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Title:

"The Returns from a Bachelor's Degree: R1 vs Non-R1 Universities"

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Introduction

In today's competitive job market, a bachelor's degree has become a minimum requirement for many entry-level positions. However, according to College Board, from 2009-2019, the average tuition and fees at a public four-year institution has increased by 24% (adjusted for inflation), whereas real GDP per capita has gone up by only 15% (Source: St. Louis Fred).

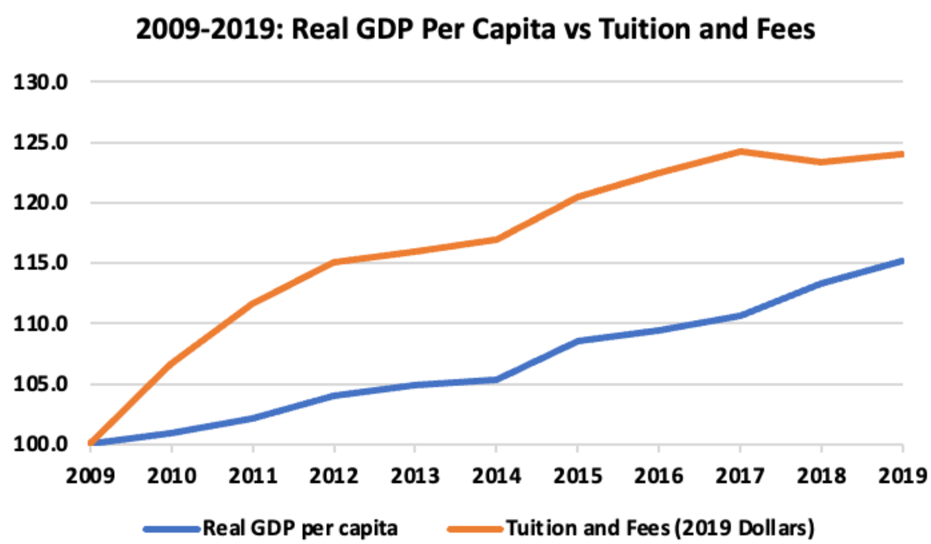

Figure 1 Source: College Board Report: "Trends in College Pricing 2019" and St. Louis Fred

With the rising cost of tuition, many students face a difficult decision when selecting a college: Should they attend a top school that boasts a strong reputation or attend one with more affordable tuition fees? This question has become increasingly relevant as more employers place a premium on the prestige of a top institution from which a candidate has graduated. While a bachelor's degree from a top school may offer greater opportunities and earning potential, a degree from a less prestigious school often provides a more affordable option. In this paper, we will explore how going to a top tier school affects the student's overall quality of life by looking at their movement within the country after graduation.

For the purposes of this paper, I have used Carnegie classifications of Institutions to categorize schools as "top tier schools". The Carnegie classification is an effective way to do so as it classifies schools based on multiple factors like number of doctoral degrees awarded per year, research expenditure, number of majors available at the university, highest degree offered, etc. The highest level of Carnegie classification is R1, which points to universities with 'very high research activity'. R1 universities are what I use to classify a top school. There are three criteria which a university has to meet in order to qualify as an R1 institution. If the institution spends more than $5 Million in research and development expenditures per year and has conferred at least 20 Doctoral Degrees per year on average over the past three years, then it is categorized as either R1 or R2. R1 universities have 'very high level of research activity', whereas R2 universities have 'high level of research activity'. These levels are calculated based on a multi-faceted research activity index which accounts for aggregate and per capita research activity in an institution. The detailed calculation can be found on the Carnegie Classification website.

Carnegie classifications are widely recognized as a comprehensive and reliable measure for assessing universities in the United States. As a result, they are likely to be a salient measure of perceived quality for students and their families. The Carnegie classification system was first developed in 1970 and is based on a more detailed and comprehensive set of criteria which provide a standardized way to differentiate between universities. Therefore, students and their families may use Carnegie Classification system as an important factor in their decision-making process when selecting a college or university, as these classifications provide a reliable indicator of the quality of education and research opportunities available at each institution. While Carnegie classifications are widely recognized as a comprehensive and reliable measure of assessing higher education institutions in the United States, there are other popular ranking systems available. The US News and World Report's Best Colleges Ranking is one such system, which considers a range of factors including undergraduate academic reputation, student selectivity, and financial resources. However, unlike the Carnegie classification system, US News rankings do not distinguish between research and non-research institutions, which can be a significant factor in determining the quality of education at an institution. In addition, US News rankings also heavily weigh factors such as student retention and graduation rates, which may not necessarily reflect quality of education at a university. For example, a university with extremely high academic standards might not have a high first-year student retention rate due to the sheer difficulty of the programs.

While both systems can provide valuable insights into the quality of education and research opportunities available at universities, for the purposes of this paper, the Carnegie classification methodology is used as it provides a more detailed and nuanced classification of universities based on research activity and academic programs. I recognize that these rankings systems and the Carnegie classification are not congruent. Therefore, I control for other variables like endowment, net price of attendance, and number of full-time faculty in my analysis, which obviously vary even within each level of Carnegie classification.

Literature Review

Past researchers have examined the link between school quality and student outcomes. Dale and Krueger (2002) find that only students from low-income families benefit by going to more selective universities from a pool of randomly selected students who are accepted into more selective universities. Hoekstra (2009) finds a strong 20% increase in earnings 15 years after high school graduation for white men that attended a flagship state university (the results for white women were inconclusive). The earnings premium mentioned is compared to students who were barely rejected and ended up going to a less selective in-state public state universities. He also finds no correlation between admission in flagship state university and likeliness to participate in the in-state labor force ten to fifteen years later. A limitation of Hoekstra's findings is that that earnings are not considered if a student moves out-of-state after graduation and no data is available on rejected students. This is a big selection bias and may cause the results to be skewed in favor of higher benefits to flagship university attendance.

Conzelmann et al. (2022) discusses how the market share of a college/university affects the state's college-educated students retention rate in terms of employment. This research may be of help to policymakers to increase the retention rate of college grads. Using variables like Herfindahl-Hirschman Index (HHI), Carnegie Classification of the institution, student population, urbanization level of the nearest metropolitan area, etc. Their research finds that more selective schools and flagship schools end up sending students to a wider geographical area. Students graduating from more selective schools have a higher rate of retention in the state.

Finally, the authors also found a correlation between the Degrees awarded between 2010-2018 and the percentage of students residing in-state after graduation over public and private institutions. They found a very strong positive correlation ($R^2=0.94$) however, most universities that awarded large number of degrees and retained large number of students were public universities. And on the other hand, most universities that awarded a small number of degrees and retained a small number of graduates within state were private universities. It is important to note that the private vs. public classification is a different method for assessing the prestige of universities than the one being used in this paper. While private vs. public is often used as a measure of perceived prestige, the Carnegie classifications aim to empirically measure different perceptions of prestige based on a more comprehensive set of criteria. Moreover, the Carnegie classifications are still objective and provide standardized methods of categorizing universities.

This paper represents a unique contribution to the existing body of literature on the returns of a bachelor's degree, particularly focusing on comparing the returns of attending R1 vs non-R1 universities. Due to lack of availability of data, we will use median earnings of a state as proxy for earnings of students. This is a big generalization, however due to lack of data, it is very difficult to attain the more suitable statistics.

Background

Obtaining a bachelor's degree is often seen as an important step towards career advancement and increased earning potential. However, the financial returns from a bachelor's degree can vary widely depending on factors such as the institution attended and chosen major.

R1 graduates have access to higher quality education and research opportunities provided by these institutions. R1 institutions tend to have larger research budgets, which allow for more extensive research facilities and faculty, leading to increased opportunities for undergraduate research and internships. These experiences can provide R1 graduates with a competitive edge in the job market and prepare them for more specialized careers.

On the other hand, graduates from non-R1 institutions tend to have more affordable tuition, making them accessible to a broader range of students. According to College Board's trends in college pricing 2021 report, the average published tuition and fees for full-time in-state students at public four-year institutions for 2021-2022 academic year was $10,560. However, the average published tuition and fees at flagship public universities, many of which are classified as R1 institutions, was higher at $11,220. Although this difference doesn't seem big, it is important to note that these reports do not use Carnegie classifications to differentiate between flagship public university. Furthermore, it is worth noting that these figures are averages and can vary widely depending on factors such as location and degree program. Specific institutions of interest can be researched in the future to get a more accurate picture of their tuition and fees rates.

There can be a link between cost of college and higher quality students, which can ultimately affect the reputation of the college and lead to higher earnings for students. Higher cost of college may attract students who are able to afford higher-priced colleges, and also have the academic credentials and skills to be successful in college or in the workforce. As a result, the college may have higher admission standards, higher graduation rates, and higher-quality programs compared to lower-priced colleges. This could lead to a perception that the college is of higher quality, which could ultimately affect the reputation of the college among employers and the broader community. This perception could lead to higher earnings for students who graduate from the college, as employers may place a premium for students graduating from these colleges, which would expand their employment opportunities and earning potential.

Therefore, while lower cost of college can make education more accessible and affordable for some students, colleges that maintain higher academic standard help their students warrant higher salaries and earnings compared to colleges with lower cost and lower academic standard.

In addition to the financial implications, the quality of education and amount of research conducted at universities also have important implication on students after graduation. As such, it is worth exploring how high levels of research and teaching quality are interdependent elements of universities that can impact students in meaningful ways. High levels of research by faculty not only enhance the quality of teaching, but also inspire new lines of research through the questions that arise during the course of teaching. When faculty members are engaged in active research, they are exposed to new ideas, concepts, and findings that can be integrated into their teaching. This in turn can make their courses more engaging and up-to-date, and help students see the practical applications of their studies. Moreover, the questions that arise from teaching can lead to new research projects that can advance the field and provide fresh insights. By maintaining a high level of research activity, universities are better equipped to guide students in their academic pursuits and help them achieve their career goals.

Data and Methods

I have used data from National Center for Education Statistics (NCES), LinkedIn, the Federal Bureau of Investigation (FBI), Global Data Labs, the Bureau of Labor Statistics, and St. Louis Fred for the analysis in this paper. Descriptive statistics for all variables used are reported in Table 3 in the Appendix.

National Center for Education Statistics

The NCES data is compiled from the Integrated Postsecondary Education Data System (IPEDS). It includes data about the institutions such as the Carnegie Classification, Mean enrollment per year from 2010-2018, levels of degrees awarded per year (associate's, bachelor's, master's, doctoral, etc.), Racial categorization of the institution, Percent of students receiving Pell grants, Average Net Price, and Control of Institution (Public or Private). In this dataset, there is one observation per institution.

LinkedIn Data

The LinkedIn Dataset is compiled by Conzelmann et al. The dataset used in this study includes information on the career outcomes of millions of college graduates in the US, based on their LinkedIn profiles. The data was collected in 2020 about graduates who mention attending a university between 2010 and 2019. This data includes counts of students attending a university for over 1500 institutions and 100 majors at that time. There is one observation for a combination of a university and a state. This data primarily comprises of the percentage of students who graduated from a specific university and reside in a particular state. For instance, if 60% of graduates from Georgia Institute of Technology (Georgia Tech) reside in Georgia, the observation for Georgia Tech and Georgia would have a value of 0.6. This helped in tracking the general location of graduates categorized by institutions.

FBI Crime Data

The FBI data comprises of number of occurrences of crime by state. It also had categorization of crime based on its severity. The data was broadly categorized into two categories: Violent Crime and Property Crime. This was further sub-categorized into seven categories: Larceny-Theft, Motor-Vehicle Theft, Burglary, Aggravated Assault, Robbery, Rape, and Murder and non-negligent manslaughter. Using this data, I calculated a crime index based on severity and type of crime committed per 100,000 people. A simple weighting method was used to do this by ranking the crimes based on severity (1 being least severe, and 7 being most severe) using the information provided on the FBI website and then adding up the ranks to get 28. All the respective ranks then divided by 28 provided the weights of each crime type. These weights were then multiplied with crime per 100,000 people. Adding these indices up gave me a single value of crime index by state. This was done so that the severity of crime could be considered while calculating the index, rather than simply adding the number of occurrences per 100,000 for each crime type. Finally, a higher number of this crime index indicates more severe crime with more occurrences.

State Data

The last dataset was manually obtained data from a few different websites which included variables like Median Household Income in 2020, Human Development Index (HDI), and the Census Region of the state. Median Household Income data was obtained from St. Louis Fred; HDI was obtained from Global Data Lab, and Census Region by state from Bureau of Labor Statistics.

These datasets were merged into one dataset. After that, I multiplied the outcome variables, which in this case were Earnings, Income, HDI, and the Crime Index by the state share of student graduating from each institution. This process produced a weighted mean of outcomes. After this step, the dataset was grouped by institution, resulting in one observation per institution

Methods

Multivariate linear regression models were used to analyze the data. Model one is specified using the following equation:

$$Y_s = \beta_0 + \beta_1(R1_s) + \beta_2 X_s + \delta_s + \varepsilon_s$$

Model two is specified using the following equation:

$$Y_s = \theta_0 + \theta_1(R1_s) + \theta_2(R2_s) + \theta_3 X_s + \gamma_s + \mu_s$$

In the first model, I focus on whether as institution is classified as R1 or non-R1. The second model considers the impact of both R1 and R2 institutions on my measures of quality-of-life outcomes. Both models include the same set of control variables.

In both above models, Y_s represents the outcome (dependent) variables, which in this case are Earnings, Income, HDI, and the Crime Level Index. β_0 and θ_0 represent the intercept values of the equation and the outcomes for the base group when β_1, θ_1, and θ_2 terms equal zero. β_1 and θ_1 represent the impact of an R1 institution on the outcomes. It is important to note that R1 is a binary variable, the value of which equals 1 when the observed university is classified as an 'R1' and equals 0 when the university is non-R1. In Model 2, θ_2 represents the impact of attending an R2 institution on the outcomes. Like the R1 variable, R2 is also a binary variable which assigns value of 1 or 0 depending on if the institution observed is classified as 'R2'. β_2 and θ_3 represents the correlation coefficients for all other control variables which are represented by the vector 'X'. These include SAT scores of incoming students, Endowment, Total Full-Time Faculty employed, etc. The vector 'X' also incorporates 'Net Price of Attendance' which is computed as the difference between 'In-State Undergraduate Tuition' and 'Average Amount of Federal, State, Local, or Institutional Grant'. This measure takes into account for any grants and scholarships that students receive rather than solely focusing on the sticker price of in-state undergraduate tuition. δ_s and γ_s are the fixed effects within a state. This allowed for control of many unobservable variables that stay constant within the state boundaries. For example, it would be unfair to compare the impact of R1 institution on one's earnings for someone who lives in Nebraska to someone who lives in New York. If we did so, we would be falsely attributing differences in cost of living between states to the impact of a top-tier institution. This is also a fair assumption as most students live in the state of their institution after graduation (Conzelmann et al. 2022). Finally, the ε_s and the μ_s represent the random error terms.

Results

Model 1:

Using this model, I find that for the first step, in estimating the earnings, β_1 is 492.2 with a standard error of 665.5 (see Table 1 below). However, this finding is not statistically significant. There are four statistically significant variables in the first step – 'In-State Net Price of Attendance', 'Percent of students receiving financial aid', 'Percent of students receiving Pell Grants', and 'Total Number of bachelor's Degrees awarded'. The correlation coefficient for 'In-State Net Price of Attendance' is 0.3770 with a standard error of 0.1129. This is significant at $p<0.01$. For 'percent of students receiving financial aid', the correlation coefficient and standard error is –96.15 and 30.90 respectively, which is significant at $p<0.01$. The correlation coefficient and the standard error of 'percent of students receiving Pell grants' is 90.82 and 19.85 respectively. This is at $p<0.001$ significance level. The correlation coefficient and standard error of 'Total number of bachelor's degrees awarded' is 0.3437 and 0.1824 respectively. This is significant at $p<0.1$. The R^2 value for this step of the model is 0.2024.

In the second step of estimating income, I find β_1 to be −1852 and a standard error of 1585. But this is also statistically not significant. In this step, there are three variables which were statistically significant: 'Full time Enrollment', 'In-State Net Price of Attendance' and 'Total number of bachelor's degrees awarded'. The correlation coefficient and the standard error for full time enrollment is -2.025 and 0.6400. This is significant at $p<0.01$. The correlation coefficient and the standard error for the 'Total number of bachelor's degrees awarded' is 1.440 and 0.3861 at a $p<0.001$ significance level. The R^2 value for this step of the model is 0.2796.

Table 1 – Model 1 Correlation Coefficients and Standard Errors

	Model 1			
	Earnings	**Income**	**HDI**	**Crime**
R1	492.2	-1852	0.002*	-0.834
	(665.5)	(1585)	(0.0009)	(2.12)
Full time enrollment	-0.3418	-2.025***	<0.0001***	0.0023
	(0.2418)	(0.640)	(<0.0001)	(0.0017)
In-state Net Price of Attendance	0.3770***	0.5987***	<0.0001	-0.0003
	(0.1129)	(0.2176)	(<0.0001)	(0.0004)
Percent of students receiving financial aid	-96.15***	-88.80	<0.0001	-0.0581
	(30.90)	(65.00)	(<0.0001)	(0.1556)
Percent of students receiveing pell grants	90.82****	47.19	<0.0001*	0.0234
	(19.85)	(57.88)	(<0.0001)	(0.0579)
Total # of Bachelor's Degrees awarded	0.3437*	1.44****	<0.0001***	-0.0015
	(0.1824)	(0.3861)	(<0.0001)	(0.0012)
R^2	0.2024	0.2796	0.1412	0.0481

[1]

In the third step of estimating HDI, β_1 and the standard error is 0.002 and 0.0009. This is statistically significant at $p<0.1$. There are three other statistically significant variables: 'Full time enrollment', 'Percent of Students receiving Pell Grants', and 'Total number of bachelor's degrees'. However, the coefficient and the standard error for all three variables are <0.0001 and <0.0001 respectively. Therefore, it is not economically significant. The R^2 value for this step of the model is 0.1413.

[1] Full Regression Table for Model 1 can be found in the Appendix
Significance Levels (p< __): '****' – 0.001; '***' – 0.01%; '**' – 0.05%; '*' – 0.1%; ' ' – 1

In the last step of estimating Crime Levels, β_1 and standard error of R1 variable is – 0.834 and 2.12. This is also statistically not significant. There are no other variables which are statistically significant in estimating the Crime Levels. The R^2 value for this step of the model is 0.03813.

It is important to note that the β_1 is statistically significant only in estimating HDI. β_2 for the 'In-State Net Price of Attendance is statistically significant in two out of the four steps in estimating Earnings and Income. β_2 for 'Total bachelor's Degrees Awarded' is statistically significant for three out of the four steps which included estimations for Earnings, Income, and HDI. β_2 for the 'Full time enrollment' is statistically significant for two out of the four steps which included estimations for Income and HDI. β_2 for 'Percent of Students receiving Pell grant' is statistically significant in only one out of the four steps in estimating Earnings.

Model 2:

Using this model, I find that for the first step, in estimating the earnings, the θ_1 is 295.8 with a standard error of 680.8 (see Table 2 below). However, this finding is not statistically significant. In the first step, there are five statistically significant variables are 'R2', 'In-State Net Price of Attendance', 'Percent of students receiving financial aid', 'Percent of students receiving Pell Grants', and 'Total Number of bachelor's Degrees awarded'. The θ_2 and the standard error is -681.3 and 370.5 at $p<0.1$ significance level. For 'In-State Net Price of Attendance', θ_3 and standard error is 0.3659 and 0.1137, which is significant at $p<0.01$. For 'percent of students receiving financial aid', θ_3 and standard error is -95.76 and 29.81 respectively. This is significance at $p<0.01$. The θ_3 and the standard error of 'percent of students receiving Pell grants' is 93.76 and 19.97 respectively. This is significance at $p<0.001$. The θ_3 and standard error of 'Total number of bachelor's degrees awarded' is 0.3750 and 0.1825 respectively. This is significance at $p<0.05$. The R^2 value for this step of the model is 0.2076.

In the second step of estimating income, I find θ_1 equal -1886 and a standard error of 1566. But this is also statistically not significant. In this step, there are three variables which were statistically significant: 'Full time Enrollment', 'In-State Net Price of Attendance', and 'Total number of bachelor's degrees awarded'. The θ_3 and the standard error for full time enrollment is -2.018 and 0.6641. This is significant at $p<0.01$. The θ_3 and the standard error for

'In-State Net Price of Attendance' is 0.5968 and 0.2143. This is significant at $p<0.01$. The θ_3 and the standard error for the 'Total number of bachelor's degrees awarded' is 1.446 and 0.3781 at a $p<0.001$ significance level. The R^2 value for this step of the model is 0.2796.

Table 2 – Model 2 Correlation Coefficients and Standard Errors

	Model 2			
	Earnings	**Income**	**HDI**	**Crime**
R1	295.8	-1886	0.0019*	-1.227
	(680.8)	(1566)	(0.0010)	(2.524)
R2	-681.3*	-161.1	0.0007	-1.365
	(370.5)	(1001)	(0.0007)	(2.045)
Full time enrollment	-0.2997	-2.018***	<0.0001***	0.0024
	(0.2583)	(0.6641)	(<0.0001)	(0.0017)
In-state Net Price of Attendance	0.3659***	0.5968***	<0.0001	-0.0003
	(0.1137)	(0.2143)	(<0.0001)	(0.0004)
Percent of students receiving financial aid	-95.76***	-88.73	<0.0001*	-0.0573
	(29.81)	(65.04)	(<0.0001)	(0.1556)
Percent of students receiveing pell grants	93.76****	47.69	<0.0001	0.0293
	(19.97)	(59.36)	(<0.0001)	(0.0628)
Total # of Bachelor's Degrees awarded	0.3750**	1.446****	<0.0001***	-0.0015
	(0.1825)	(0.3781)	(<0.0001)	(0.0014)
R^2	0.2076	0.2796	0.1467	0.0500

[2]

In the third step of estimating HDI, θ_1 and the standard error is 0.0019 an 0.0010. This is statistically significant at $p<0.1$. There are two other statistically significant variables: 'Full time enrollment' and 'Total number of bachelor's degrees'. However, θ_3 and the standard error for both variables are <0.0001 and <0.0001 respectively. Therefore, it is not economically significant. The R^2 value for this step of the model is 0.1467.

In the last step of estimating Crime Levels, θ_1 and the standard error is -1.227 and 2.524. This is statistically not significant. There are no other statistically significant variables in this step. The R^2 value for this step of the model is 0.0500.

[2] Full Regression table for Model 2 can be found in the appendix
Significance Levels (p< __): '****' – 0.001; '***' – 0.01%; '**' – 0.05%; '*' – 0.1%; ' ' – 1

It is interesting that R1 variable is only statistically significant in estimating HDI. 'Total bachelor's Degrees Awarded' is statistically significant for two out of the four steps which included estimations for Earnings and Income.

Conclusion

In both models, R1 is statistically significant in estimating HDI. The results of model 1 suggest that R1 classification does not have a statistically significant effect on the dependent variables of Earnings, Income, and Crime when controlling for other covariates. Furthermore, in model 2, the inclusion of R2 variable along with R1 yields no change in statistical significance with Earnings, Income, and Crime. Therefore, the notion that R1 institutions have a positive effect on the quality of life of students in comparison to institutions with lower research output cannot be conclusively supported.

In both models, Full Time Enrollment in a university remained a negative factor in estimating Income and HDI. Perhaps universities with higher numbers of full-time enrolled students strain university's resources available to students such as career advice centers and academic advising, which might lead to students having uncertainty about their careers eventually having a negative impact on their incomes. In terms of HDI, even though the impact is statistically significant, it is not big enough (economically significant) to make a difference in a student's life on average.

The next variable that showed both statistical and economical significance was the In-State Net Price of Attendance for undergraduates. The coefficient of this factor in both models for Earnings was roughly 0.371 and for income, the coefficient was roughly 0.598. This implies that with every additional dollar spent on college per year, the Median household Income of a student increases by 37¢ per year and Real Income Per capita increases by 60¢ per year. This might not seem like a big increase; however, it is important to take into consideration the mean and the standard deviation of the Net Price of Attendance across all universities which is $6,443 and $7,179 respectively. This, on the extreme end of the standard deviation translates to an Earnings and Income increase by $2,656 and $4,307 per year on average respectively.
The next two variables 'Percent of students receiving financial aid' and 'Percent of students receiving Pell grants' have statistically significant, yet economically opposite outcomes on students' earnings. According to both the models, with an increase of 1 percentage points in percent of students receiving financial aid, the earnings decrease by roughly $95 per year on

average. This essentially means that a university with a high percent of students receiving financial aid have less outcome on earnings for their students. A possible explanation for this is that these students may come from families who are less able to contribute to their education. This could lead to a situation where students are more likely to take out loans, work while attending school, and have limited access to resources that could help them build their resumes and increase their job prospects after graduation.

On the other hand, according to both models, with an increase in 1 percentage points in percent of students receiving Pell grants, the earnings increase by $92 per year on average. This essentially translates to if in a university a higher percentage of students receive Pell grants, there is an increased chance of a positive change in earning potential of the students. One possible explanation to this is that these grants are awarded to students from families with the greatest financial need. This may mean that these students have access to more financial aid and other resources that can help them succeed academically and professionally, including internships, networking opportunities, and other career development programs. Additionally, because these students come from disadvantaged backgrounds, they may be more motivated to succeed and may be willing to take on greater risks and challenges in their professional lives. Finally, it is also possible that employers may actively seek out and value the diverse experiences and perspectives that these students bring to the workforce, which could translate into higher earnings outcomes. This finding also relates to what Dale and Kreuger (2002) found which is that students from low-income families benefit more than students from high-income families.

The last variable which is most consistently statistically significant in both models in estimating Earnings, Income, and HDI is the 'Total number of bachelor's Degrees Awarded'. According to both models, a university awarding 1 additional bachelor's degree translates to 34¢ increase in Earnings, $1.44 increase in Income, and no real increase in HDI for its students. However, the only economically significant increase are the Earnings and the Income. One possible explanation for the increase is that these universities might have larger and more established Alumni networks, which can provide students with access to wider range of professional opportunities and connections. These networks may also provide graduates with a sense of community and support, which can be valuable as they navigate their careers. In addition, universities with larger number of bachelor's degrees awarded likely have greater name recognition and may have a stronger reputation in the job market, which could lead to higher salaries and more career opportunities for their graduates.

Despite these findings, it is necessary to acknowledge the limitations of this analysis. The limitations of this paper are that it does not cover all possible variables that might affect student outcomes. This is difficult to do especially in the field of education of economics due to omitted variable bias, which also explains the lower $R2$ estimates. These models only explain about 17% of the change in outcomes. Another limitation of this paper is that the outcome variables are not observed at a finer level of granularity. The earnings, income, and crime variations over a smaller geographical region may yield different results. Instead of using state level aggregates, the use of sub-state, county, metropolitan statistical area, and even neighborhood data may yield more nuanced results. Another possible way to extend this line of research would be to incorporate other College/University ranking methods – like U.S News and World Reports, Times Higher Education World University Rankings, QS World University Rankings, Academic Ranking of World Universities, The Princeton Review Best College Rankings – into the analysis.

Overall, my results suggest that research productivity alone does not necessarily have a direct positive impact on the quality of life of students.

Appendix

Table 3 – Summary Statistics of Variables Used

	Mean	Std Dev
Median Earnings by Institution	$57,763	$9,416
Real Income Per Capita by Institution	$28,657	$11,291
Crime Index by Institution	166.57	0.01606
HDI by Institution	0.9215	36.41
Total Research Expenditure	$58,456,099	$142,330,931
Total Institution Endowment	$232,100,000	$797,350,071
Total Employed Faculty	487	656.87
75th Percentile of SAT Verbal Scores	577.7	71.57
75th Percentile of SAT Math Scores	585	75.35
Full-time Enrollment	1,101.10	1,324.10
In State Undergraduate Net Price	$6,443	$7,179
Percent of students receiving financial aid	91.06	12.84
Percent of students receiving Pell grant	39.95	18.29
Total Number of Bachelor's Degrees Awarded	1,128.40	1,631.85
R1 Sample Size	107	
R2 Sample Size	95	
Others	1,395	

Table 4 – Summary Statistics Table (By School type)

	R1 Institutions		***R2 Institutions***		***Non-R1 Non-R2 Institutions***	
	Mean	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Median Earnings by Institution	$58,388	$7,930	$56,878	$9,156	$57,775	$9,538
Real Income Per Capita by Institution	$23,217	$10,162	$26,956	$8,982	$29,190	$11,398
Crime Index by Institution	173.8	30.98	171.96	40.11	165.64	36.47
HDI by Institution	0.9247	0.0147	0.9199	0.0162	0.9213	0.0161
Total Research Expenditure	$329,407,504	$241,706,566	$64,826,413	$52,770,556	$8,647,738	$32,808,583
Total Institution Endowment	$1,251,035,459	$1,861,621,954	$246,123,410	$210,309,476	$41,473,406	$64,576,006
Total Employed Faculty	2,079.60	1,106.10	1,185.30	493.50	317.00	356.29
75th Percentile of SAT Verbal Scores	676.6	63.11	610.05	48.44	563.65	64.29
75th Percentile of SAT Math Scores	704.2	65.09	624.92	55.99	568.1	63.82
Full-time Enrollment	3,867.10	2,090.54	2,536.36	1,352.81	648.00	716.32
In-state Undergraduate Net Price	$2,847	$7,214	$2,716	$7,318	$6,995	$7,008
Percent of students receiving financial aid	75.61	12.65	86.75	10.36	92.58	12.13
Percent of students receiving Pell grant	22.62	10	31.37	13.27	41.93	18.21
Total Number of Bachelor's Degrees Awarded	4,768.60	2,722.20	3,028.71	1,714.93	718.00	920.90
Sample Size	107		95		1,395	

Table 5 – Full Regression Table with coefficients and standard errors for Model 1

	Model 1			
	Earnings	**Income**	**HDI**	**Crime**
R1	492.2	-1852	0.0018.	-0.834
	(665.5)	(1585)	(0.0009)	(2.12)
Total Research Expenditure	<0.0001	<0.0001	<0.0001	<0.0001
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)
Endowment	<0.0001	<0.0001	<0.0001	<0.0001
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)
Total Faculty	-0.5803	0.2560	<0.0001	-0.0017
	(0.4161)	(0.8420)	(<0.0001)	(0.0019)
Verbal SAT 75th Percentile	-2.992	-14.69	<0.0001	-0.0143
	(4.843)	(14.79)	(<0.0001)	(0.0174)
Math SAT 75th Percentile	-0.7725	-19.40	<0.0001	0.0310
	(5.054)	(14.88)	(<0.0001)	(0.0185)
Full time enrollment	-0.3418	-2.025***	<0.0001***	0.0023
	(0.2418)	(0.640)	(<0.0001)	(0.0017)
In-state Net Price of Attendance	0.3770***	0.5987***	<0.0001	-0.0003
	(0.1129)	(0.2176)	(<0.0001)	(0.0004)
Percent of students receiving financial aid	-96.15***	-88.80	<0.0001	-0.0581
	(30.90)	(65.00)	(<0.0001)	(0.1556)
Percent of students receiveing pell grants	90.82****	47.19	<0.0001.	0.0234
	(19.85)	(57.88)	(<0.0001)	(0.0579)
Total # of Bachelor's Degrees awarded	0.3437*	1.44****	<0.0001***	-0.0015
	(0.1824)	(0.3861)	(<0.0001)	(0.0012)
R^2	0.2024	0.2796	0.1412	0.0481

Table 6 – Full Regression Table with coefficients and standard errors for Model 2

	Model 2			
	Earnings	Income	HDI	Crime
R1	295.8	-1886	0.0019*	-1.227
	(680.8)	(1566)	(0.0010)	(2.524)
R2	-681.3*	-161.1	0.0007	-1.365
	(37.05)	(1001)	(0.0007)	(2.045)
Total Research Expenditure	<0.0001	<0.0001	<0.0001	<0.0001
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)
Endowment	<0.0001	<0.0001	<0.0001	<0.0001
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)
Total Faculty	-0.6019	-0.2523	<0.0001	-0.0017
	(0.4170)	(0.8520)	(<0.0001)	(0.0019)
Verbal SAT 75th Percentile	-1.327	-14.41	<0.0001	-0.0110
	(4.992)	(15.20)	(<0.0001)	(0.0179)
Math SAT 75th Percentile	-0.4821	-19.35	<0.0001	0.0315
	(4.934)	(14.95)	(<0.0001)	(0.0195)
Full time enrollment	-0.2997	-2.018***	<0.0001***	0.0024
	(0.2583)	(0.6641)	(<0.0001)	(0.0017)
In-state Net Price of Attendance	0.3659***	0.5968***	<0.0001	-0.0003
	(0.1137)	(0.2143)	(<0.0001)	(0.0004)
Percent of students receiving financial aid	-95.76***	-88.73	<0.0001*	-0.0573
	(29.81)	(65.04)	(<0.0001)	(0.1556)
Percent of students receiveing pell grants	93.76****	47.69	<0.0001	0.0293
	(19.97)	(59.36)	(<0.0001)	(0.0628)
Total # of Bachelor's Degrees awarded	0.3750**	1.446****	<0.0001***	-0.0015
	(0.1825)	(0.3781)	(<0.0001)	(0.0014)
R^2	0.2076	0.2796	0.1467	0.0500

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