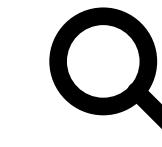


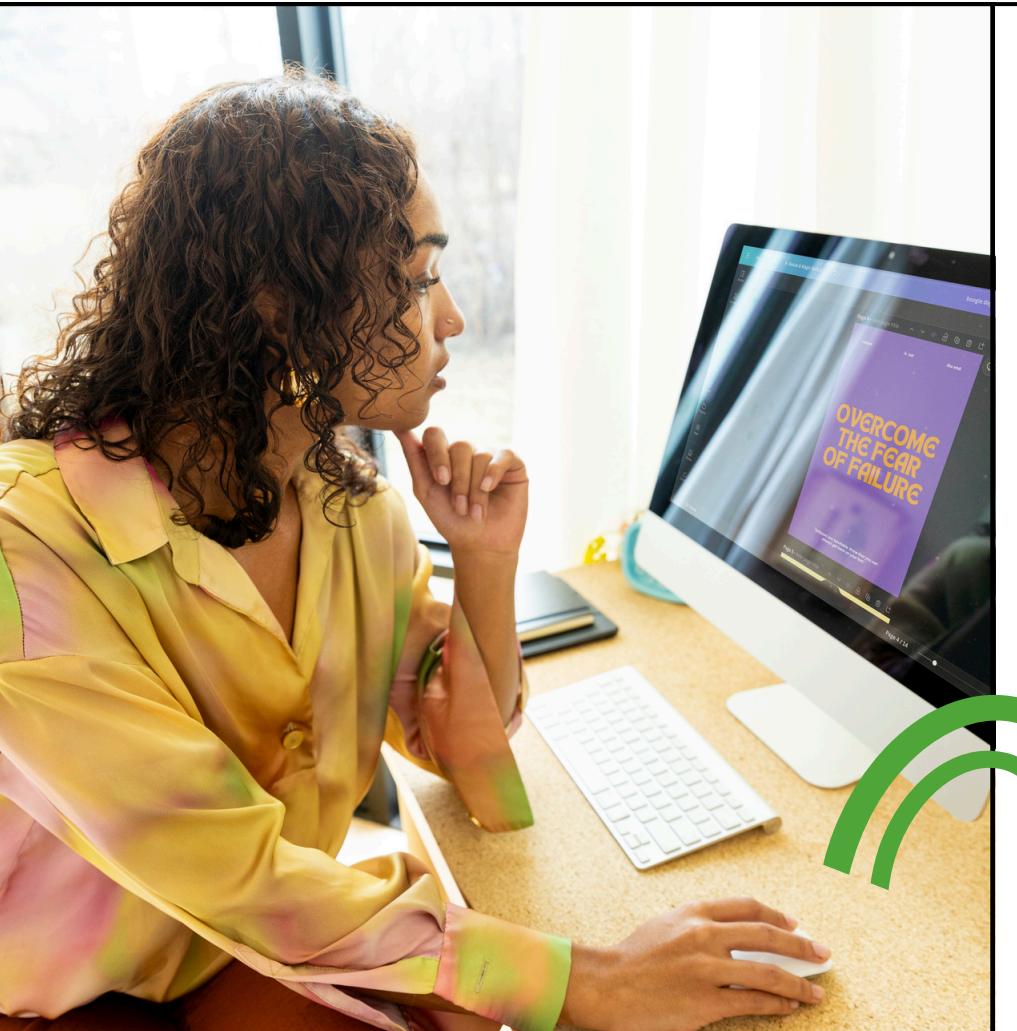
Degree Payoff



Translating your
Education into Income

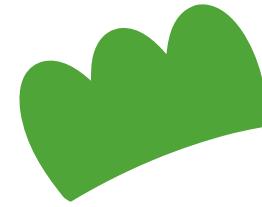
Presented by Anh, Camille, Hui Sin, Mario & Marshall

Abstract



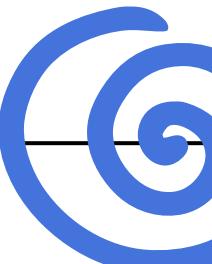
Our project compares Median salaries across Public and Private schools, examining how factors like tuition and ranking impact post-grad earnings. Our goal is to help students and families make valuable college investment decisions.





Overview

-
- Introduction
 - Data Description
 - Cleaning Challenges
-
- Questions Overview
 - Question Answers and Insights
 - Who Benefits
-
- Other Useful Data
 - Conclusion + Thank You

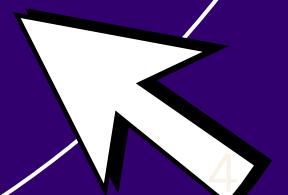


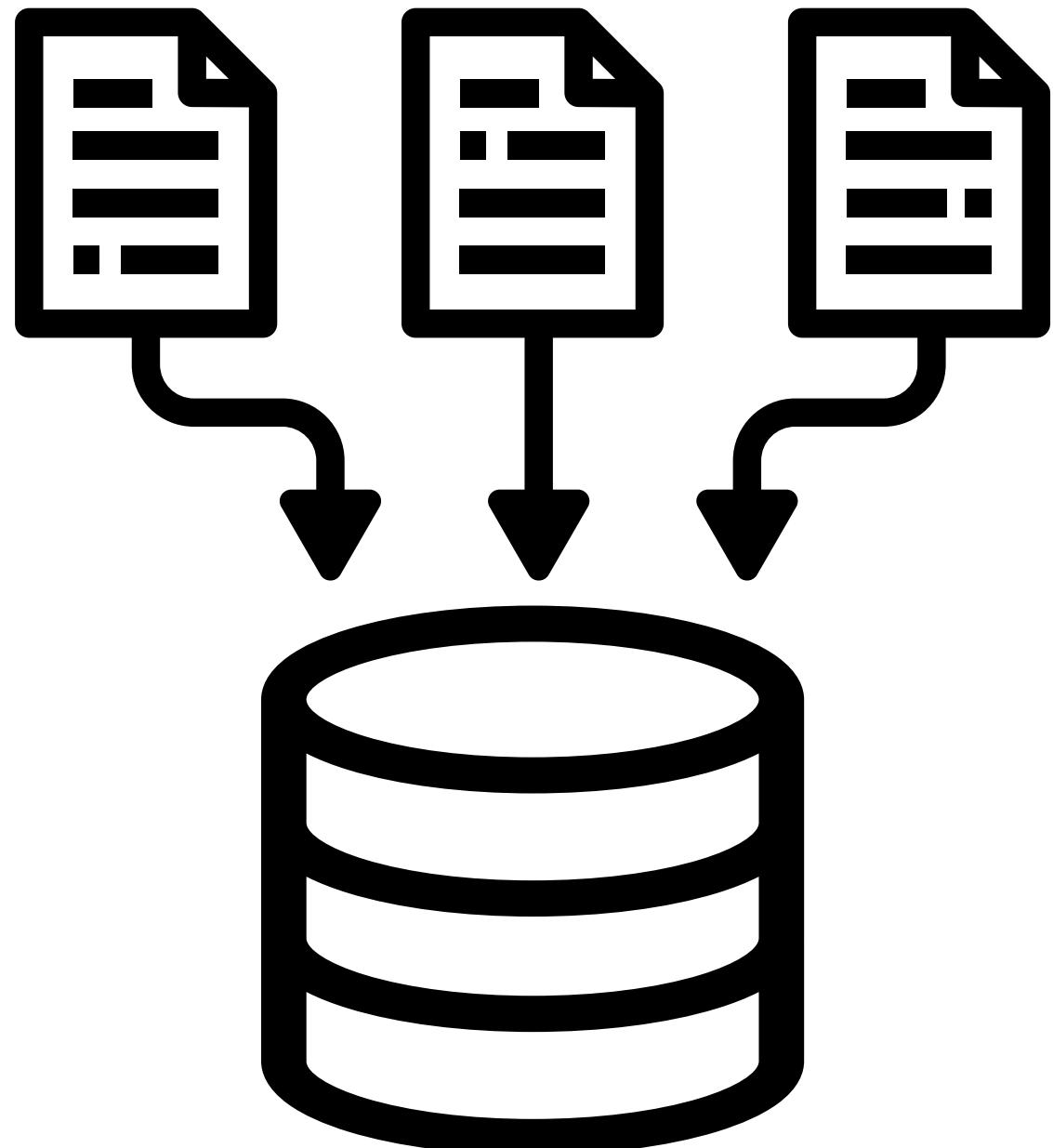
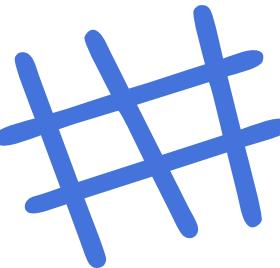
Introduction



Why do we need to know
this information?

Regret





● What we're working with

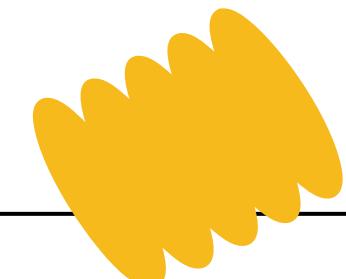
We are using two datasets that help us explore the financial return on higher education decisions.

● “College Salaries” table

The college salaries data set contains School Name, School Type, and Salary. It has 249 distinct schools for us to examine.

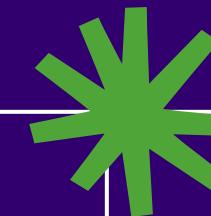
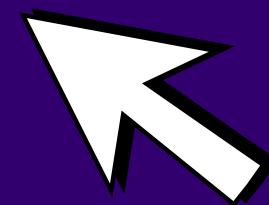
● “College Data” table

The College Data data set contains the School Name, Ranking and Average Tuition. It contains 161 distinct schools for us to use.



Data Description

Challenges in Data Cleaning and Processing

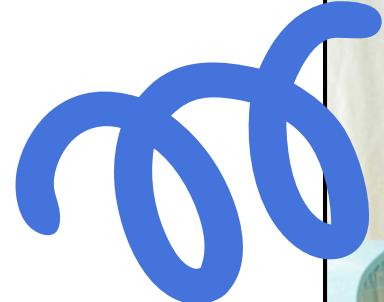


- Data comes from two separate sets
- Specific schools held repeated data when they were both a state and party school
- Salary values were not stored to allow for calculations

```
#adding salary to the query return above
select cd.`college name`, cd.tuition, cs.`mid-career median salary`
  from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
    else `college name` end as clean_name from college_data) cd
  join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
    else `school name` end as clean_name from college_salaries) cs
  on cd.clean_name = cs.clean_name;
```



Questions for the Dataset



- **Question 1**

Which University you graduated from pays the most other than the Ivy Leagues?



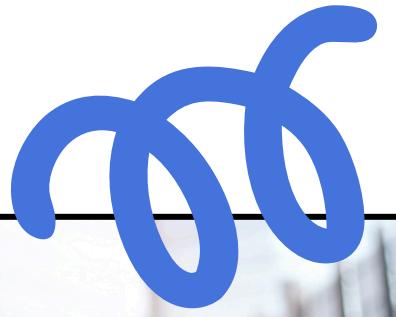
- **Question 2**

How does mid-career salary potential vary across different school types (e.g., Engineering, Liberal Arts, Party schools, etc.)?

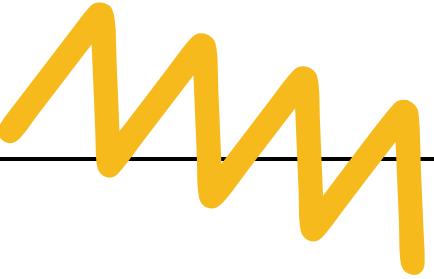
- **Question 3**

How do public flagship universities compare against similarly ranked privates in long-term earnings?





Questions for the Dataset



Question 4

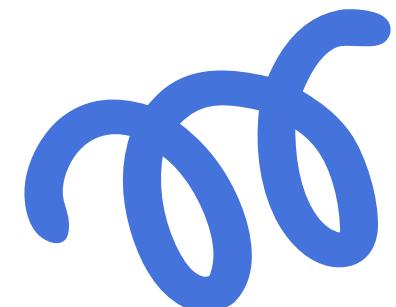
How does the return on tuition compare between prestigious (Ivy Leagues) and lower ranking schools?



Question 5

Is higher tuition at private institutions justified by the salary gains?

Universities that pay the most apart from IVY league



● Results

1. California Institute of Technology, \$75,500
2. Massachusetts Institute of Technology, \$72,200
3. Harvey Mudd College, \$71,800
4. Polytechnic University of New York, \$62,400
5. Cooper Union, \$62,200



```
1 •   SELECT `School Name`, `School Type`, `Starting Median
2   FROM College_salaries
3   WHERE `School Type` != 'Ivy League'
4   ORDER BY CAST(REPLACE(REPLACE(`Starting Median Salary
5   LIMIT 10;
```

The screenshot shows a MySQL query results window. The query selects school name, type, and starting median salary from the College_salaries table where the school type is not 'Ivy League', ordered by salary, and limited to the top 10. The results grid displays the following data:

School Name	School Type	Starting Median Salary
California Institute of Technology (CIT)	Engineering	\$75,500.00
Massachusetts Institute of Technology (MIT)	Engineering	\$72,200.00
Harvey Mudd College	Engineering	\$71,800.00
Polytechnic University of New York, Brooklyn	Engineering	\$62,400.00
Cooper Union	Engineering	\$62,200.00
Carnegie Mellon University (CMU)	Engineering	\$61,800.00
Rensselaer Polytechnic Institute (RPI)	Engineering	\$61,100.00
Worcester Polytechnic Institute (WPI)	Engineering	\$61,000.00
Stevens Institute of Technology	Engineering	\$60,600.00

● Key Insights

All of the schools listed are engineering-focused institutions, which likely contributes to their higher salaries due to the earning potential of engineering careers. Except for CIT, most are located on the East Coast, where the cost of living tends to be higher—often leading to increased compensation to match regional expenses.

Data Insights



How does mid-career salary potential vary across different school types (e.g., Engineering, Liberal Arts, Party schools, etc.)?

```
select `school type`, avg(cast(replace(replace(`mid-career median salary`, '$', ''), ',', '') as float)) as avg_mid_career_salary
from college_salaries.college_salaries
group by `school type`
order by avg_mid_career_salary desc;
```

Results

1. Ivy League – \$120,125
2. Engineering – \$103,842
3. Liberal Arts – \$89,378
4. Party – \$84,685
5. State – \$78,567

Key insights

- Ivy League schools top the list, underscoring the power of brand and network effects.
- Engineering schools demonstrate that specialized, technical training can yield similarly strong long-term pay.
- Liberal Arts, Party, and State schools also offer solid returns, highlighting how school type and not just ranks shapes earnings potential.

The screenshot shows a database interface with the following details:

- SQL Query:**

```
86     ) as private_schools;
87
88     # Combining the two: mid-career salary for graduates from public
89 •   select public_schools.avg_salary as public_avg_salary,
90           private_schools.avg_salary as private_avg_salary
91
92     from (
93         select avg(cast(replace(replace(`mid-career median salary`,
94             from college_salaries.college_salaries
95             where `school type` = 'party' or `school type` = 'state'
96         ) as public_schools,
97
98         (
99             select avg(cast(replace(replace(`mid-career median salary`,
100                from college_salaries.college_salaries
101                where `school type` != 'party' and `school type` != 'state'
102            ) as private_schools;
103
104 •   select `school type`, avg(cast(replace(replace(`mid-career median
105               from college_salaries.college_salaries
106               group by `school type`
107               order by avg_mid_career_salary desc;
```
- Result Grid:**

school type	avg_mid_career_sala...
Ivy League	120125
Engineering	103842.1052631579
Liberal Arts	89378.72340425532
Party	84685
State	78567.42857142857
- Page Number:** 10

Data Insights

How does mid-career salary potential vary across different school types (e.g., Engineering, Liberal Arts, Party schools, etc.)?

● Analytical takeaway

- While elite schools earn the highest average salaries, the gap narrows for specialized fields like engineering.

School type, whether Ivy, Engineering, Liberal Arts, or others, plays a big role in future earnings.

- The results highlight how practical and specialized training can rival the reputation of top-ranked schools.

For example, engineering schools can match or even exceed Ivy League outcomes for many graduates.

- Liberal arts schools, often overlooked, still deliver strong mid-career earnings and show the value of a broad education.

The best choice is not about brand or prestige. Aligning your interests with a school's strengths can be just as important as its overall ranking.



How do public flagship universities compare against similarly ranked privates in long-term earnings?

Results

1. Insights: Average salary for private school is higher than public schools
2. REPLACE(REPLACE(`Mid-Career Median Salary`, '\$', ''), ',', '') - used to remove \$ and , so that average can be calculated
3. CAST(... AS DECIMAL(10,2)) - Up to 10 digits total, 2 digits after the dot
4. ROUND(..., 2) - makes the final answer show only 2 decimal places after averaging

```

107 #Q3 How do public flagship universities compare against similarly ranked privates in long-term earnings?
108 • SELECT
109     ROUND(AVG(CAST(REPLACE(REPLACE(`Mid-Career Median Salary`, '$', ''), ',', '') AS DECIMAL(10,2))), 2) AS AvgSalary_Private
110 FROM college_salaries
111 WHERE `School Type` IN ('Liberal Arts', 'Ivy League', 'Engineering', 'Party');
112
113 • SELECT
114     ROUND(AVG(CAST(REPLACE(REPLACE(`Mid-Career Median Salary`, '$', ''), ',', '') AS DECIMAL(10,2))), 2) AS AvgSalary_Public
115 FROM college_salaries
116 WHERE `School Type` = 'State';
117
118
119

```

100% 21:95

Result Grid Filter Rows: Search Export:

AvgSalary_Private
93920.21
AvgSalary_Public
78567.43

How does the *return on tuition* (ROT) compare between **prestigious (Ivy Leagues)** and **lower ranking schools**?

Ivy Leagues (Ranking range: 1-17)

College Name	Tuition	Mid-Career Median Sal...	ROT
Dartmouth College	60870	\$134,000.00	2.2014128470510923
Princeton University	56010	\$131,000.00	2.3388680592751294
Yale University	59950	\$126,000.00	2.1017514595496247
Harvard University	55587	\$124,000.00	2.2307374026301114
University of Pennsylvania	61710	\$120,000.00	1.9445794846864366
Cornell University	61015	\$110,000.00	1.8028353683520446
Brown University	62404	\$109,000.00	1.746682904941991
Columbia University	63530	\$107,000.00	1.6842436644105148

Lowest-Ranking schools (148)

College Name	Adjusted Rank	Tuition	Mid-Career Median Sal...	ROT
University of Mississippi	148	25876	\$79,700.00	3.053022105
George Mason University	148	36579	\$86,900.00	2.351075753
San Diego State University	148	20016	\$85,200.00	4.246602717
University of Mississippi	148	25876	\$79,700.00	3.053022105
Colorado State University	148	31540	\$79,000.00	2.504755865
University of Central Florida	148	22467	\$71,700.00	3.160190501
University of Alabama at Birmingham	148	25380	\$70,100.00	2.758077226

IVY_avg_ROT
2.0063888988621184

Results: The lowest ranking schools (in our data set) have a higher avg return on tuition

LOW_avg_ROT
3.0181066108399714

ROT formula: average salary / average tuition

How does the *return on tuition* compare between prestigious (Ivy Leagues) and lower ranking schools?

Alternative things to consider:

- Does not account for Loan Interest Rates and pay back timelines...
- NET tuition (tuition after aid), tuition is in out of state cost

- Cost of Living in different cities (Ivy's tend to be in High-Cost cities vs. Mississippi)
- Economic Mobility

Ivy Leagues starting (median) salary

College Name	Tuition	Starting Median Sal...
Dartmouth College	60870	\$58,000.00
Princeton University	56010	\$66,500.00
Yale University	59950	\$59,100.00
Harvard University	55587	\$63,400.00
University of Pennsylvania	61710	\$60,900.00
Cornell University	61015	\$60,300.00
Brown University	62404	\$56,200.00
Columbia University	63530	\$59,400.00

Lower ranked starting (median) salary

College Name	Adjusted Rank	Tuition	Starting Median Sal...
University of Mississippi	148	25876	\$41,400.00
George Mason University	148	36579	\$47,800.00
San Diego State University	148	20016	\$46,200.00
University of Mississippi	148	25876	\$41,400.00
Colorado State University	148	31540	\$44,800.00
University of Central Florida	148	22467	\$42,600.00
University of Alabama at Birmingham	148	25380	\$39,200.00

Is the higher tuition charged by private institutions justified by long-term salary gains?

● Results

All of the top 10 are public schools, with 8 of the bottom 10 being private

Public schools give graduates a much better average return on investment

Tuition generally varies more (as a percent) than mid-career median salary

Top 10 schools by “value”

San Diego State University	20016	\$85,200.00	4.2466027178257395
University of South Florida	17324	\$71,100.00	4.098360655737705
Florida State University	21683	\$73,000.00	3.3666928008116956
University of Oklahoma	25116	\$82,900.00	3.2648510909380475
University of Central Florida	22467	\$71,700.00	3.160190501624605
Georgia Institute of Technology	33794	\$106,000.00	3.136651476593478
University of Mississippi	25876	\$79,700.00	3.0530221054258773
University of Florida	28658	\$87,900.00	3.0358015213901877
University of Kansas	28034	\$81,600.00	2.8893486480702006
Arizona State University	29438	\$84,100.00	2.853454718391195

Bottom 10 schools by “value”

University of Virginia	53666	\$103,000.00	1.9192785003540416
Illinois Institute of Technology	50640	\$97,800.00	1.915481832543444
Carnegie Mellon University	58924	\$111,000.00	1.8837824994908696
Rensselaer Polytechnic Institute	58526	\$110,000.00	1.879506544100058
University of Vermont	43890	\$82,700.00	1.8683071314650261
Stevens Institute of Technology	56920	\$105,000.00	1.8446943078004217
Cornell University	61015	\$110,000.00	1.8028353683520446
Brown University	62404	\$109,000.00	1.746682904941991
Columbia University	63530	\$107,000.00	1.6842436644105148
Rochester Institute of Technol...	52756	\$84,600.00	1.5922359542042612

Is the higher tuition charged by private institutions justified by long-term salary gains?

When judging “value” on starting salary

University of South Florida	17324	\$41,100.00
San Diego State University	20016	\$46,200.00
Florida State University	21683	\$42,100.00
University of Central Florida	22467	\$42,600.00
University of Oklahoma	25116	\$44,700.00

University of Virginia	53666	\$52,700.00
Dartmouth College	60870	\$58,000.00
Columbia University	63530	\$59,400.00
Rochester Institute of Technol...	52756	\$48,900.00
Brown University	62404	\$56,200.00

When using the 10th percentile mid-career earners

San Diego State University	20016	\$158,000.00
University of South Florida	17324	\$131,000.00
Florida State University	21683	\$156,000.00
University of Mississippi	25876	\$186,000.00
University of Oklahoma	25116	\$167,000.00

Illinois Institute of Technolog...	50640	\$165,000.00
Stevens Institute of Techn...	56920	\$185,000.00
Worcester Polytechnic Ins...	55531	\$180,000.00
Rensselaer Polytechnic In...	58526	\$182,000.00
Rochester Institute of Tec...	52756	\$159,000.00

When using the 90th percentile mid-career earners

University of South Florida	17324	\$39,600.00
San Diego State University	20016	\$45,500.00
Georgia Institute of Technology	33794	\$67,200.00
Florida State University	21683	\$39,600.00
University of Central Florida	22467	\$39,500.00

Cornell University	61015	\$56,800.00
University of Pennsylvania	61710	\$55,900.00
Brown University	62404	\$55,400.00
Rochester Institute of Technology	52756	\$45,000.00
Columbia University	63530	\$50,300.00

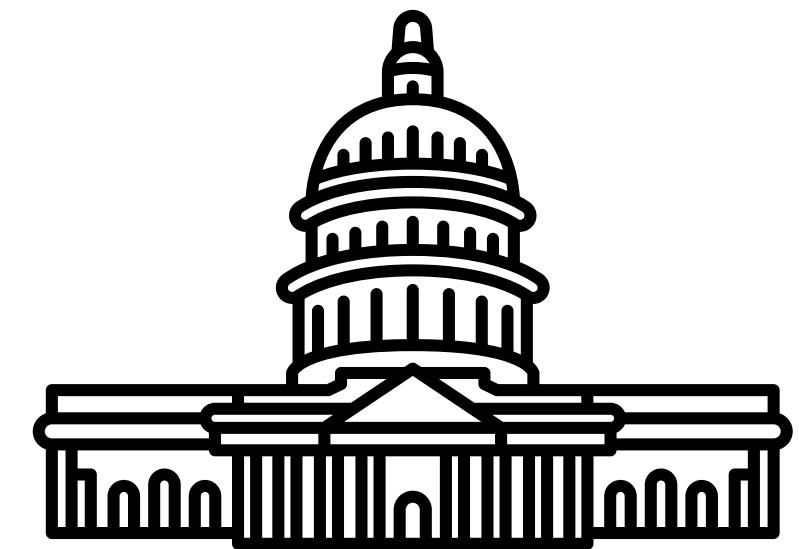
Is the higher tuition charged by private institutions justified by long-term salary gains?

● Nuances

Private schools often offer more in financial aid to students, lessening tuition costs

High-cost private schools provide more personalized experiences

Private institutions are more often located on the East Coast providing different networking opportunities and in many cases lifestyles



Although public universities receive >10k funding per student , private universities often also receive government funding through separate pathways



Who benefits from data and how it can help make decisions

● Students & parents

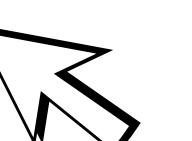
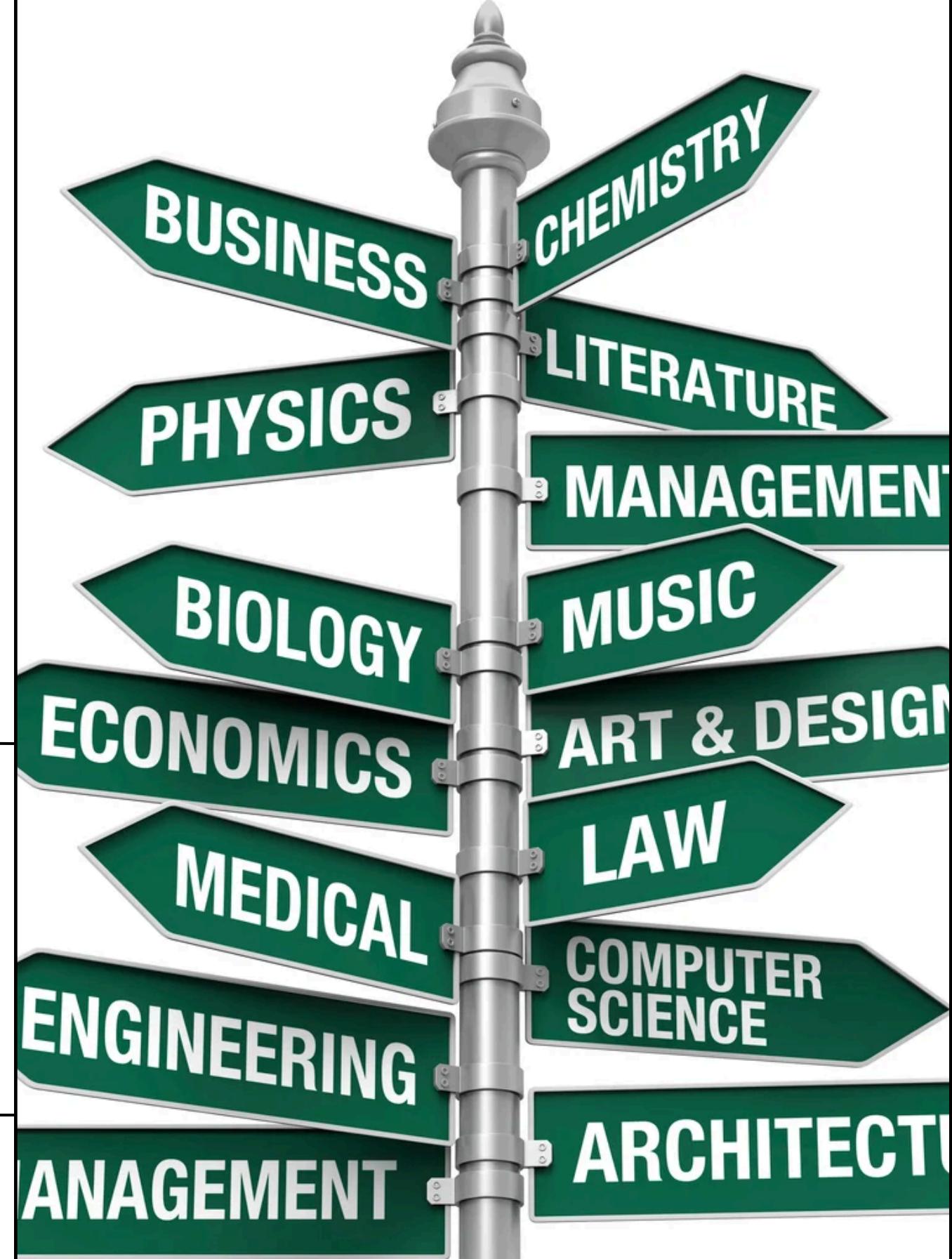
- Compare expected long-term earnings from different colleges
- Make smarter college and major choices
- Balance tuition cost vs. future salary to find best value

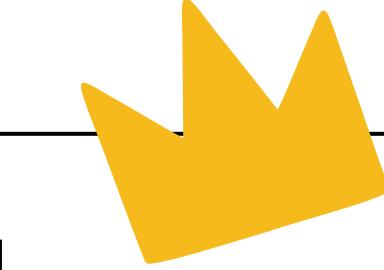
● Job seekers

- Understand how their college and major affect long-term earning potential
- Set realistic salary expectations when entering the job market
- Use salary data to negotiate better offers by knowing industry benchmarks

● College Advisors

- Help students choose schools based on career outcomes
- Recommend programs with strong return on investment
- Support first-generation or cost-sensitive students



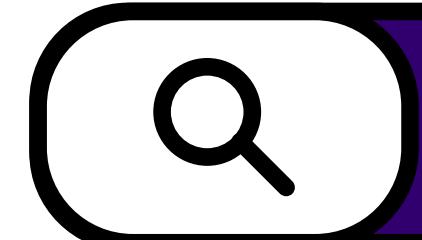
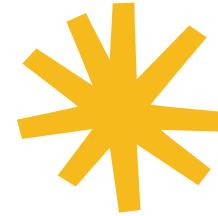


What other data would be useful to have

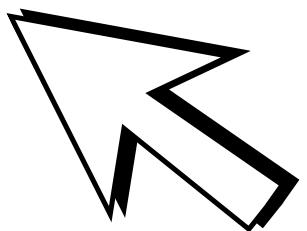
- **Acceptance Rates/alternative “rankings”**
“Rankings” (especially from 3rd party companies) are often ambiguous – more tangible representation of prestige
- **Average Financial Aid or Debt at Graduation**
Tuition alone has drawbacks and tends not to give a wholistic picture
- **Cost of Living**
Cities vs. Small towns – costs not accounted for



~~~~~ Thank You ~~~~~  
So Much!



Degree Payoff



# Appendix

Question 4

## Query for lower ranking schools:

```
#finding "lowest ranking" (looking spec. for ranking =148--the lowest rank)
• select cd.`college name`, cd.`Adjusted Rank`
  ⊕ from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
    else `college name` end as clean_name from college_data) cd
  ⊕ join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
    else `school name` end as clean_name from college_salaries) cs
    on cd.clean_name = cs.clean_name
  where cd.`Adjusted Rank` = 148;

#find Return on Tuition (ROT) = avg salary/ avg tuition (for lower ranked schools)
• select cd.`college name`, cd.`Adjusted Rank`, cd.tuition, cs.`mid-career median salary`,(substr(cs.`mid-career median salary`, 2) * 1000 / cd.tuition) as ROT
  ⊕ from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
    else `college name` end as clean_name from college_data) cd
  ⊕ join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
    else `school name` end as clean_name from college_salaries) cs
    on cd.clean_name = cs.clean_name
  where cd.`Adjusted Rank` = 148;

#finding avg ROT for lower ranked
  select avg(substr(cs.`mid-career median salary`, 2) * 1000 / cd.tuition) as LOW_avg_ROT
  ⊕ from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
    else `college name` end as clean_name from college_data) cd
  ⊕ join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
    else `school name` end as clean_name from college_salaries) cs
    on cd.clean_name = cs.clean_name
  where cd.`Adjusted Rank` = 148;
```

\*Used Marshall's code to join table  
– refer to Appendix page for question 5\*

- For finding starting salary, replace “cs.`mid-career median salary” with “cs.`Starting Median Salary”

# Appendix

## Question 4

```
#finding ROT for IVY schools
select cd.`college name`, cd.tuition, cs.`Mid-Career Median Salary`,(substr(cs.`Mid-Career Median Salary`, 2) * 1000 / cd.tuition) as ROT
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
else `college name` end as clean_name from college_data) cd
join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
where cd.`college name` = 'Brown University'
or cd.`college name` = 'Columbia University'
or cd.`college name` = 'Cornell University'
or cd.`college name` = 'Dartmouth College'
or cd.`college name` = 'Harvard University'
or cd.`college name` = 'Princeton University'
or cd.`college name` = 'University of Pennsylvania'
or cd.`college name` = 'Yale University';

#getting average ROT for ivy
select avg(substr(cs.`mid-career median salary`, 2) * 1000 / cd.tuition) as IVY_avg_ROT
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, ')' - 1))
else `college name` end as clean_name from college_data) cd
join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, ')' - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
where cd.`college name` = 'Brown University'
or cd.`college name` = 'Columbia University'
or cd.`college name` = 'Cornell University'
or cd.`college name` = 'Dartmouth College'
or cd.`college name` = 'Harvard University'
or cd.`college name` = 'Princeton University'
or cd.`college name` = 'University of Pennsylvania'
or cd.`college name` = 'Yale University';
```

### Query for Ivy Leagues:

\*Used Marshall's code to join table  
– refer to Appendix page for  
question 5\*

\*For finding starting salary, replace  
“cs.`mid-career median salary” with  
“cs.`Starting Median Salary”

# Appendix

## For Question 5

```
#this is joined list of schools on both datasets -->
select cd.`College Name`, cs.`School Name`from college_data cd
inner join
(select `School Name`, case when instr(`School Name`, '(') > 0 then trim(substr(`School Name`, 1, instr(`School Name`, '(') - 1))
else `School Name` end as `School Name Cleaned` from college_salaries) cs
on cd.`College Name` = cs.`School Name Cleaned`;

#adding salary to the query return above
select cd.`college name`, cd.tuition, cs.`mid-career median salary`
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, '(') - 1))
else `college name` end as clean_name from college_data) cd
join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, '(') - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name;

#now these schools by mid-career median salary divided by tuition cost
select distinct cd.`college name`, cd.tuition, cs.`mid-career median salary`,((substr(cs.`mid-career median salary`, 2) * 1000) / cd.tuition) as value
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, '(') - 1))
else `college name` end as clean_name from college_data) cd
inner join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, '(') - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
order by value desc;
```

```
#starting salary
select distinct cd.`college name`, cd.tuition, cs.`starting median salary`,((substr(cs.`starting median salary`, 2) * 1000) / cd.tuition) as value
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, '(') - 1))
else `college name` end as clean_name from college_data) cd
inner join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, '(') - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
order by value desc;
#10th percentile earners
select distinct cd.`college name`, cd.tuition, cs.`Mid-Career 10th Percentile Salary`,((substr(cs.`Mid-Career 10th Percentile Salary`, 2) * 1000) / cd.tuition) as value
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, '(') - 1))
else `college name` end as clean_name from college_data) cd
inner join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, '(') - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
order by value desc;
#90th percentile earners
select distinct cd.`college name`, cd.tuition, cs.`Mid-Career 90th Percentile Salary`,((substr(cs.`Mid-Career 90th Percentile Salary`, 2) * 1000) / cd.tuition) as value
from (select *, case when instr(`college name`, '(') > 0 then trim(substr(`college name`, 1, instr(`college name`, '(') - 1))
else `college name` end as clean_name from college_data) cd
inner join (select *, case when instr(`school name`, '(') > 0 then trim(substr(`school name`, 1, instr(`school name`, '(') - 1))
else `school name` end as clean_name from college_salaries) cs
on cd.clean_name = cs.clean_name
order by value desc;
```