

Is U.S. College Worth the Cost?

W200 - Project 2 (Dec 2022)

Andrew Higgins, Emily Kenney, Alberto Lopez Rueda

Introduction

- Over the past two decades, college tuition pricing has increased more than any other good or service in the US besides hospital services, outstripping inflation by 3x
- This has impacted the affordability of education and led to an increase in student debt load to record highs
- These trends have also given rise to many fundamental questions such as: “Is college worth the cost?”

Dataset Description

- The US Department of Education releases U.S. college data to provide insights into the performance of such institutions
- The dataset contains 2,989 variables for 6,681 U.S. colleges. Some of the variables we use are:

Variable name	Description	Example
STABBR / ST_FIPS	State abbreviation (string, integer)	AL (Alabama) / 1
CONTROL	Ownership of institution (integer)	1 (Public), 2 (Private)
COSTT4_A, COSTT4_P	Average cost of attendance including tuition and living costs (integer)	23445
MD_EARN_WNE_P10	Median earnings of students 10 years after graduation (integer)	35500
MN_EARN_WNE_MALE0_P10	Average earnings of female and male students 10 years after graduation (integer)	38945
DEBT_MDN	The median original amount of the loan principal upon entering repayment (integer)	15250

Questions of Interest

- **Topic 1: College Cost vs. Student Earnings**
 - Which states have the most/least expensive colleges?
 - Does it pay off to attend private colleges?
 - Which institutions offer the best return on investment? (i.e., earnings after graduation over cost of attendance)
 - Do male students earn more than female students who graduate from the same university?
- **Topic 2: Student Debt**
 - What is the relationship between the level of student debt and the ownership of the university? (e.g., private, public)
 - In which states students have the highest level of debt relative to household income?
 - How are different demographics impacted by student debt?

Data Sanity Checking

- Data Correctness
 - Research validated that this dataset contains every University in the U.S. (6,800 Universities)
- Data Completeness
 - High presence of null values in about half of the columns used
- Data Duplicates
 - Universities with multiple campuses seemed to report some of the same data for all campuses
- Bad Data Outliers
 - Salary max is 250K and contains a high number of values
 - Assume the questionnaire max salary value was 250K

	INSTNM	STABBR	ST_FIPS	REGION	CONTROL	CCUGPROF	MN_EARN_WNE_P10	MD_EARN_WNE_P10
3912	Academy of Hair Design-Jackson	MS	Mississippi	Southeast	Private for-profit	-2.0	18900	19,789.0
1706	Academy of Hair Design-Grenada	MS	Mississippi	Southeast	Private for-profit	-2.0	18900	19,789.0

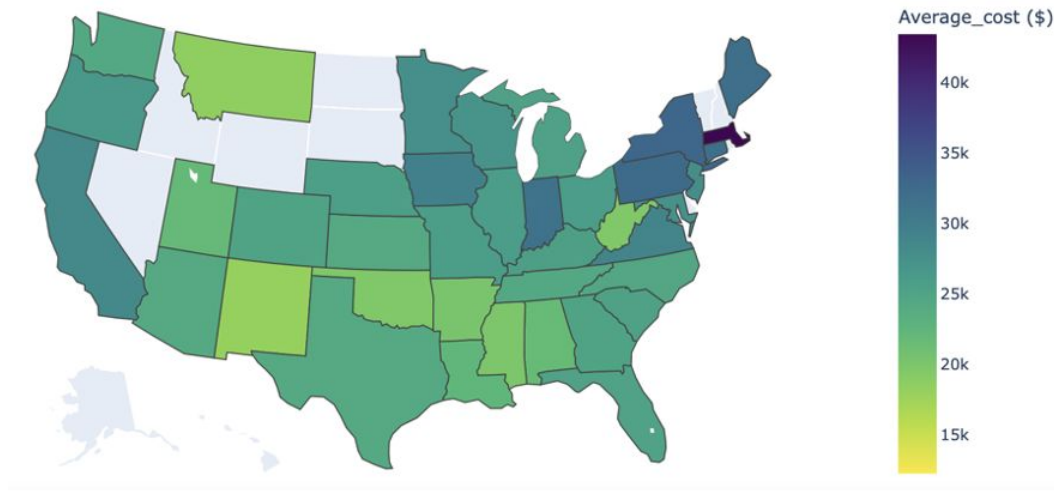
	Null_values	Percent
MN_EARN_WNE_MALE1_P10	3336	49.9
MN_EARN_WNE_MALE0_P10	3336	49.9
FEMALE_DEBT_MDN	2374	35.5
MALE_DEBT_MDN	2374	35.5
MEDIAN_HH_INC	2237	33.5
NOTFIRSTGEN_DEBT_MDN	2233	33.4
FIRSTGEN_DEBT_MDN	2233	33.4
MN_EARN_WNE_P10	2176	32.6
MD_EARN_WNE_P10	1656	24.8
GRAD_DEBT_MDN	1648	24.7
COSTT4	1288	19.3
DEBT_MDN	1259	18.8
UGDS	841	12.6
UGDS_MEN	841	12.6
UGDS_WOMEN	841	12.6
CCUGPROF	554	8.3
LENGTH	554	8.3
CONTROL2	476	7.1
STABBR	0	0.0
CONTROL	0	0.0
REGION	0	0.0
ST_FIPS	0	0.0

College Cost vs. Student Earnings

Which states have the most/least expensive colleges?

- States with +25 colleges to eliminate outliers (e.g. Marshall Islands)
- Most expensive states are in the North East, least expensive are in Central US
- Driven by college mix (i.e. private vs. public)

Average college cost by state



Does it pay off to attend a private college?

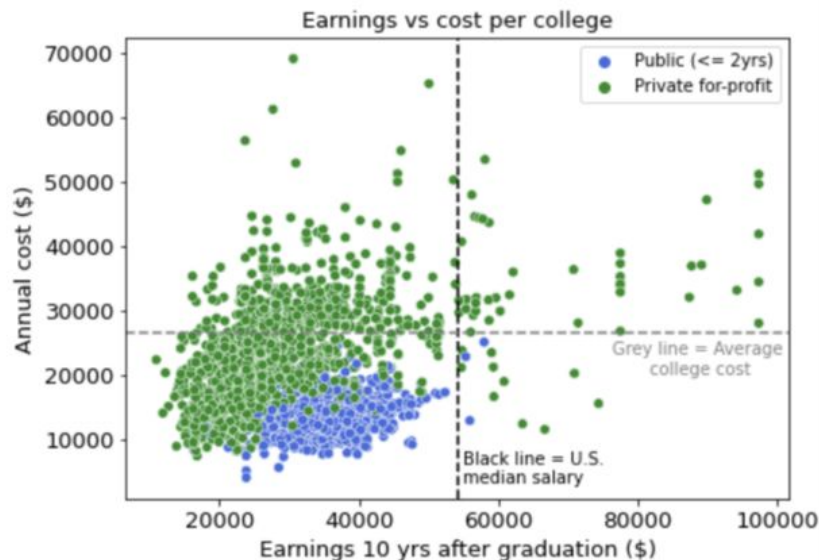
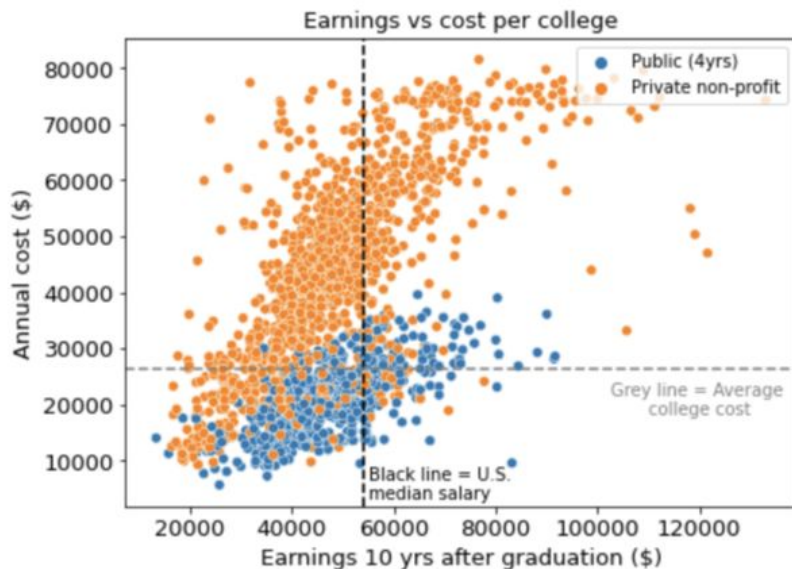
- Comparing apples-to-apples, defining returns
- High-level answer: On average no, but...

College_type	Earnings_10yrs (\$)	Average_cost (\$)	Return_10yrs
Private non-profit	47,997	43,254	1.2
Public (4yrs)	47,004	20,968	2.4
Public (<= 2yrs)	35,274	13,276	2.7
Private for-profit	29,111	23,862	1.3

College Cost vs. Student Earnings

Does it pay off to attend private colleges? (cont'd)

- ... but of those colleges earning above the national median of \$54k, 70% are private non-profit.
- Hence, private non-profit colleges offer the hope of achieving very high salaries (at the the cost of high student debt) if you select wisely



College Cost vs. Student Earnings

Which institutions offer the best return on investment?

To obtain the highest returns while still earning above the national average



Name	Return_10yrs	Earnings_10yrs (\$)
United States Merchant Marine Academy	8.7	83,209
ATA College	5.8	66,672
Mercy Hospital School of Practical Nursing-Pla...	5.2	63,486
CUNY Bernard M Baruch College	4.9	67,136
Columbia Southern University	4.8	74,398

To obtain a minimum return on investment of 2x while maximizing earnings

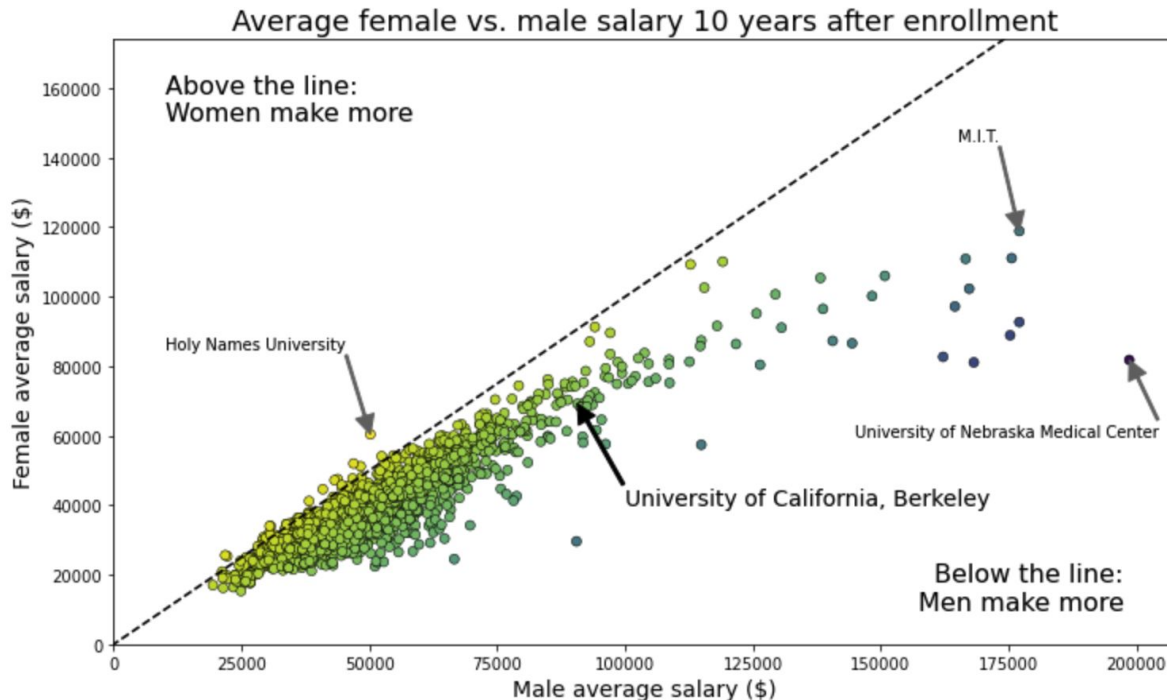


Name	Return_10yrs	Earnings_10yrs (\$)
University of Health Sciences and Pharmacy in ...	2.6	121,576
Albany College of Pharmacy and Health Sciences	2.4	119,112
MCPHS University	2.2	118,171
Charles R Drew University of Medicine and Science	3.2	105,693
University of the Sciences	2.2	98,779

College Cost vs. Student Earnings

Do male students earn more than female students who graduate from the same university?

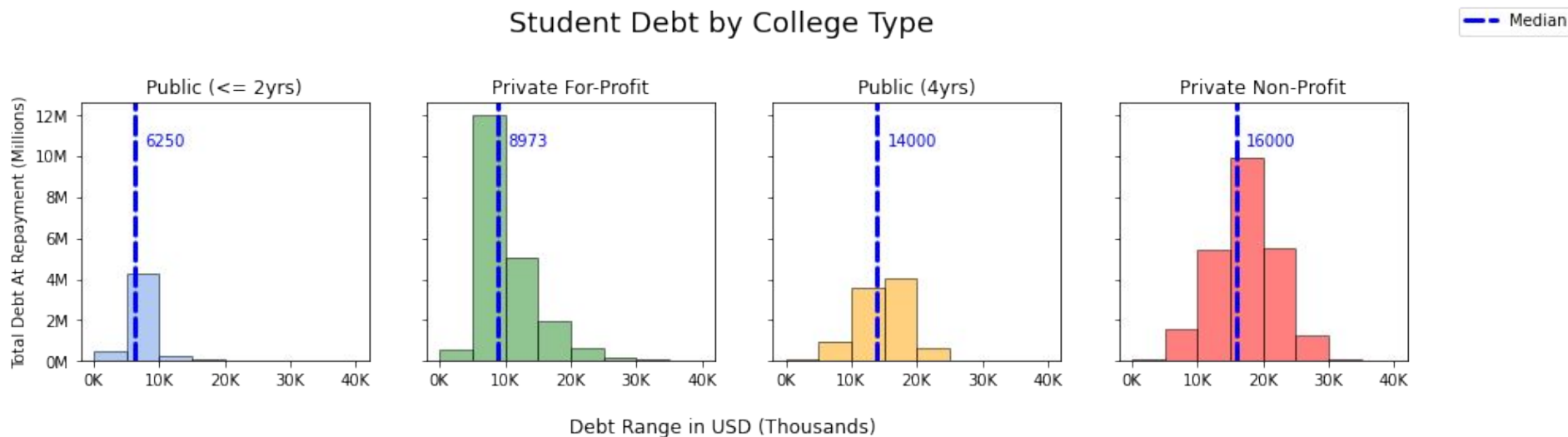
- In general, Yes.
- Worst offenders:
 - Ivy League Unis
 - Medical Universities
- Exception to the rule:
 - Holy Names University



Student Debt

What is the relationship between the level of student debt and the ownership of the college?

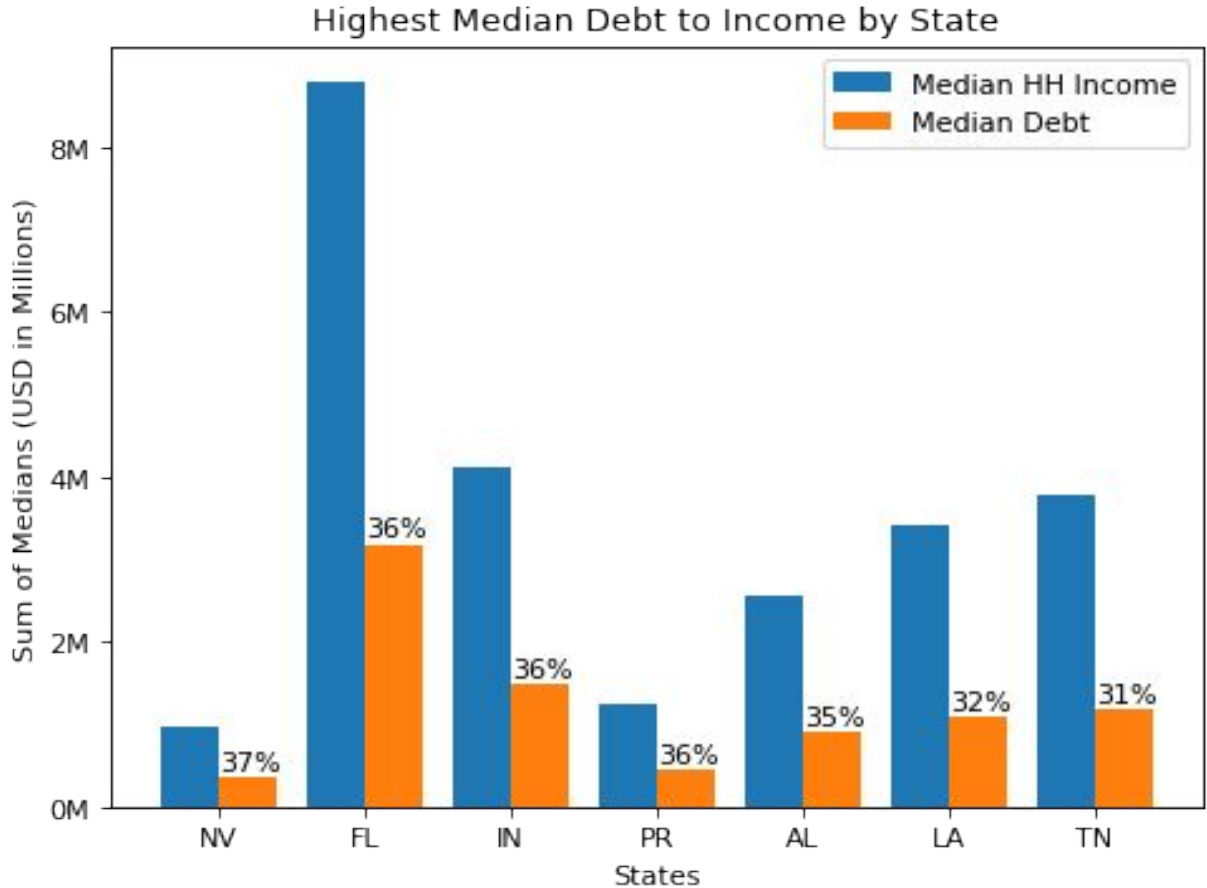
- Students graduating from private non-profits carry the highest amount of debt
- Most students graduate from Public 4-year Universities with <20K in debt



Student Debt

In which states students have the highest level of debt relative to household income?

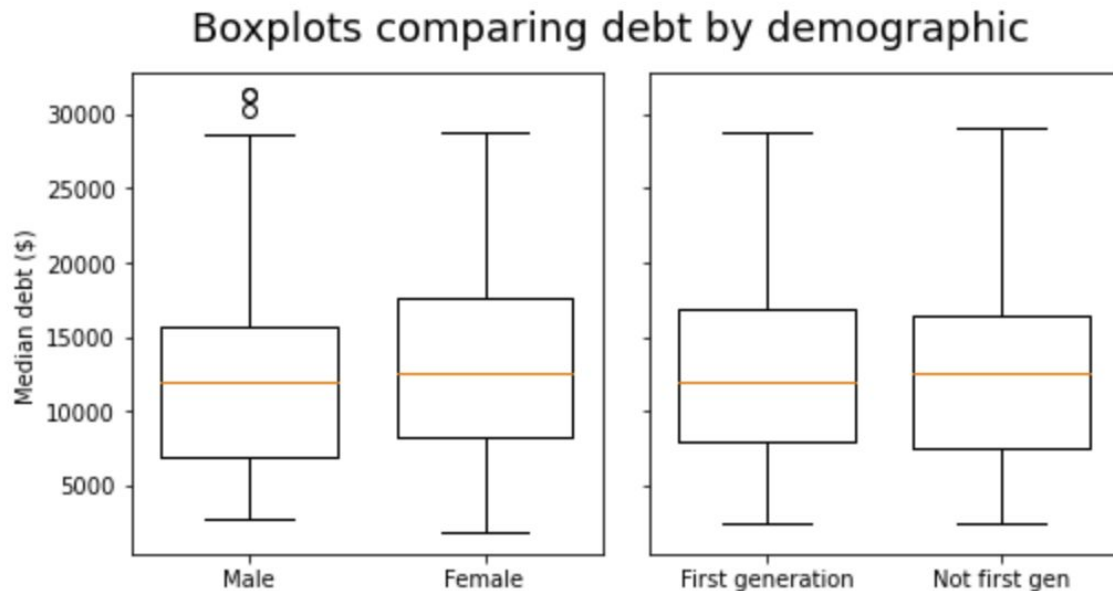
- Southern states average debt that is $\frac{1}{3}$ of household income



Student Debt

How are different demographics impacted by debt?

- Women have *higher* debt than men
- First-Generation students have *lower* debt than others



Conclusion

- **College Cost vs. Student Earnings**

- **Private** and **Public** Universities have approximately the *same earnings* after 10 years, but public is half the cost
- The majority of top earners attended **Private Non-Profit** institutions
- Some of the highest return on investments are seen in the **health and medical** field
- The greatest *discrepancies* between men and women occur in the **health and medical** field
- **Male graduates** earn *more* than female graduates from the same universities
 - Worst offenders are at the highest income brackets from **Ivy League schools** and **Medical Centers**

- **Student Debt**

- Students who graduate from **Private Non-Profit** Universities carry more debt
- **Women** have *higher* debt than men
- **First-Generation students** have *lower* debt than others