic readiness for college" (Physics 2012). A student's SAT or ACT score is one of the two most considered components of a college application (UNIGO 2011).

Does the rigor involved in intense admissions processes better prepare students for college? As an admissions office is it better to be more selective in order to graduate more students? These are the questions that this paper has set out to answer. By using data provided by the Department of Education on their annual survey conducted by the National Center for Education Statistics, a linear regression was performed to establish the effects of decreasing acceptance rates on the increase in graduation rates.

2. Conceptual Framework

The college admissions process presents an information problem. The admissions office can only know so much about the student and they lack complete information about how successful a student will be. So they take the indicators that they have available in order to assess and predict students' future success. They look at the numbers behind admission: SAT score, GPA, class rank, but these numbers do not necessarily indicate success. There are those students who have great numbers "on paper" but do not know how to do laundry. Ultimately, there will always be information that they cannot obtain and applicants. So while taking these numbers into consideration, an admissions office's goal is to accept the students they feel have the highest chance of graduating.

Colleges and universities want to maximize the number of degree completions. Not only does this improve their ranking nationally, it creates benefactors who could support the institution in the future. Parents and high school students when searching for a college are concerned with graduation and retention ratings, so it encourages a higher application percentage. With a more people applying, the acceptance rate gets lower, and there is a positive cycle for the college or university.

It was previously presented by Light and Strayer (2000) that college entry is an experiment where there is a decision to first enter college, and then as more information is

presented a decision is made about whether to graduate. Students receive information about expected benefits, college costs, and academic rigor. After this information is processed, students then make the choice about whether to dropout, transfer, or in any way not complete their degree within the six years.

It has also been well established that the higher quality a school is, the better their retention and graduation rates are (Light and Strayer 2000). When provided with a good learning environment, qualified and highly educated faculty and excellent academic resources and support, students succeed and choose to not dropout and graduate. Quality schools are successful, but perhaps only when they have quality students as well.

Students who are better prepared for college are more likely to make the decision graduate (Goldrick-Rab 2009). If they have completed college preparatory classes, done exceptionally well in high school, and completed higher levels of mathematics and English, it follows that they can handle the academic rigor of college and reap the expected benefits from graduating. The advantages significantly outweigh the disadvantages in the graduation decision to a well prepared student.

Research within the education community has worked to conclude that selectivity is beneficial to students (Thomas 2003). But more recent studies have published that selectivity does not foster a positive academic environment with good educational practices, which were selected and isolated by educators (DiMaria 2007). The selectivity process could have an effect on the retention of high quality students and their ultimate graduation and that is what this study looks to examine.

In what ways can universities separate the high quality and achieving students from those who are more likely to arrive and flunk out? What is the effect of accepting high quality students? The admissions process is a presumably a good way to find enough information about students to make this determination. SAT scores are an element of admissions consideration, and they have already been concluded to be a good indicator for graduation success (Seattle 2008). In *Diplomas and Dropouts*, Hess et al concluded that there is a higher average graduation rate by the selectivity tiers outlined by acceptance percentage (2009). This study will build on their framework with a different model, to see if there is any significance to if the acceptance rate decreases the graduation rate will increase.

This study will build on this examination will test the following hypothesis:

Students enrolled in more selective four year bachelors' degree granting colleges and universities are more likely to graduate within 150% of the standard time to complete the degree.

3. Data

This study will be using the Integrated Postsecondary Education Data System (IPEDS). It is a system of interrelated surveys conducted annually by the U.S. Department's National Center for Education Statistics (NCES). IPEDS gathers information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. Because of the Higher Education Act of 1965, all institutions that receive federal student aid programs have to report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid. The unit for this study is by institution, and each institution has a unique code that is used throughout the data. IPEDS surveys more than 7,000 institutions, however I will be cutting this down to examine a smaller cross section of Bachelor's degree granting colleges and universities within the United States, bringing my sample down to 1749.

The dependent variable I will be using is the percentage of students completing their degree within 150% of the expected time for completion. This would mean that for a four year typical bachelors' degree if a student completes it within 6 years or 12 semesters, then that is considered a degree completion. The percentage of students is appropriate instead of just the number because it takes into account different sizes of universities. The independent variable I will be using is the acceptance percentage, or the number of students accepted to the university divided by the number of applicants, which also standardizes for different sized universities.

There are other variables within the data set that I feel are important to control for when looking at this correlation. I chose control variables because they could potentially have an impact upon the graduation rate at institutions. The first variable I controlled for was percentage of minority students, as it could have an effect on the graduation rate. Historically minority students have a statistically lower chance of completing higher education.

Another variable that should be controlled for is the tuition paid per student. Tuition could be a factor of whether a student feels the academic and ultimate benefit of their education is worth the financial drawback per year. The net tuition the university receives from all students together indicates their revenue from students and the money they could be spending on classes and programs. In addition to those variables, total enrollment and undergraduate enrollment gives a better look at the composition of the institution. In-state attendance percentage should be a controlled variable as well. Students that attend the institution from within the state might have an influence on a student's decision to remain with a university and graduate

Summary Statistics of Relevant Variables

Variable	Observations	Mean	Standard Deviation	Minimum Value	Maximum Value
Acceptance Rate	1749	.6558	.1962	.0711	1
Number of Applicants	1749	4195.96	6609.69	1	55423
Number of Admitted Students	1749	2383.99	3476.51	1	25439
Acceptance Rate	1749	.6559	.1926	.0711	1
Graduation Percentage	1624	.5332	.1978	.0148	1
Percentage Minority Students	1748	.2179	.2249	0	1
Tuition per Student	1744	11800.66	7345.92	-3985.46	170683.9
Tuition Revenue	1744	16,400,000	110,000,000	-1009723	1,280,000,000
Bachelor's Degrees	1749	876.83	1622.09	1	28818
Full Time Faculty	1733	317.11	708.03	1	11585
Total Enrollment	1748	6287.71	12166.85	14	259515
Total Undergraduate Students	1748	4914.07	9686.67	9	226272
Percentage In-State Students	450	.12406	.0467	0	.32607

What this summary provides is a glimpse of the data that this study worked with. The typical or average university was midsized, the mean undergraduates was about 4900. The average acceptance percentage is just over 60%, which the literature points out as being average in the United States (Hess et al 2009). The graduation percentage is just over 50%, which from an administrative standpoint is quite low and indicates that the higher education system in the United States potentially needs some policy changes to improve.

This data is appropriate for this analysis because it gives a complete look at higher education within the United States. Since nearly every institution is required to submit data to the Department of Education which compiles this data, it gives a thorough sample.

4. Methods

This study will be running a simple linear regression to check the correlation between graduation rate within 150% of the expected time as my dependent variable and acceptance rate as my independent variable. The coefficient found of the acceptance percentage is the determining factor for rejecting or accepting the hypothesis. If the coefficient is statistically significant and negative, then we fail to reject the hypothesis. In any other case, the hypothesis to be tested will be rejected. I will also be controlling for percent minority students, tuition paid per student, net tuition the university receives, number of full time faculty, total enrollment, total undergraduate enrollment, and percentage of students that attend from within the same state as this institution. If these factors have a statistically significant coefficient when regressed by graduation rate, they will be discussed in results.

In *Diplomas and Dropouts*, the authors used Barron's selectivity rankings and divided the schools they were looking at into 6 different selectivity categories (Hess et al 2009). Once they had those divisions, they simply looked at the percentage of students with degree completions (Hess et al 2009). This study looks to use the regression to see the correlative effect of admissions percentage on the graduation rate. In essence, this study uses a sliding scale instead of one that is tiered by selectivity category. It is informative and provides a different set of information.

Another study looked at the results of institutional selectivity on student engagement and concluded that selectivity and effective educational practices are largely independent (DiMaria 2007). This is an interesting point to make as it shows that just because a school excludes large populations; it does not mean that the education received is of any higher quality. This would indicate that the selectivity rating is perhaps because they recruit higher quality students (DiMaria 2007).

Before continuing to results of this study, there are a few potential issues with this discussion. Transfer students are not accounted for in this analysis, as there is no way to accurately represent them within the study. Under the data collection by the US Department of Education, students who transfer and thus fail to graduate at the original institution are not counted towards graduation percentages even if they graduate at the second institution. There are some institutions that thrive on attracting transfers and for those schools, graduations rates

would be lower. Out of this sample, however, less than 500 of the approximately 1400 institutions reported any transfers.

5. Results

As the table below indicates, there were three independent variables in the regression model that were statistically significant and had a nonzero correlation coefficient and those are listed in bold. The three independent variables that were significant were: acceptance rate, percentage of minority students, and percentage of in-state students. Acceptance rate and percentage of minority students were negatively correlated with graduation rate, while the percentage of in-state students was positively correlated. There were 1749 observations that were used to in the regression.

Regression of Graduation Rate against Listed Variables

Variable Measured against Graduation Percentage	Coefficient	Standard Error	t score	P > t	95% Confidence Interval	
Acceptance Rate	-.2311	.0337	-6.86	0.000	-.2974	-.1649
Percentage of Minority Students	-.2427	.0244	-9.92	0.000	-.2908	-.1947
Tuition per Student Enrolled	.000029	.0000	9.22	0.000	.000023	.0000355
Total Tuition Revenue	.0000	.00001	-2.06	0.040	.0000	.0000
Total Faculty	.0000445	.0000151	2.95	0.003	.0000149	.0000742
Total Enrollment	.0000	.0000	0.75	.452	.0000	.0000105
Total Undergraduate Students	.0000	.0000	-0.67	.505	-.00001	.0000
Percentage In State	.3986	.1288	3.09	0.002	.1453	.6519

The hypothesis that this study was interested in was that students enrolled in more selective four year bachelors' degree granting colleges and universities are more likely to graduate within 150% of the standard time to complete the degree. According to this

regression, for every percent that the graduation rate increases, the admission rate goes down .2311 percent. With 95 percent confidence, the hypothesis fails to be rejected, as the regression indicates a correlation.

This brings us back to the decision problem faced by university officials when accepting students. Clearly there is a positive consequence when an admissions office is stricter with requirements for acceptance. Institutions generally have a higher graduation rate, which means that schools are more effectively isolating high quality students from the many that apply. These students are more successful and more likely to graduate.

The percentage of minority students enrolled at a university is also negatively correlated with graduation rate and is statistically significant. This could be because in general minority students come from high schools where they are less prepared for college, or it could be a result of the socioeconomic structure within the United States.

The percentage of in-state students being positively correlated to graduation rate was also interesting. The more students attending a university and residing within the same state, implies that the graduation rate is higher. This could be for many different factors. From a cost perspective, in-state students have the option of residing at their parents' homes and saving themselves housing and food costs. There is also closer familial support if they do live on campus or they need to go home for the weekend. Their decision to leave school or transfer would be influenced by the presence of their family. Attending a university near your home shows a value on family and students would be less likely to transfer and move away from that safety net.

The R-squared value for this analysis was 0.5558 and the adjusted R-squared value was .5476. This indicated that most of the variance of the dependent variable, graduation percentage rate, is explained by the model created. An R-squared value over .60 would have been preferred, but for social science this model fits pretty well.

This result agreed with another study performed that found that as the tier of selectivity increased from non-competitive to highly competitive, the graduation rate increased (Hess et al 2009). This study showed that as acceptance rate goes down, graduation rates may increase instead, so a very similar results just based on a different model. Another study that was performed has slightly different results, which indicated that student performance might not improve when acceptance rates are lower (Aina et al 2010). This analysis was performed for just one university in Italy, however. In addition, this is not exactly the same test, so they are certainly not in a direct contradiction. One possibility for both of those conclusions to be true is that perhaps students do not necessarily perform better but are still more likely to matriculate from a university, even with lower grades or indicators.

6. Conclusions and Policy Recommendations

Based on this analysis, it would make sense for a university to tighten their acceptance standards in order to increase their graduation rates. Higher graduation rates are a positive for a university because it increases their rankings nationally and attracts more students to apply and then they ultimately can be more exclusive. It is a positive cycle that could help the educational structure in the United States. As admissions become tougher in searching for better students, high schools would have to better academically prepare their students.

Going forward, it would be interesting to see a similar study done across different geographic regions. Or with reference to specific types of admissions standards and not the acceptance rate as a whole. Studies have been performed that look specifically at SAT scores and AP scores on student success, but not necessarily graduation rates.

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