The Cost of Tuition and Minority Attendance

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Abstract

This report aims to analyze the relationship between the cost of tuition and the proportion of minority students in attendance across various United States universities. The data being analyzed comes from Opportunity Insights with the unit of analysis being colleges. The key research question this report tries to answer is: Does the cost of tuition impact the amount of minority students in attendance in universities? The data largely supports the hypothesis that the cost of tuition does impact minority representation, however it affects each group in different ways.

Introduction

The central question of this report is what is the impact of tuition cost on minority student attendance and representation? This is a key question because oftentimes, minority students tend to come from lower income families, so their ability to attend institutions of higher education may be limited. It is important to find out the impact of tuition costs on minority attendance as it can help reveal some flaws in the education system in the United States, and how it may impact social mobility. The data collected for this study comes from Opportunity Insights, which concatenated data at the university level from schools across the United States in 2000 and 2013. They drew mostly from data collected by the Department of Education, which observed over 2,000 colleges and universities.

In this analysis, the minority groups studied were Black students, Hispanic students, Asian/Pacific Islander students, and foreign students. The hypothesis for this study was that the cost of tuition will have a negative correlation with the minority proportion at universities. To put it simply, schools with higher costs of attendance will have lower proportions of minority students. This hypothesis was somewhat supported by the evidence, but varied from group to group. While groups who have been historically disadvantaged in terms of access to higher education, such as Hispanic and Black students, saw attendance decrease as tuition increased, this was not true for Asian/Pacific Islander and foreign students.

Data

My data came from a dataset compiled by Opportunity Insights, who drew data from the Department of Education. The dataset contains many variables related to higher education. For my research specifically, I paid attention to the variables concerning the cost of attendance, and

the proportion of minority students in each university. As the Department of Education is a non-partisan group, it is safe to assume that there are most likely no heavy biases that would impact the results of the data.

Table 1: Minority Share At Universities

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
asian_or_pacific_share_fall_2000	2,413	3.390	5.605	0.000	0.671	3.518	79.159
black_share_fall_2000	2,413	13.037	18.430	0.000	2.796	15.214	100.000
hisp_share_fall_2000	2,413	7.425	12.916	0.000	1.165	7.482	96.418
alien_share_fall_2000	2,413	2.039	3.244	0.000	0.131	2.673	41.468

Shown in Table 1 are the dependent variables being analyzed in this report. asian_or_pacific_share_fall_2000 represents the proportion of Asian/Pacific Islander students in attendance at each university. black_share_fall_2000 represents the proportion of Black students in attendance at each university. hisp_share_fall_2000 represents the proportion of Hispanic students in attendance at each university. alien_share_fall_2000 represents the proportion of foreign students in attendance at each university.

Figure 1: Minority Share Across US Universities

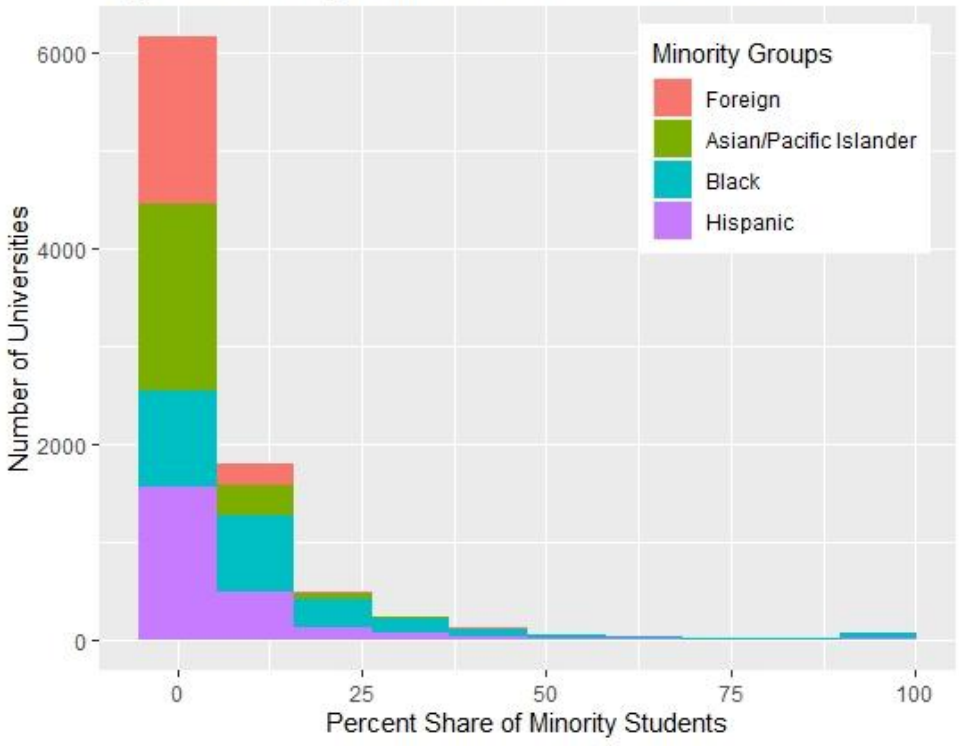


Figure 1 is a stacked histogram that shows the share of each minority group across United States universities. The number of universities is greatest for all minority groups when the share of each group is the smallest. The trend shows the number of universities decreasing as the percent share decreases. There is an exception at the end of the graph, however, where the share of Black students rises slightly. This is because of the presence of several historically black colleges in the dataset.

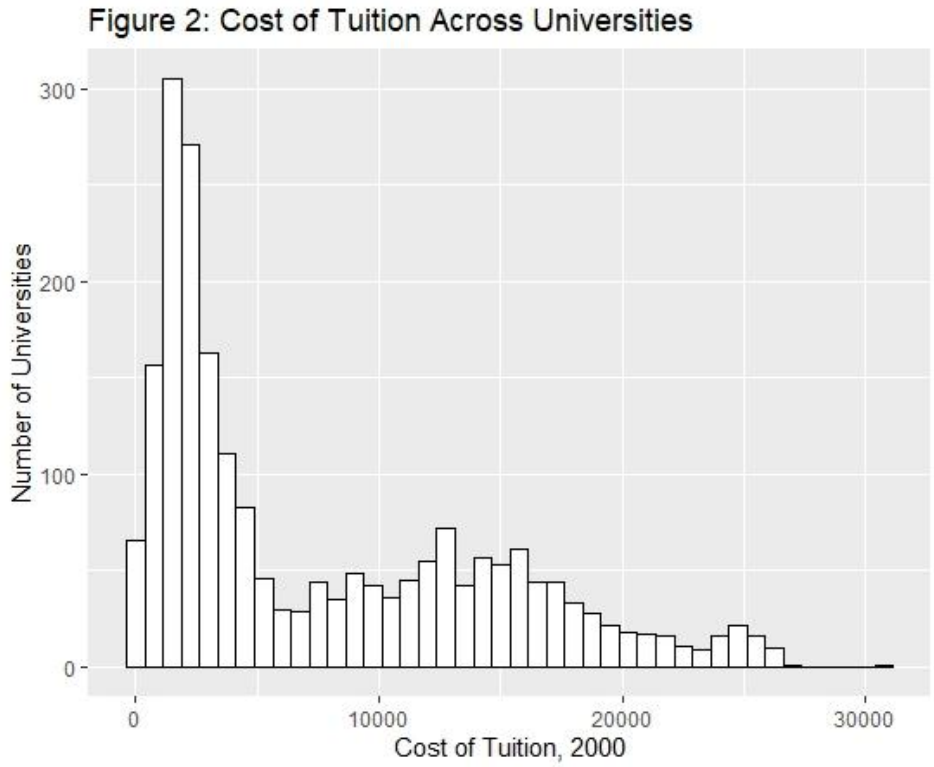


Figure 2 shows the distribution of universities according to cost of tuition. As shown in the graph, the peak of cost of tuition is on the lower end, below $10,000. sticker_price_2000 shows the tuition price of each university in the year 2000. As shown in Table 2, the mean is

Table 2: Tuition Cost Distribution

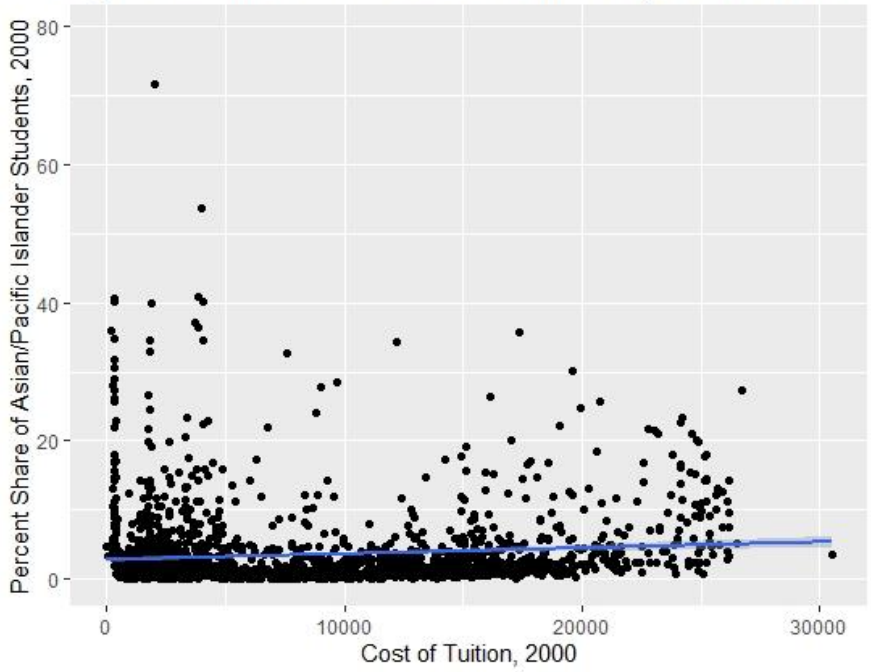
Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
sticker_price_2000	2,160	7,596.375	6,897.309	0.000	1,890.000	12,950.000	30,500.000

around $7,596.38, but the standard deviation is quite large. This means that there is quite a bit of range between the cost of tuition across various universities. The number of observations in sticker_price_2000 is lower than the amount there are in Table 1 with minority share. This could be due to universities in the study not being willing to or able to provide their tuition cost, but able to provide minority share.

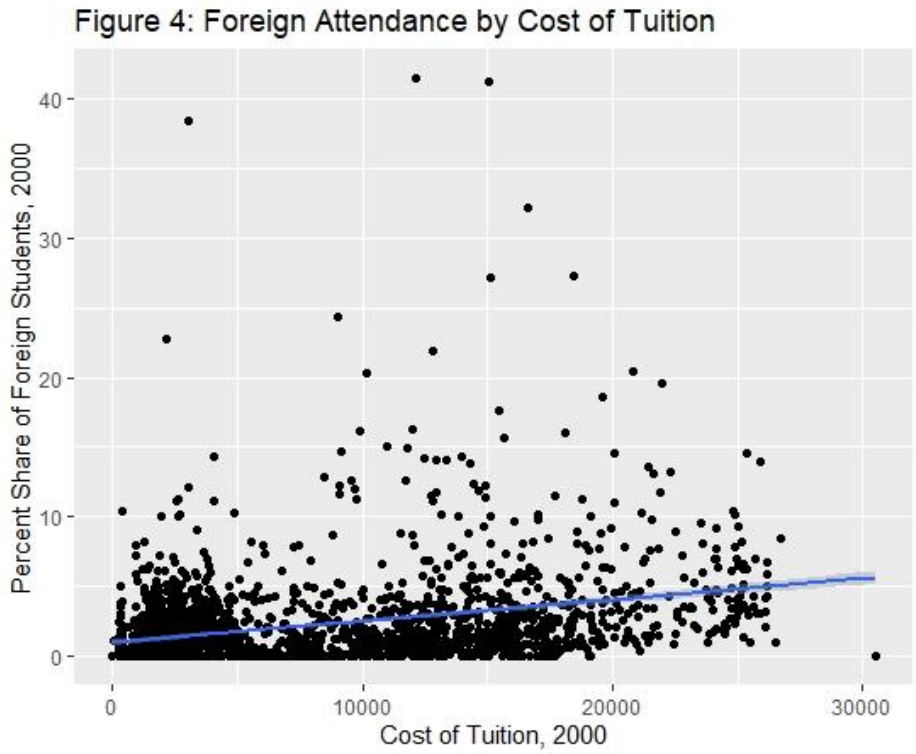
Method and Results

In order to obtain conclusions concerning the hypothesis, numerous steps were taken to analyze the data. As shown in Figure 3, 4, 5 and 6, extensive bivariate analysis was run. The first step taken to analyze the relationship between the independent variable and the dependent variables was creating scatterplots with a regression line to show the trends of the data. Each scatter plot has the cost of tuition on the x-axis, and the percent share of each minority group on the y-axis. This is because we wanted to see how the cost of tuition impacted the minority share, not the other way around. First, Figure 3 shows the relationship between the cost of tuition and

Figure 3: Asian/Pacific Islander Attendance by Cost of Tuition



the proportion of Asian/Pacific Islander students at each university. Contrary to my hypothesis, there seems to be a slight positive correlation between the cost of tuition and the share of Asian/Pacific Islander students. However, the slope is very small, and demonstrates only a small correlation. Also contrary to my hypothesis is Figure 4, which shows a high positive correlation between the cost of tuition and the percent share of foreign students. This may be because



foreign students tend to come from wealthier families who can afford to send their children overseas, thus they are more likely to attend expensive universities. In contrast to these two groups, Figures 5 and 6 do support my hypothesis. Figure 5 shows the relationship between the cost of tuition and the share of Hispanic students at a university. The slope of this graph is negative, indicating that as the cost of tuition increases, the proportion of Hispanic students decreases. Similarly to Figure 5, Figure 6 shows a

Figure 5: Hispanic Attendance by Cost of Tuition

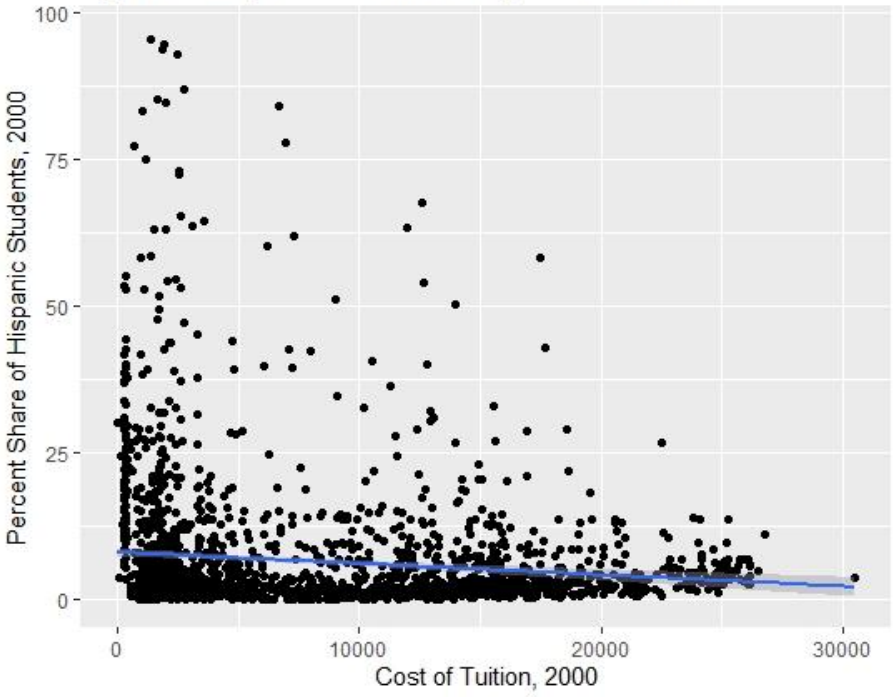
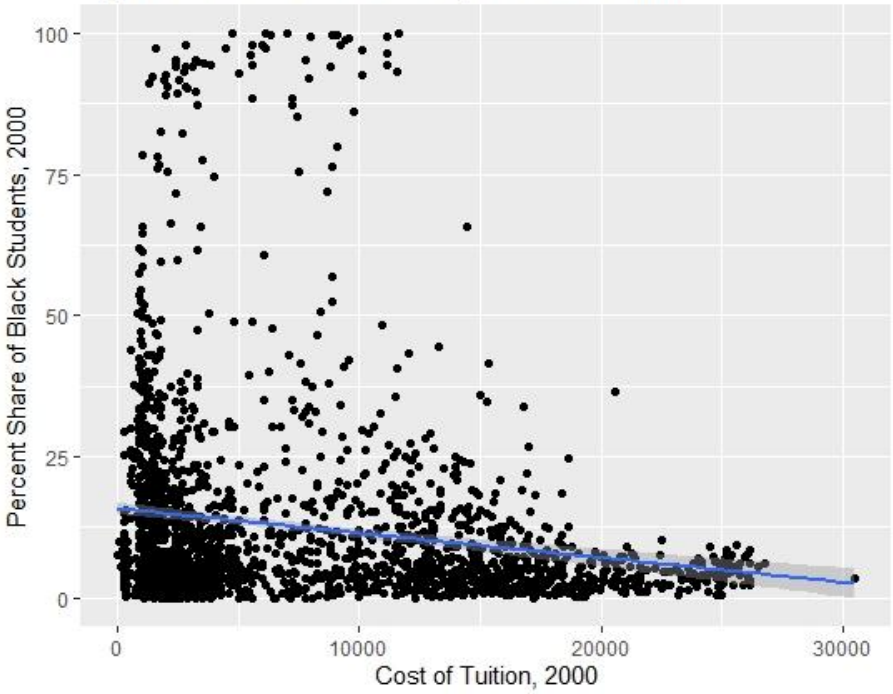


Figure 6: Black Attendance by Cost of Tuition



negative correlation between the cost of tuition and the proportion of students in each university who are Black. The slope of Figure 6 seems to be even steeper than that of Figure 5, indicating

that the proportion of Black students at more expensive universities drops steeply in comparison to more affordable universities. These preliminary results do make sense as in terms of educational opportunities, Black and Hispanic students tend to be at more of a disadvantage (NCES). In order to get a more precise reading of the relationship, a bivariate regression was run. This was so we could obtain the exact slope, intercept and other important statistical analysis

Table 3: Bivariate Regressions

	Dependent variable:			
	Asian Share	Black Share	Hispanic Share	Foreign Share
	(1)	(2)	(3)	(4)
Cost of Tuition (in thousands)	0.085***	-0.436***	-0.193***	0.152***
	(0.017)	(0.056)	(0.035)	(0.010)
Constant	2.737***	15.853***	7.999***	0.975***
	(0.175)	(0.570)	(0.359)	(0.099)
Observations	2,160	2,160	2,160	2,160
R^2	0.011	0.028	0.014	0.103
Adjusted R^2	0.011	0.027	0.013	0.103
Residual Std. Error (df = 2158)	5.470	17.813	11.201	3.105
F Statistic (df = 1; 2158)	24.712***	61.519***	30.490***	247.591***
Note:				*p<0.1; **p<0.05; ***p<0.01

values. The regression results shown in Table 3 confirm the initial speculations made from the scatterplots. The regression analysis shown in Table 3 uses the cost of tuition in thousands, to give a more easily interpretable result. To do this, all tuition costs were divided by 1,000. The share of each minority group was measured as a percent, so all original decimal values were multiplied by 10. The slopes for both percent share of Asian/Pacific Islander and Foreign students are positive, 0.085 and 0.152, respectively. The slopes for Black and Hispanic students calculated in the regression also match the results from the scatterplots. For the share of Black students, the slope is -0.436, and for the share of Hispanic students, it is -0.193. As indicated by

the three asterisks next to each of these values, the P-value is less than 0.01, so we can reject the null hypothesis and draw the conclusion that these are the accurate slopes, and that the cost of tuition does impact, to some extent, the percent share of minority students in attendance. Though the r-squared values are quite small, we can still conclude that at least some of the trends of minority share are attributable to the cost of attendance.

Discussion

The results obtained from this analysis somewhat support my hypothesis, but also contradict some aspects. The original hypothesis predicted that for all minority groups, the share of students of that minority would decrease as the cost of tuition increased. This was proven untrue for the Asian/Pacific Islander and foreign groups. For Asian/Pacific Islander students, there was a slight increase of percent share as tuition increased, although very minimal. According to the National Center for Education Statistics, between 1972 and 1992, the proportion of Asian/Pacific Islander high school seniors who said that tuition and fees for college were important stayed the same (NCES). This indicates that for this minority group, the cost of attending university was not as significant of a factor. This matches the results of the regression run fairly well.

As for foreign students, there was a quite substantial positive correlation between the cost of tuition and the percent share of foreign students. This is most likely because families that are able to afford sending their children abroad are able to afford the cost of tuition at more expensive universities.

My hypothesis was proven correct for the other two minority groups, Black and Hispanic students. In general, Black and Hispanic populations tend to be affected at greater rates by

poverty than other groups. This is most likely the reason the percent share of these groups decrease as tuition increases. It is possible that some families from these groups simply cannot afford to send their children to more expensive universities. In 1992, 67% of Black seniors said that financial aid was a very important factor when choosing a university (NCES). For the majority of Black students, expensive schools that do not offer much financial aid are essentially unattainable. Similarly, 62% of Hispanic seniors said the same thing, restricting their access to higher education (NCES).

The slope for the relationship between the share of Black students and tuition is more steep than for Hispanic students. One factor that could impact this is the presence of historically black colleges and universities (HBCUs) in the study. Since the share of Black students at these schools are close to 100% and the tuition at these schools tend to be lower, this will skew the data to cause the slope to be steeper. There are of course some limitations to this analysis. For example, there are many other factors that can influence the attendance of any particular group that were not observed. The college guidance resources a community has access to vary across different groups, and this can impact how able groups are to attend university. Additionally, the wealth of a school can impact how much advertising they give to different communities, which can impact enrollment, and the cost of tuition. However, since there was no data gathered on these possible confounding variables, it is impossible to predict how impactful they might have been.

Conclusion

Overall, the results derived from my analysis were not entirely shocking. To recap, my original hypothesis was that as the cost of tuition increased, the percent share of all minority

groups would decrease. This was proven untrue for two groups, but true for the other two. Concerning foreign students, it makes sense that if their parents are willing to send their children to a different country to get an education, they are likely fairly wealthy. As for Asian/Pacific Islander students, there is no obvious reason why attendance increased as tuition increased. Since the slope was very slight, there is very little positive correlation, so perhaps the cost of tuition simply does not impact Asian/Pacific Islander students percent share at universities as heavily.

For Black students, the slope was very strongly negative. As aforementioned, Black students tend to be at a disadvantage in terms of having access to higher education, which would explain why their percent share decreases as the tuition increases. Similarly, hispanic students also had a lower percent share at more costly universities. Though the slope was not as steep as for Black students, there was still solidly a clear connection between the cost of tuition and the attendance of Hispanic students. This is important to pay attention to because it is something that points out deep flaws within our society. It is a well known fact that access to higher education is something that can pull families out of poverty, and the fact that certain groups don't have the same access to it as others should be a red flag. More research must be done on this subject to find the root of the problem. Additional related research topics that would be important to study are how financial aid can help increase the percent share of minority students at more expensive schools, or how more expensive schools recruit students.

Works Cited

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