



IS ALUMNI SALARY AN APPROPRIATE METRIC FOR UNIVERSITY MARKETERS?

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ABSTRACT

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This paper considers ethnicity variables and financial variables to study what impact they have on alumni salaries six and ten years after graduation, for colleges and universities in the United States. We find that certain ethnic groups earn less salary both six years out and ten years out, while other ethnic groups earn more salary both six and ten years out. The same is true for selected financial variables, such as median household income. We perform our study primarily using stepwise-regression analyses. Since many colleges and universities use future salary of alumni as a marketing tool, this study cautions that there is a danger to the diversity of a college campus, and a corresponding harm to students on such a campus, if the college or university places too much emphasis on future alumni salary and makes admissions decisions in a way that emphasizes that criterion.

Contribution/Originality: This study contributes to the existing literature by pointing out a potentially unintended consequence of an economically-motivated decision made by colleges and universities that is, arguably, bad for society. The danger is that of reducing the diversity of the undergraduate student-body, and the corresponding harm done to said student body.

1. INTRODUCTION

In this paper, we examine the impact of university marketing – specifically the use of average alumni salary metrics in university advertising – and the effect that it has on the university community and the students who create that community. It should be noted that we do not focus on the *effectiveness of the marketing for recruiting purposes*, but, rather, on the potential impact of diversity on campus; one might argue that we are examining *at best* the impact of “unintended consequences.”

Examples of universities that include salary data of alumni in their web marketing include, surely among others:

- Harvey Mudd University, California ([Harvey Mudd College, 2017](#))
- California Institute of Technology, California ([Caltech Undergraduate Admissions, 2017](#))
- Babson College, Massachusetts ([Babson College, 2017](#))
- Bucknell University, Pennsylvania ([Bucknell University, 2017](#))

We are particularly interested in this topic from the marketing perspective, because society often focuses on marketing crises that are considered “scandals” within organizations, resulting in bad publicity. Occasionally, what

is neglected is that the more important story about these marketing issues is the negative impact on the organization and society, overall, due to the result of small lapses, or oversights, that are embedded in our systems. These oversights can often be caused by how an organization chooses to evaluate itself, both as an organization and as a set of individuals within the organization, represented by the key performance indicators that the organization uses both to monitor its successes and to share with its customers and prospects.

While universities often advertise the amount of money that former students can earn once they start their careers, one might wonder how accurate these numbers are (after all, not all alumni keep in touch with a school within a few months after graduation, never mind after 6 or 10 *years* later [the time periods used in this paper, based on collected data]); one can argue that there is easily the possibility of bias, especially if “higher earning” alumni are pleased to report (brag??) about their salaries, while “lower earning” alumni may not wish to report their earnings, due to embarrassment, or the feeling that they are “letting the school down.” Not reporting salaries is a very common issue on surveys as a routine part of the demographic section. It is well-known that salary-data response is “missing” more than the response to any other routine demographic question.

One might also wonder about the impact of the desire to continually “improve” (i.e., increase) future salary figures - on individual students admitted to the university, and the overall university community. Universities are not the only ones sharing these metrics; there is also a variety of lists available online that are ranking colleges with the highest-paid alumni (Dale and Krueger, 2011). The characteristics that make up high-future-earning university-populations are the key focus of our analysis. We are seeking to determine the predictors of salary based on the characteristics of undergraduate students on campuses nationwide in the United States.

Essentially, we are examining what our universities would look like if striving for increased alumni salaries became priority number 1. It is worrisome to consider the consequences of a university’s attributing too high a priority to high future salaries; assuredly, as will be seen later in this paper, the demographic mix of the student body at such a university would not be what most people truly want.

2. LITERATURE REVIEW

- In 2016, BeyondCore found that the single biggest factor in post-graduation salaries is the income of the student’s parents (Morrison, 2016).
- In 2014, Nicholas Bowman found that openness to diversity and challenge on college campuses has positive impacts on the first-year students' GPA and is a marginally significant predictor of first to second-year retention (Bowman, 2014).
- A 2016 study by the Pew Research Center found racial and gender wage gaps in the United States. All ethnic groups except Asian men “...lag behind white men regarding median hourly earnings...” (Patten, 2016).

3. METHODOLOGY

The data used for the following study is from the *College Scorecard* published by the U.S. Department of Education in September 2017. These data are available at <https://collegescorecard.ed.gov/data/> (College Scorecard Data from US Department of Education, 2017). The *College Scorecard* data are collected to give students who are making choices about college access to information to help them in their decision making. The Department of Education collects the data through reporting from federal institutions, financial-aid reports, and tax information. The *College Scorecard* website states that “many data elements are drawn directly from, or derived from, data reported to the IPEDS [Integrated Postsecondary Education Data System].” The *College Scorecard* provides data from over 7,500 U.S. undergraduate degree-granting colleges and universities and the sample size in this study is $n = 7,593$. The data were last updated on September 28th, 2017.

The two dependent variables in this study are median annual income six years after college, and median annual income ten years after college, for former undergraduate students at each university. The independent variables in our study can be grouped into two categories: 1) ethnicity, and 2) family income when admitted to the university.

The 12 independent variables used to indicate ethnicity are:

- Total share of enrollment of undergraduate degree-seeking students who are White (UGDS_WHITE)
- Total share of enrollment of undergraduate degree-seeking students who are Black (UGDS_BLACK)
- Total share of enrollment of undergraduate degree-seeking students who are Hispanic (UGDS_HISP)
- Total share of enrollment of undergraduate degree-seeking students who are Asian (UGDS_ASIAN)
- Total share of enrollment of undergraduate degree-seeking students who are American Indian/Alaska Native (UGDS_AIAN)
- Total share of enrollment of undergraduate degree-seeking students who are Native Hawaiian/Pacific Islander (UGDS_NHPI)
- Total share of enrollment of undergraduate degree-seeking students who are two or more races (UGDS_2MOR)
- Total share of enrollment of undergraduate degree-seeking students who are non-resident aliens (UGDS_NRA)
- Total share of enrollment of undergraduate degree-seeking students whose race is unknown (UGDS_UNKN)
- Total share of enrollment of undergraduate degree-seeking students who are White non-Hispanic (UGDS_WHITENH)
- Total share of enrollment of undergraduate degree-seeking students who are Black non-Hispanic (UGDS_BLACKNH)
- Total share of enrollment of undergraduate degree-seeking students who are Asian/Pacific Islander (UGDS_API)

We acknowledge that there is a high correlation/multi-collinearity among certain of these variables.

The 3 independent variables used to indicate family income are:

- Median household income (MEDIAN_HH_INC)
- Percentage of undergraduates who receive a Pell Grant – According to [FastWeb \(2011\)](#) “The average family adjusted gross income (AGI) for Pell Grant recipients is 123% of the poverty line, compared with 395% of the poverty line for non-recipients.” (PCTPELL)
- Percent of all undergraduate students receiving a federal student loan - According to [Fastweb Team \(2017\)](#) “The Hope Scholarship tax credit is available to families with income up to \$90,000 (single filers) and \$180,000 (married filing joint).” (PCTFLOAN)

3.1. Hypotheses

Based on the previous research included in the above literature review, we hypothesized, for a stepwise-regression model, the following:

1. Assuming other variables in the model are held constant, the higher the percentage of Black non-Hispanic students that attend a school (i.e., college, university, institute), the lower the median salary of former students will be after both six and ten years.
2. Assuming other variables in the model are held constant, the higher the percentage of Hispanic students that attend a school, the lower the median salary of former students will be after both six and ten years.
3. Assuming other variables in the model are held constant, the higher the percentage of Black students that attend a school, the lower the median salary of former students will be after both six and ten years.
4. Assuming other variables in the model are held constant, the higher the percentage of White non-Hispanic students that attend a school, the higher the median salary of former students will be after both six and ten years.

5. Assuming other variables in the model are held constant, the higher the median household income of students at a school, the higher the median salary of former students will be after both six and ten years.
6. Assuming other variables in the model are held constant, the higher the percentage of students at a school who receive a Pell grant, the lower the median salary of former students will be after both six and ten years.
7. Assuming other variables in the model are held constant, the higher the percentage of students at a school who receive a federal student loan, the lower the median salary of former students will be after both six and ten years.

These hypotheses come from the unfortunate reality that Black and Hispanic employees earn less, on average, than White employees (Patten, 2016). Additionally, as mentioned in the aforementioned literature review, students whose families have lower household incomes when they attend college tend to earn less as workers in the future (Morrison, 2016).

4. ANALYSIS

4.1. Initial Stepwise Regressions

We will run a series of stepwise regressions. First, we will run four stepwise regressions, two for each dependent variable (salary six years out, salary ten years out); the two per dependent variable will be one for each set of independent variables. In other words, the four initial stepwise regressions will be:

- 1) Y = salary ten years out, X's = the 12 ethnicity variables
- 2) Y = salary six years out, X's = the 12 ethnicity variables
- 3) Y = salary ten years out, X's = the 3 family-income variables
- 4) Y = salary six years out, X's = the 3 family-income variables

Table 1 shows the final step of the stepwise-regression analysis for (Y, X's) combination 1.

Table-1. Salary ten years out, 12 ethnicity variables

9	(Constant)	27998.688	294.843		94.961	.000
	UGDS_NRA	83351.793	3987.917	.276	20.901	.000
	UGDS_WHITENH	6913.382	465.113	.194	14.864	.000
	UGDS_ASIAN	34718.719	2568.784	.185	13.516	.000
	UGDS_BLACKNH	-5874.999	982.144	-.078	-5.982	.000
	UGDS_AIAN	-12986.266	2158.201	-.078	-6.017	.000
	UGDS_HISP	-112.213	21.164	-.069	-5.302	.000
	UGDS_2MOR	21112.064	4725.984	.058	4.467	.000
	UGDS_UNKN	7089.218	1732.858	.053	4.091	.000
	UGDS_NHPI	-18737.112	5221.629	-.046	-3.588	.000

a. Dependent Variable: MD_EARN_WNE_P10

It can be seen in Table 1 that 9 of the 12 variables were contained in the final stepwise-regression model. The multiple R² for the model is .200 (adjusted R² = .199). All of the variables have a p-value (to 3 digits) of .000 (last column in the table). Results indicate that, holding other variables in the model constant, the larger the percentage non-resident alien students, White-non-Hispanic students, Asian students, students who indicated 2 or more races, and students whose race was not indicated (i.e., unknown), the larger the median salary of students ten years out. The larger the percentage of Black-non-Hispanic students, American Indian/Alaskan Native students, Hispanic students, and Native Hawaiian/ Pacific Islander students, the smaller the median salary of student ten years out. It might be surprising to the reader that the variables, percent of White students and percent of Black students, did

not enter the final model; undoubtedly, that is because the variables are each sufficiently co-linear with other variables in the final model, as to not provide incremental value to predicting Y.

Table 2 shows the final step of the stepwise-regression analysis for (Y, X's) combination 2.

Table-2. Salary six years out, 12 ethnicity variables

10	(Constant)	23577.541	237.560		99.249	.000
	UGDS_NRA	51158.979	3153.229	.215	16.224	.000
	UGDS_WHITENH	6163.185	379.096	.214	16.258	.000
	UGDS_ASIAN	27715.697	2066.547	.183	13.412	.000
	UGDS_BLACKNH	-5908.498	798.909	-.097	-7.396	.000
	UGDS_AIAN	-10896.175	1809.646	-.078	-6.021	.000
	UGDS_HISP	-92.567	17.499	-.069	-5.290	.000
	UGDS_NHPI	-15452.747	4333.943	-.047	-3.566	.000
	UGDS_UNKN	4618.039	1419.146	.042	3.254	.001
	UGDS_2MOR	9167.641	3602.351	.033	2.545	.011
	UGDS_WHITE	28.520	13.592	.027	2.098	.036

a. Dependent Variable: MD_EARN_WNE_P6

It can be seen in Table 2 that 10 of the 12 variables were contained in the final stepwise-regression model. The multiple R² for the model is .165 (adjusted R² = .163). Seven of the variables have a p-value (to 3 digits) of .000, and two others have p-value ≤ .011. Results indicate that, holding other variables in the model constant, the larger the percentage non-resident alien students, White-non-Hispanic students, Asian students, students whose race was not indicated (i.e., unknown), students who indicated 2 or more races, and percentage of White student, the larger the median salary of students ten years out. The larger the percentage of Black- non-Hispanic students, American Indian/Alaskan Native students, Hispanic students, and Native Hawaiian/ Pacific Islander students, the smaller the median salary of students six years out. The results for the two dependent variables are not identical but very similar.

Table 3 shows the final step of the stepwise-regression analysis for (Y, X's) combination 3.

Table-3. Salary ten years out, 3 family-income variables

2	(Constant)	3349.970	747.746		4.480	.000
	MEDIAN_HH_INC	.498	.013	.509	39.687	.000
	PCTFLOAN	1789.422	576.887	.040	3.102	.002

a. Dependent Variable: MD_EARN_WNE_P10

It can be seen in Table 3 that 2 of the 3 variables were contained in the final stepwise-regression model. The multiple R² for the model is .268 (adjusted R² = .268). One of the variables has a p-value (to 3 digits) of .000, and the other has a p-value = .002. Results indicate that, holding other variables in the model constant, the larger the median household income of the students, and the larger the percentage of students receiving a federal loan, the higher the median salary ten years out.

Table 4 shows the final step of the stepwise-regression analysis for (Y, X's) combination 4.

Table-4. Salary six years out, 3 family-income variables

2	(Constant)	4994.462	607.549		8.221	.000
	MEDIAN_HH_INC	.364	.010	.465	35.619	.000
	PCTFLOAN	2335.093	472.814	.064	4.939	.000

Dependent Variable: MD_EARN_WNE_P6

It can be seen in Table 4 that the same two variables as in Table 3 were contained in the final stepwise-regression model. The multiple R² for the model is .232 (adjusted R² = .232). Both variables have a p-value (to 3 digits) of .000. The same as indicated in Table 3, results indicate that, holding other variables in the model constant, the larger the median household income of the students, and the larger the percentage of students receiving a

federal loan, the higher the median salary six years out. For the dependent variable, salary six years out, the income coefficient is somewhat smaller than that for median salary ten years out, but the coefficient for percentage of students receiving a federal loan is somewhat higher than that for salary ten years out.

It might also be noted that the models using the two-family income variables provided higher R² values (.268, .232) than those provided by the models based on the 9 or 10 ethnicity variables (.200, .168).

4.2. Final (Stage 2) Stepwise Regressions

In each of the initial stepwise regression analyses, the variables in the final model are not highly correlated with one another; the nature of the stepwise-regression process guarantees this. Redundant variables are “not allowed” to enter the model, and if redundancy occurs at a later stage, variables are accordingly deleted. However, there may be “overlap,” or correlation between some of the variables in the ethnicity-based models and the family-income-based models. That is why we now perform our “final stage” stepwise-regression analyses that, for each dependent variable, have as eligible variables, the “winners” from each of the two initial analyses. So, for the salary ten years out dependent variable, the set of eligible independent variables will be the 9 variables shown in Table 1 and the 2 variables shown in Table 3. For the salary six years out dependent variable, the set of eligible independent variables will be the 10 variables shown in Table 2 and the 2 variables shown in Table 4.

Table 5 shows the final stepwise-regression analysis for salary ten years out. Table 6 shows the final stepwise-regression analysis for salary six-years out.

Table-5. Salary ten years out – FINAL MODEL

8	(Constant)	6198.747	739.195		8.386	.000
	MEDIAN_HH_INC	.382	.014	.390	28.138	.000
	UGDS_NRA	61931.470	3755.118	.209	16.493	.000
	UGDS_WHITENH	4507.698	438.354	.127	10.283	.000
	PCTFLOAN	4301.950	575.639	.096	7.473	.000
	UGDS_BLACKNH	-5551.843	920.370	-.074	-6.032	.000
	UGDS_ASIAN	16856.870	2516.639	.091	6.698	.000
	UGDS_NHPI	-21316.399	5539.678	-.047	-3.848	.000
	UGDS_HISP	-56.227	19.663	-.036	-2.860	.004

a. Dependent Variable: MD_EARN_WNE_P10

Table-6. Salary six years out – FINAL MODEL

9	(Constant)	4732.441	603.497		7.842	.000
	MEDIAN_HH_INC	.247	.011	.316	21.827	.000
	UGDS_WHITE	7203.365	521.232	.195	13.820	.000
	UGDS_NRA	41601.748	2986.564	.178	13.930	.000
	UGDS_ASIAN	22967.390	2128.544	.154	10.790	.000
	PCTFLOAN	4087.124	467.236	.113	8.747	.000
	UGDS_WHITENH	2191.890	378.787	.077	5.787	.000
	UGDS_HISP	-59.025	16.048	-.046	-3.678	.000
	UGDS_UNKN	5101.498	1603.794	.040	3.181	.001
	UGDS_NHPI	-12788.104	4554.394	-.034	-2.808	.005

a. Dependent Variable: MD_EARN_WNE_P6

For Table 5, the R² = .339 (adjusted R² = .338). For Table 6, the R² = .319 (adjusted R² = .317). Based on the coefficients provided by the analyses above, we can identify the characteristics of a university community which are likely to have an impact on median salary of alumni after ten and six years. In Table 5, (salary ten years out) 6 of the 9 ethnicity variables and both of the income variables made the final model. In Table 6, (salary six years out) 7 of the 10 ethnicity variables and both of the income variables made the final model. The ethnicity variables that entered the initial stepwise models but did not enter the final model were highly correlated with the two income

variables, and not in the final model due to redundancy. Figure 1A and 1B sum up the variables that are positively and negatively associated with median income, assuming that all other variables are held constant.

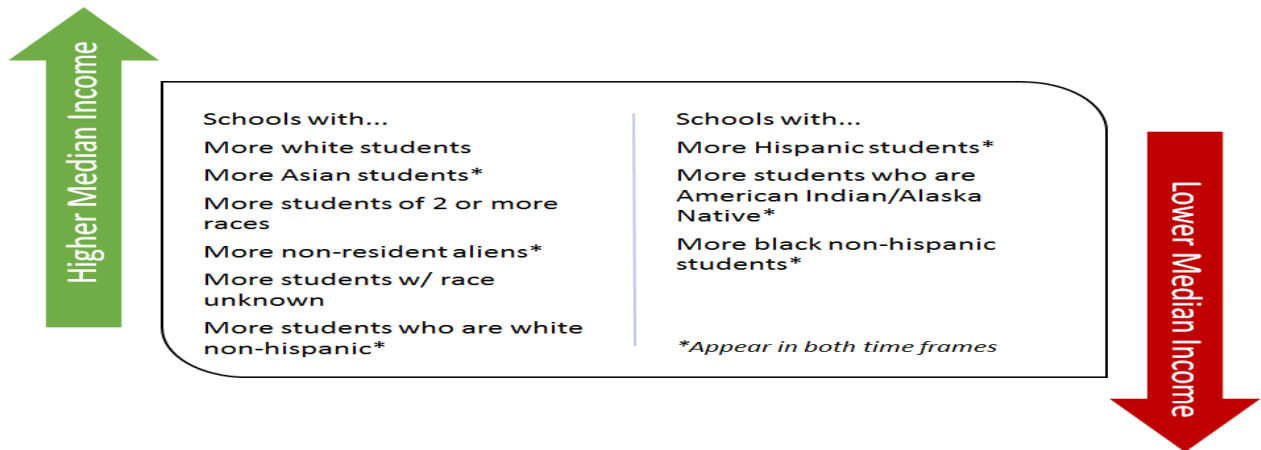


Figure-1A. Characteristics of universities based on median salary level after six years

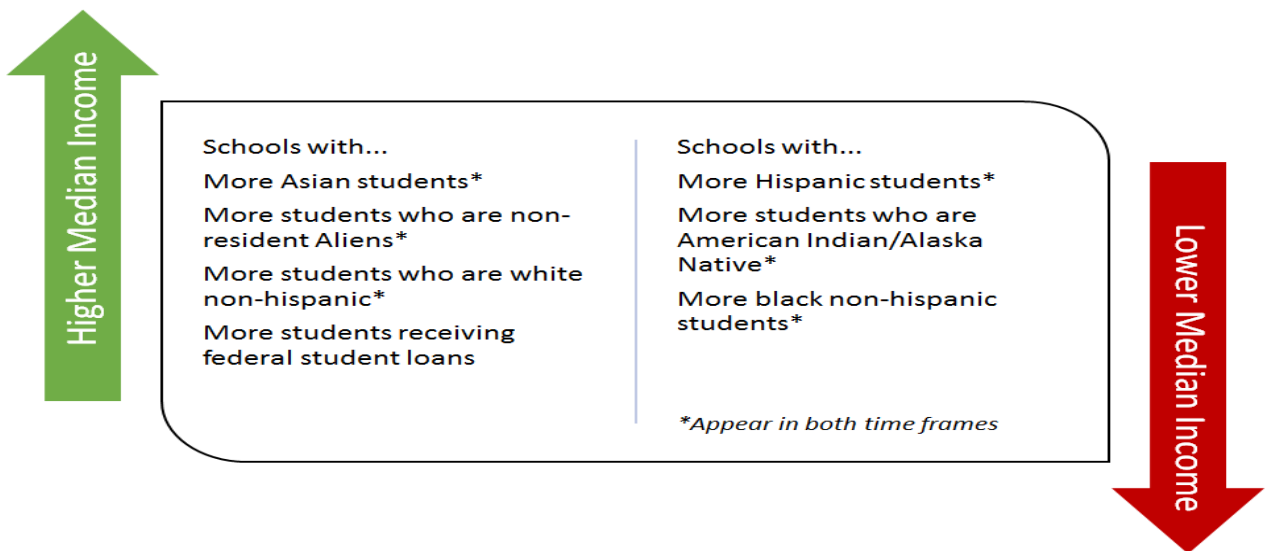


Figure-1B. Characteristics of universities based on median salary level after ten years

Some of the findings agree with our predicted hypotheses while others do not. Figure 2 displays the outcome of these hypothesis tests.

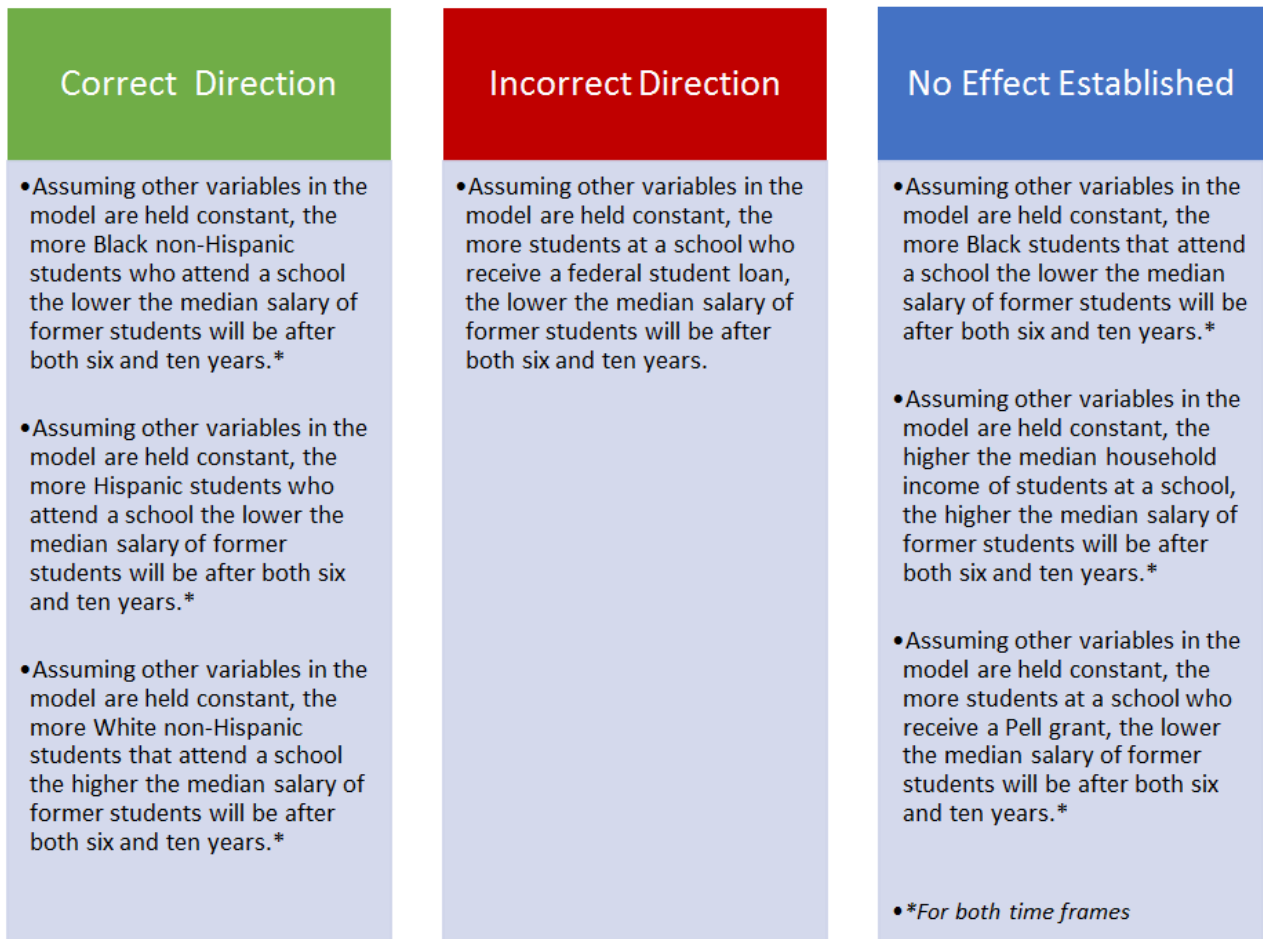


Figure-2. Hypotheses assessment

This study shows that *in theory*, universities who wish to increase their median alumni salary for marketing or other purposes could have an incentive to limit the percentage of Hispanic, American Indian/Alaska Native and Black non-Hispanic students who attend.

Universities would also have an incentive to increase the percentage of students who are receiving a federal student loan, who are non-resident aliens, Asian, of 2 or more races, race unknown, White, and are White non-Hispanic.

Therefore, based on these results, universities should closely monitor how they are using alumni salary in their marketing materials and the types of processes, traditions, and norms it is creating in the university culture. For example, universities should consider how employees at the university are rewarded or not rewarded for increasing this metric. Is it encouraging team members (perhaps, the admissions committee?) to limit diversity? If not careful, colleges could end up limiting the diversity of the school in pursuit of increasing the median alumni salary. Limiting diversity can impact student experiences in a variety of ways and has a negative social impact as well (Bowman, 2014).

5. LIMITATIONS AND FUTURE RESEARCH

One limitation of this study is that the data does not capture which universities use the alumni salary metric in their marketing materials. Therefore, we do not know for sure if schools which use this information in their marketing have an increased likelihood of building a university community with higher earning potential and, correspondingly, less diversity.

Another limitation is that we don't know the impact of each of the variables on the graduation rate of students. Are certain variables associated with lower salary levels because students from that ethnic or financial background are less likely to graduate? Further research is possible on both topics.

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