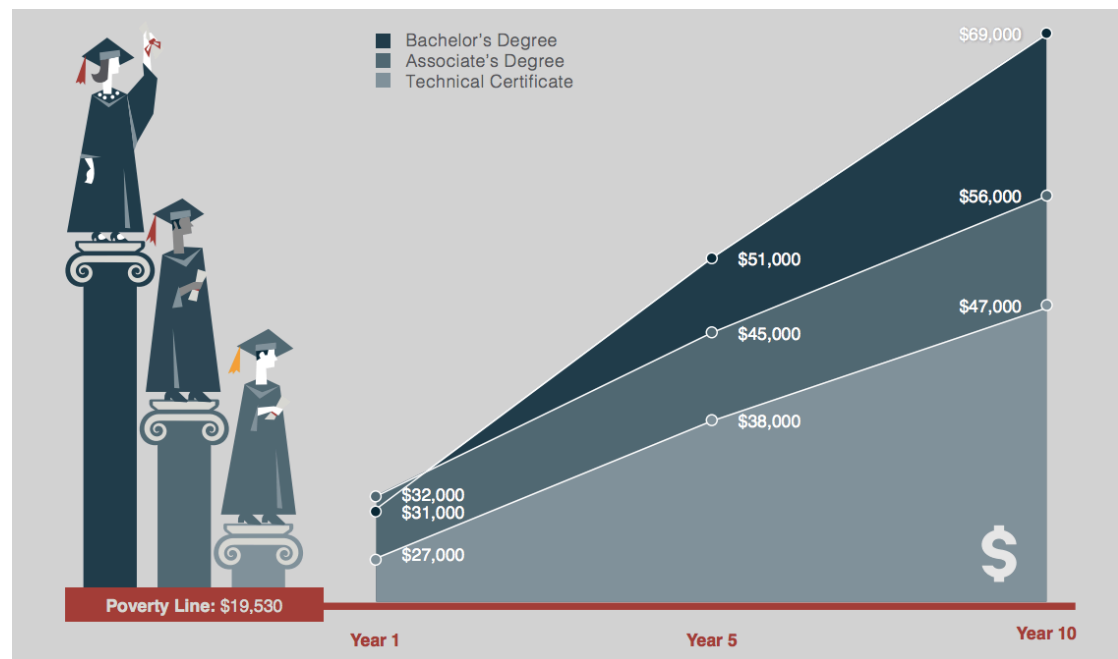


Moving On Up? Predicting Social Mobility through Educational Attainment in the U.S.

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CUNY SPS DATA621, Fall 2019

Introduction

- Despite the national narrative that America affords its inhabitants an unprecedented land of opportunity, Fewer than eight percent of Americans born in the bottom 20% of the income distribution reach the top 20%.
- We wish to understand which demographic and geographic factors are associated with social mobility using educational attainment as a proxy.
- **Research Question:** Are the numbers of years of education beyond high school related to the relationship of elements such as exam scores, tuition paid, distance they had to travel to get to school and/or if their high school was situated in an urban/rural environment?



<https://fordhaminstitute.org/national/commentary/education-still-sturdy-path-upward-mobility>

Methodology

- Extract dataset from package and perform exploratory analysis
- Check for multicollinearity with three different methods
- Construct a multiple linear regression model, diagnose the model and check model assumptions
- Create another model with interaction terms
- Create regression equations, confidence intervals and provide interpretation for the results and insights

Experimentation

- By looking at plots, correlation matrices and VIF, we confirmed that there was no multicollinearity between our features
- We used backwards elimination, all subsets method, and manual feature selection to create multiple linear regression models for educational attainment
- Compared models using AIC/Mallow's C_p values
- No outliers were found in our data by using Cook's Distance as a metric
- The urban indicator variable was recoded as binary for our models
- We also experimented with the interaction between our distance and urban variables

Results

Our final chosen model:

$$\widehat{EducationalAttainment} = 9.141 + .0956 \cdot AchievementScore - .1426 \cdot Tuition - .0487 \cdot Distance + .0256 \cdot I(urban = yes)$$

Residual standard error: 1.58 on 4734 degrees of freedom

Multiple R-squared: 0.221, Adjusted R-squared: 0.2203

F-statistic: 335.7 on 4 and 4734 DF, p-value: < 2.2e-16

Model with interaction:

$$\widehat{EducationalAttainment} = 9.141 + .096 \cdot AchievementScore - .143 \cdot Tuition - .049 \cdot Distance + .026 \cdot I(urban = yes) + .005 \cdot Distance \cdot I(urban = yes)$$

Residual standard error: 1.58 on 4733 degrees of freedom

Multiple R-squared: 0.221, Adjusted R-squared: 0.2201

F-statistic: 268.5 on 5 and 4733 DF, p-value: < 2.2e-16

Discussion & Conclusions

- Educational attainment increases in urban settings and with higher achievement scores, but it decreases with the cost of tuition and the distance a student has to travel to school.
- While our data captures educational attainment from more than 30 years ago, we think the construction of a model that predicts such a metric is nonetheless a worthwhile endeavor.
- An interesting follow-up study may be to repeat such a survey in the present day, construct a model, and then analyze differences.
- This study helps us understand different elements that can influence education attainment and hence social mobility and ultimately equality.
- Investing in better tutoring to improve scores, better transportation for kids that are far from schools, and other elements can extend years of study and lead to better opportunities.

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Thank you!