Exploration of Earnings Report

Introduction:

Income is a vital metric in evaluating economic and mental well-being and understanding pay disparities. Our group investigated how median income varies across states, majors, and gender. Specifically, we aimed to identify geographic income trends, quantify gender pay gaps by major, and determine which majors offer a livable wage for men versus women using R and Tableau visualizations.

Research Questions:

1. What is the median income across states, and what are some general gender gap trends?
2. What is the gender gap for median income by major across the country?
3. Which majors are making above the liveable wage for men vs. women?

Data Cleaning:

Our dataset combined 2023 US Census Bureau data on median earnings by sex, major, and state with 2025 livable wage estimates from the World Population Review. We removed entries for Washington D.C. and Puerto Rico and dropped the "Multidisciplinary Studies" major due to missing values. Column names were renamed, and the dataset was pivoted to organize data by state and gender combinations. We scraped livable wage data for each state and merged it with the income data to create a comprehensive dataset for analysis.

Q1: What is the median income across states, and what are general gender gap trends?

We selected a heatmap to show geographic income variation because it effectively highlights regional clusters of higher and lower earnings, and a bar plot for gender distribution was chosen for clarity in comparing male and female earnings side-by-side. Using this Tableau visualization, we determined that higher incomes clustered on the East and West coasts (California: $91,385), while central states had lower medians. The bar plot showed males consistently earned more than females, which prompted deeper analysis by major.

Q2: What is the gender gap for median income by major across the country?

We chose a lollipop chart to allow for easy visualization of gender gaps by major while emphasizing both direction and magnitude. It also shows clear comparisons to the national average income. From this display, we saw that across 700 state and major combinations, only 18 (2.6%) showed women earning more than men. The largest gap in favor of women was Vermont, Communications (23%). Majors like Communications, Visual Arts, and Liberal Arts showed occasional female advantage but remained exceptions. Most states had gender pay gaps favoring men, and there was no clear divide between STEM and Arts fields.

Q3: Which majors are making above the liveable wage for men vs. women?

Finally, we used an interactive bar plot for livable wage comparisons because it enabled users to explore complex relationships across majors, gender, and state in an intuitive way. The red bars represented majors with incomes that did not meet the liveable wage while green indicated incomes above liveable wage, effectively highlighting problem areas. We determined that in 15 states, all majors (both genders) exceeded the state’s livable wage. Engineering was most consistently above the threshold (35 states) while Visual and Performing Arts was most often

below threshold (27 states). No states had women outperforming men in terms of livable wage coverage. Even in majors where women earned more, like Visual Arts, earnings often remained below livable standards.

Conclusion:

Overall, we found that median incomes are higher on the coasts, and there is a consistent gender gap favors men. Only 2.6% of state-major combinations showed women earning more than men. Most states did not meet the livable wage threshold across all majors for women. If we were to do future work, we would explore wage impacts on parents, those without degrees, and structural factors influencing central states' lower incomes.

Tableau Link:

https://public.tableau.com/app/profile/rachel.kersey/viz/Book1_17444017596010/Dashboard1?publish=yes

Shiny App:

https://taran-gupta.shinyapps.io/DS2003-Final-Project/