Do Institutional Characteristics of Colleges Relate to Long-Term Earnings?

An Exploratory Analysis of U.S. Higher Education Outcomes

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Why This Matters

1 Higher education is often framed as a long-term investment.

2 Students and families face rising tuition costs and uncertainty about outcomes.

3 Understanding how institutional characteristics relate to earnings can support more informed decisions and policy discussions.

Research Question

How do institutional characteristics like institution type, degree level, tuition cost, and admissions selectivity relate to median earnings 10 years after entry?

Target Audience

Students and families evaluating college options

Policymakers and education stakeholders interested in outcomes and equity

Data Preparation Overview

Dataset

- U.S. Department of Education College Scorecard dataset
- 6,429 U.S. higher education institutions
- Includes institution type, degree level, tuition, admissions rate, and median earnings 10 years after entry
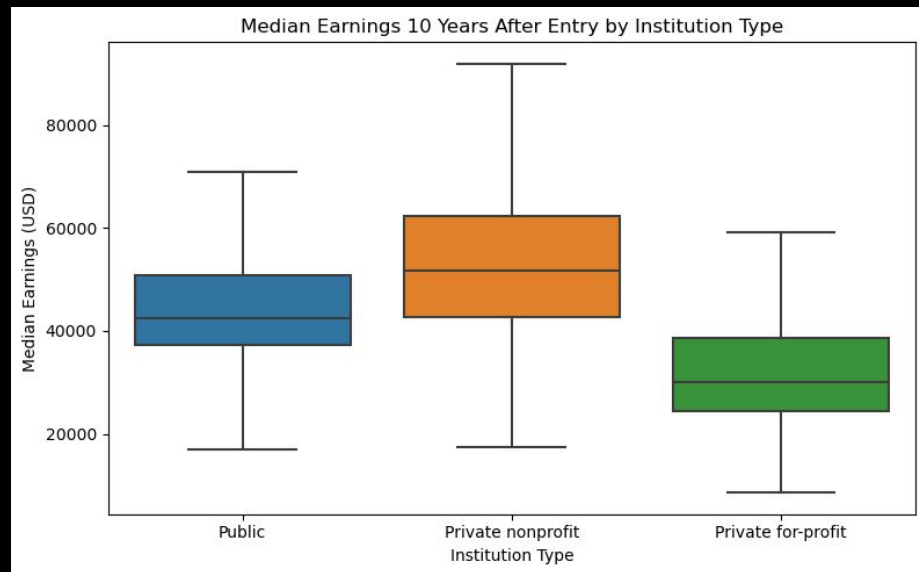
Methods

- Data cleaning and preprocessing in Python (Pandas, NumPy)
- Feature engineering (institution labels, selectivity buckets)
- Exploratory data analysis using Seaborn and Matplotlib
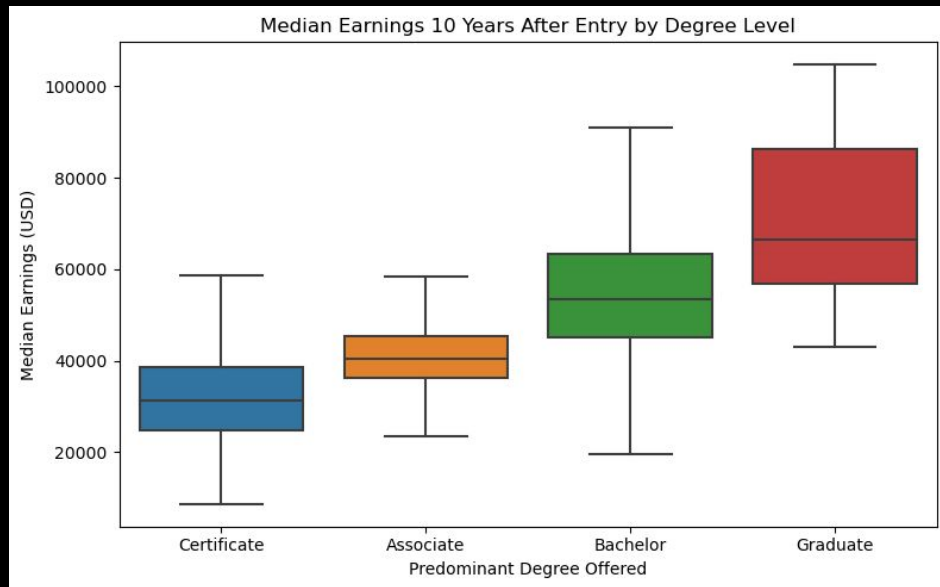- Focus on descriptive, non-causal insights

Earnings by Institution Type

- Private nonprofit institutions have the highest median earnings
- Public institutions fall in the middle
- Private for-profit institutions show consistently lower earnings

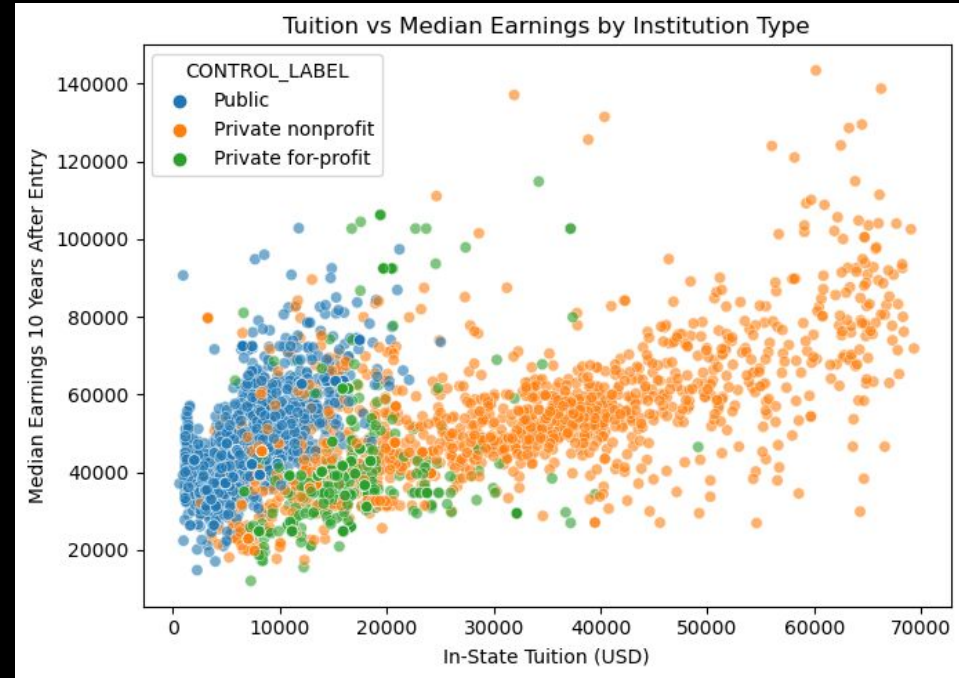Median Earnings 10 Years After Entry by Institution Type

Earnings by Degree Level

- Median earnings increase substantially with degree level
- Bachelor's and graduate-focused institutions outperform certificate- and associate-focused schools
- Credential level appears to be a major driver of earnings outcomes

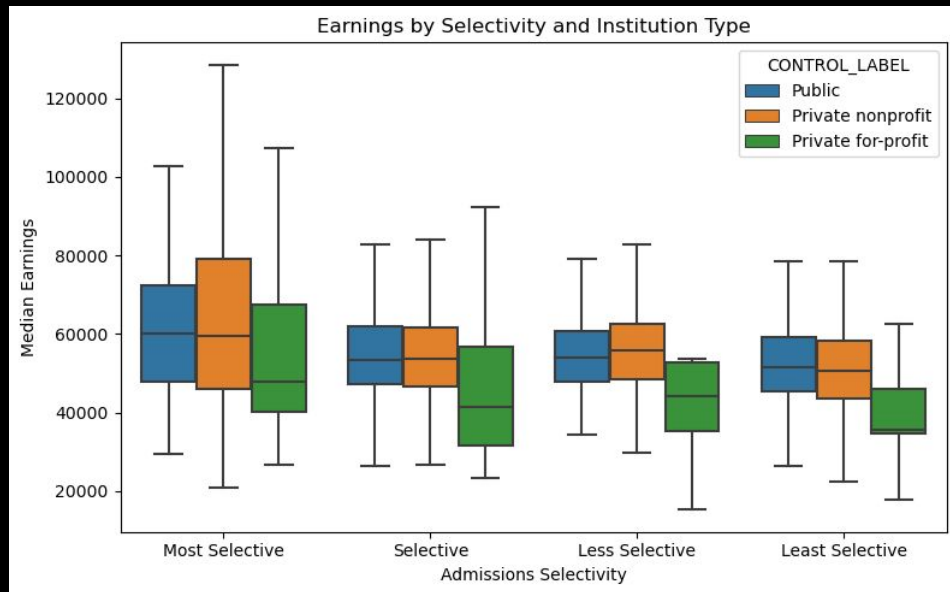Median Earnings 10 Years After Entry by Degree Level

Tuition vs Earnings

- Higher tuition does not consistently guarantee higher earnings

- Private nonprofit institutions cluster in higher-cost, higher-earning regions

- Cost alone is an unreliable proxy for return on investment

Tuition vs Median Earnings by Institution Type

Selectivity & Institution Type

- More selective institutions tend to have higher earnings
- Within selectivity tiers, earnings gaps between institution types narrow
- Selectivity may partially explain observed earnings differences

Earnings by Selectivity and Institution Type

Conclusions

Key Findings

- Long-term earnings outcomes are associated with multiple institutional characteristics, including degree level and admissions selectivity.

- While private nonprofit institutions exhibit higher median earnings on average, these differences appear partially driven by the credentials they offer and the selectivity of their admissions processes.

- Tuition cost alone does not reliably predict earnings outcomes, suggesting that higher cost does not guarantee higher returns.

Personal Takeaways

- Growing up in a competitive education hub such as Silicon Valley, institutional prestige and cost are often emphasized as primary indicators of future success.

- This analysis challenged that assumption by highlighting the importance of degree type and selectivity over institution type alone, reinforcing that multiple pathways can lead to strong long-term outcomes.

■ Python Data Analysis Project

Looking Forward

Limitations

- This analysis is observational and does not establish causal relationships between institutional characteristics and earnings outcomes.

- Earnings are measured at the institution level and do not account for differences across majors or individual student characteristics.

- Selectivity and standardized test data are incomplete for some institutions, which limits certain comparisons.

Recommendations

- Students and families should evaluate degree level and admissions selectivity alongside institution type when evaluating options.

- Policymakers may consider further scrutiny of private for-profit institutions, where earnings outcomes appear consistently lower across selectivity levels.

- Institutions could benefit from increased transparency around long-term outcomes to better inform student decision-making.

Future Work

- Incorporate field-of-study (major-level) earnings data to better align outcomes with industry pathways.

- Adjust earnings outcomes for regional cost-of-living differences.

- Apply regression or predictive modeling to further explore contributing factors while controlling for confounding variables.