Family Financial Background and Higher Education: An Analysis

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**Research Question and Relevance**

The rising cost of goods and services in the U.S. has brought increasing attention to both monetary inflation and credential inflation. Credential inflation refers to the growing tendency of employers to require college degrees or certifications for positions that historically did not necessitate such qualifications. These dual forms of inflation (economic and educational) pose significant financial and social challenges for individuals considering higher education. As the prevalence of degree requirements increases, the relative value of a bachelor’s degree may be diminishing. Many students depend on external sources of funding, such as employer-sponsored tuition assistance, to make college attainable. Without this support, higher education may be out of reach for many prospective students.

**Data Description and Data Collection**

The data was sourced from a New York Times article that presented findings from the Mobility Report Cards study in a more accessible format. A convenience sampling method was used to identify the population for analysis. Specifically, the ten largest colleges by enrollment were selected, and data was collected on the percentage of enrolled students whose family income falls within the top fifth, middle-, and bottom-income brackets. Additionally, information on the median parent income of enrolled students was gathered and compared to the overall median family income from 2013.

The convenience sampling approach was selected to ensure access to data from institutions with the largest number of students, thereby enabling more robust analysis of income-related patterns. The chosen schools are not confined to specific categories such as community colleges or elite universities and represent a broad geographic distribution across the United States. This helps support the diversity and neutrality of the sample.

While convenience sampling allowed for efficient data collection from high-enrollment institutions, this method does have limitations. Because the sample was not randomly selected, it may not fully represent the broader population of U.S. college students. As a result, the findings may be subject to sampling bias, and generalizations drawn from the data should be made with caution.

A key confounding variable in this study is the multifaceted nature of poverty. Individuals from lower-income backgrounds may also experience other disadvantages, such as single-parent households, lower levels of parental education, poorer-quality primary education, greater exposure to crime, abuse, and violence, and limited access to resources. These additional challenges can influence both the ability and the motivation to pursue higher education, as individuals may be required to prioritize mental health, immediate financial needs, or caregiving responsibilities over academic advancement.

**Data Organization**

Figure 1 displays the distribution of student family incomes across the 10 largest U.S. colleges by enrollment, segmented into three income brackets: bottom fifth, middle, and top fifth percentiles. In 7 out of the 10 colleges, the proportion of students from families in the top fifth income bracket (blue) was equal to or greater than those from the middle-income bracket (orange). Additionally, all 10 colleges reported a significantly lower percentage of students from the bottom fifth income bracket (grey) compared to both the middle- and top-income groups.

Figure 1. College Income Percentages.

Figure 2 presents a comparison between the median parent income of students enrolled in these institutions and the overall U.S. median household income in 2013—the year the data was collected. In 2013, the national median household income was $52,250. By contrast, the median parent income for students enrolled at these universities was $107,850, more than double the national figure. The median was used as the measure of central tendency to reduce the influence of outliers and provide a more accurate reflection of the data. As illustrated in Figure 2, even the institution with the lowest average parent income among the observed colleges still exceeds the overall U.S. household median income, highlighting a substantial income gap between the general population and the families of enrolled college students.

Figure 2. Median Parent Income of College Student vs Median 2013 Family Income.

Figure 3 features a line chart illustrating the disparity in enrollment rates among students from different income brackets. Specifically, it highlights how significantly underrepresented students from the bottom fifth income percentile are in comparison to those from the middle- and top-income groups. The pronounced gap emphasizes that students from low-income households face substantially reduced opportunities for college enrollment compared to their middle- and upper-income peers.

Figure 3. College Income Percentages shown in a line graph.

**Data Analysis**

Descriptive statistics were calculated for the top fifth, middle, and bottom fifth income brackets, as shown in Table 1. The mean values demonstrate a significant disparity, with the top fifth averaging 0.484, while the bottom fifth is substantially lower at 0.065. Notably, the minimum value for the top fifth (0.24) exceeds the maximum value for the bottom fifth (0.15), further emphasizing the gap in representation.

The standard deviation is highest for the top fifth income bracket at 0.106, indicating greater variability in enrollment among higher-income students. In contrast, the bottom fifth shows the lowest standard deviation at 0.032, suggesting that enrollment rates for this group tend to cluster closely around the mean, indicating limited variation and, consequently, fewer opportunities for upward deviation.

Kurtosis values also provide useful insights. The bottom fifth exhibits a high positive kurtosis of 6.95, signaling a sharp peak and a heavy concentration of data around the mean with infrequent extreme values. This contrasts with the middle (0.76) and top fifth (2.78), which fall within or near normal range. The sharp kurtosis in the bottom fifth suggests a strong deviation from normality and highlights the extent to which low-income student enrollment is an outlier compared to the other income groups. Overall, these statistics reinforce the significant disparities in college enrollment by income level.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Top Fifth* |  | *Middle* |  | *Bottom Fifth* |  |
|  |  |  |  |  |  |
| Mean | 0.484 | Mean | 0.4505 | Mean | 0.065 |
| Standard Error | 0.033406586 | Standard Error | 0.025739831 | Standard Error | 0.01008078 |
| Median | 0.49 | Median | 0.46 | Median | 0.06 |
| Mode | 0.5 | Mode | 0.46 | Mode | 0.06 |
| Standard Deviation | 0.105640901 | Standard Deviation | 0.081396492 | Standard Deviation | 0.03187824 |
| Sample Variance | 0.01116 | Sample Variance | 0.006625389 | Sample Variance | 0.00101622 |
| Kurtosis | 2.781645552 | Kurtosis | 0.760733434 | Kurtosis | 6.95868354 |
| Skewness | -1.254871072 | Skewness | 0.299092115 | Skewness | 2.43576425 |
| Range | 0.38 | Range | 0.291 | Range | 0.115 |
| Minimum | 0.24 | Minimum | 0.319 | Minimum | 0.035 |
| Maximum | 0.62 | Maximum | 0.61 | Maximum | 0.15 |
| Sum | 4.84 | Sum | 4.505 | Sum | 0.65 |
| Count | 10 | Count | 10 | Count | 10 |
| Confidence Level(95.0%) | 0.075570948 | Confidence Level(95.0%) | 0.058227543 | Confidence Level(95.0%) | 0.02280432 |

Table 1. Top Fifth, Middle, and Bottom Fifth Income Brackets Descriptive Statistics.

Descriptive statistics were also calculated for the median income data, as shown in Table 2. Both the mean ($109,030) and median ($107,850) exceed double the national median household income in 2013 ($52,250), indicating that, on average, students attending the ten largest colleges by enrollment come from families with significantly greater financial resources than the typical U.S. household.

Notably, the lowest median family income among these institutions is $57,300 which is still above the national median. This further emphasizes the financial disparity between college attendees and the general population. This suggests that access to higher education, even at the most commonly attended institutions, is disproportionately available to students from higher-income families.

Additional metrics support this disparity. The standard deviation is $24,174.37, indicating moderate variability in family income across these institutions. The negative skewness value (-0.616) suggests that the data distribution is slightly left-skewed, meaning that a few schools with lower median family incomes pull the average down slightly. The kurtosis of 2.12 is within an acceptable range, suggesting a distribution close to normal but with somewhat heavier tails. The 95% confidence level of ±$17,293.30 provides a reasonable margin for estimating the true population mean from this sample.

|  |  |
| --- | --- |
| *Median Income* | |
|  |  |
| Mean | 109030 |
| Standard Error | 7644.60667 |
| Median | 107850 |
| Mode | #N/A |
| Standard Deviation | 24174.3689 |
| Sample Variance | 584400111 |
| Kurtosis | 2.12418931 |
| Skewness | -0.6160931 |
| Range | 92000 |
| Minimum | 57300 |
| Maximum | 149300 |
| Sum | 1090300 |
| Count | 10 |
| Confidence Level(95.0%) | 17293.3017 |

Table 2. Median Income Descriptive Statistics.

To address the research question, “Is the financial background of a student’s family related to the level of education pursued?”, a Chi-square goodness of fit test was conducted comparing the proportions of students from the top fifth and bottom fifth income percentiles (alternative hypothesis: Ha: Pa ≠ Pb). The null hypothesis stated that family income and level of education pursued are independent (Ho: Pa = Pb).

The test produced a Chi-square statistic (X²) of 7.64, exceeding the critical value (CV) of 3.84 at the 0.05 significance level. Since X² > CV, the null hypothesis is rejected. Additionally, the p-value was calculated to be 0.00569, which is less than the alpha level of 0.05, further supporting rejection of the null hypothesis.

These results provide sufficient evidence to conclude that family income significantly impacts the likelihood of college enrollment.

**Conclusions**

Based on the data analysis, there is sufficient evidence to conclude that family income background significantly impacts the level of higher education pursued by students. The Chi-square test results and descriptive statistics consistently indicate a strong relationship between income and the likelihood of college enrollment. Furthermore, analysis of the median family income of enrolled students compared to the overall annual household income reveals that data points consistently remain above the trendline, underscoring that families with higher-than-average income are more likely to have children who pursue higher education.

**References**

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