

Exploration of Earnings

DS 2003 Final

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Introduction

Summary

- Income is a vital variable to study, as it ties to economic health, mental health, and informs us of existing pay gaps.
- Our group chose this dataset to explore median income trends across fifty states, separated by different types of majors and gender. This data does not include people who didn't go to college.



Dataset

- Combines two datasets
- Median earnings dataset is from the US Census Bureau for 2023: median earnings by sex, 15 majors, 50 states (and DC/Puerto Rico)
- World population review dataset: data scraped the column "Livable wage with no children 2025"

Research Questions



#	Question
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	How much more or less money is each major making compared to the livable wage for each state?

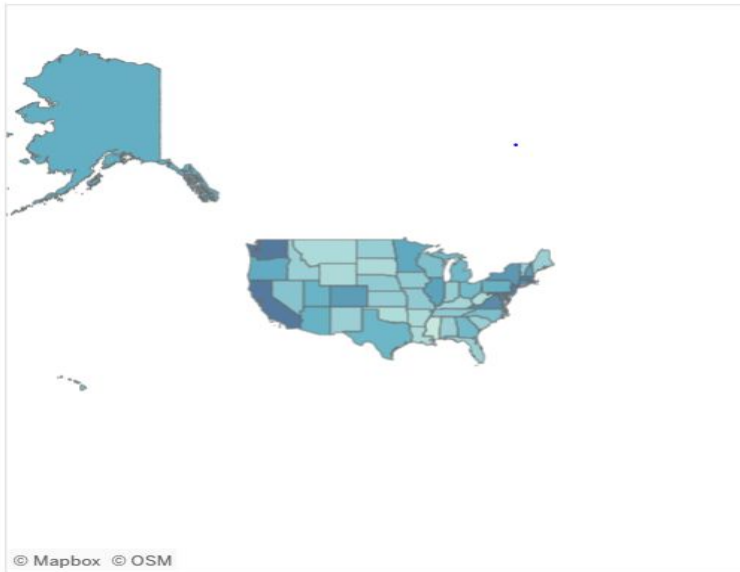
Data Cleaning Process

- Removed Washington DC and Puerto Rico from the data frame
- Removed Multidisciplinary Studies due to NAs
- Renamed the columns and pivoted the data frame so that each row was a different state and gender combination
- Scraped data from the World Population Review website to obtain the livable wages for each state
- Merged the data on livable wages with our original data frame



Q1: General Trends

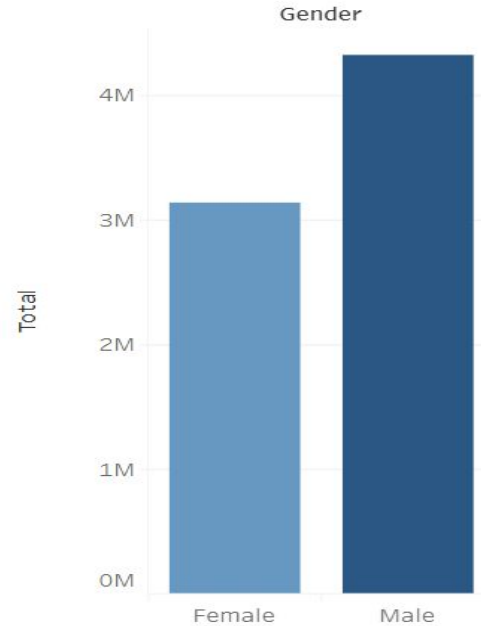
Heatmap of Median Income by State



Median Total

57,017 91,385

Gender Gap Barplot



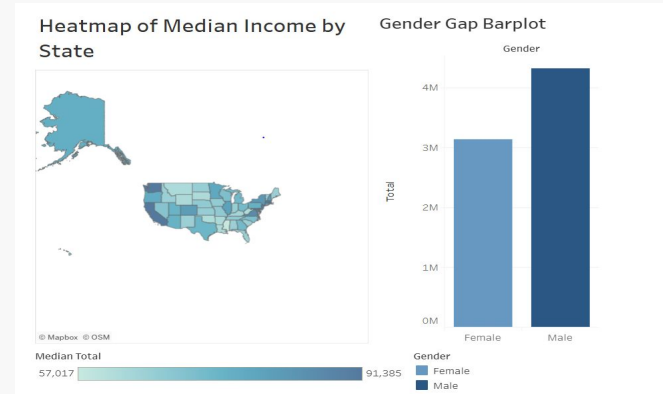
Gender

Female
Male



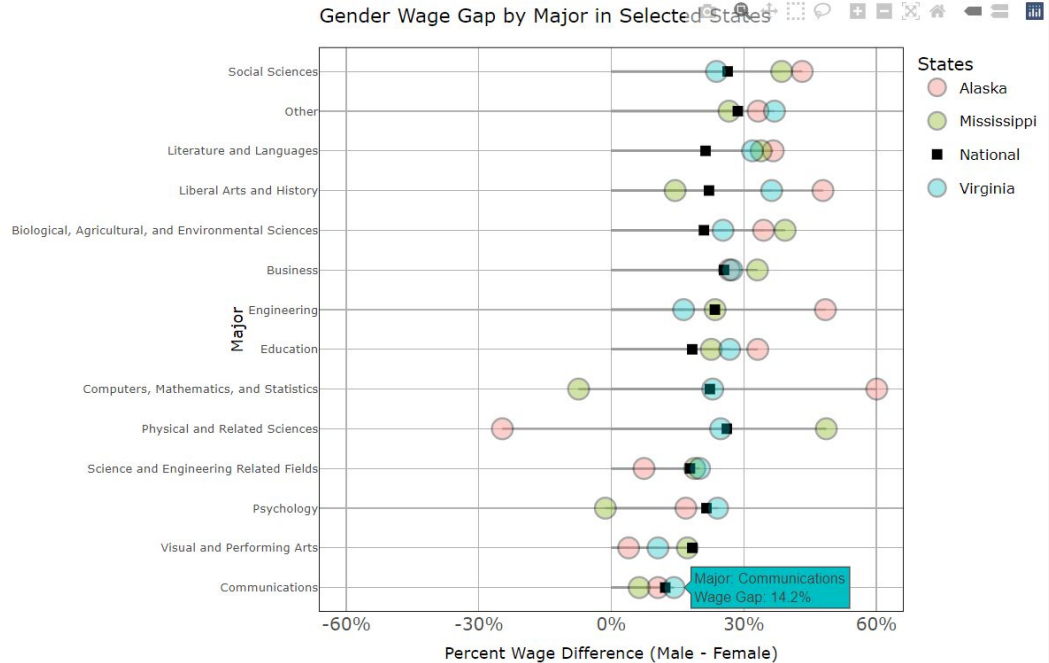
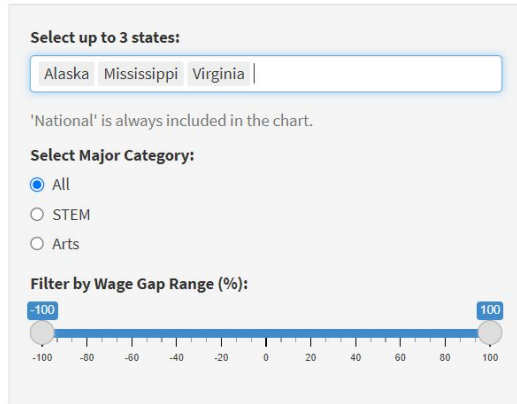
Q1: General Trends

- Higher median incomes on the coasts
- Lower median incomes in central US
- General gender gap seen → leads us to our second question



Q2: Wage Gap

Gender Wage Gap by Major in Selected States



This chart shows the wage gap between genders across various states and majors. Females tend to earn less than their male counterparts in nearly every state and major, highlighting a broader trend of gender inequity in the U.S. Source: United States Census Bureau.

Q2: Wage Gap

- 50 states, 14 majors per state = 700
 - **Only 18 categories women made more (2.6%)**
- Largest difference in favor of women:
 - Vermont, Communications - 23%
- **Communications, Visual Arts, and Liberal Arts** most likely skewed towards women
- National Average is all 10-30% in favor of males
- States are more likely to be well below average than significantly above average
- **No noticeable visual trend** between Arts and STEM Majors



Q3: Livable Wage

Median Income Examinations by Major and Gender

Median Income Compared to Livable Wage by State

Median Income Gap By Major and State

Filter by Gender:

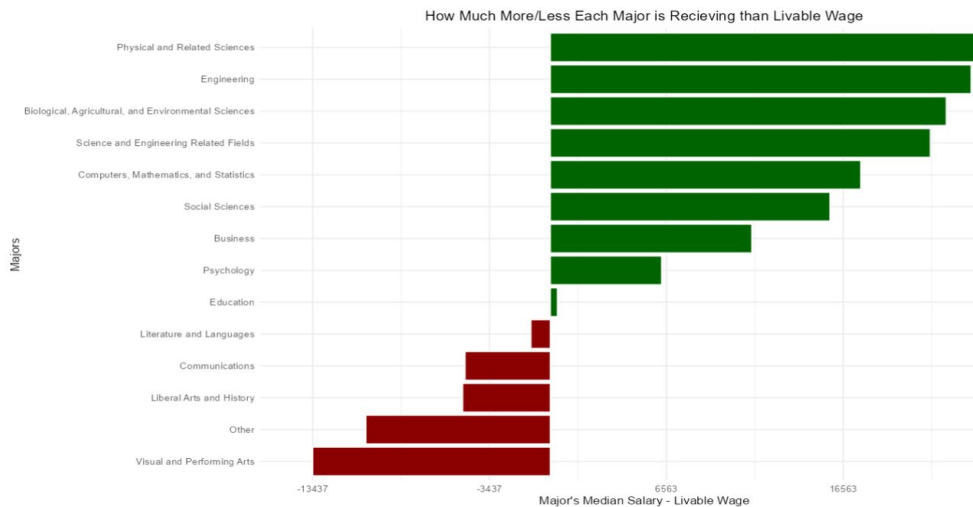
- ☒ Female
- ☐ Male
- ☐ Everyone

Filter by Major

- ☒ Computers, Mathematics, and Statistics
- ☒ Biological, Agricultural, and Environmental Sciences
- ☒ Physical and Related Sciences
- ☒ Psychology
- ☒ Social Sciences
- ☒ Engineering
- ☒ Science and Engineering Related Fields
- ☒ Business
- ☒ Education
- ☒ Literature and Languages
- ☒ Liberal Arts and History
- ☒ Visual and Performing Arts
- ☒ Communications
- ☒ Other

Filter by State:

Indiana

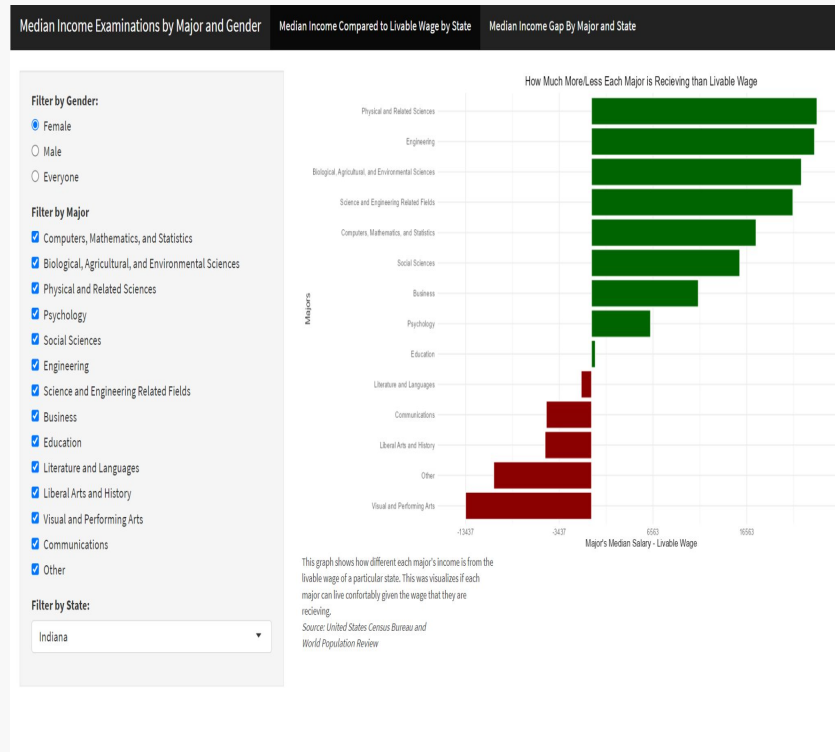


This graph shows how different each major's income is from the livable wage of a particular state. This was visualized if each major can live comfortably given the wage that they are receiving.

Source: United States Census Bureau and World Population Review

Q3: Livable Wage

- 15 states said every major, regardless of gender, made more than livable wage for that particular state
- The major that had the lowest wage compared to livable wage was **Visual and Performing Arts** (27/50 states)
- The major that had the highest wage compared to livable wage was **Engineering** (35/50 states)
- The states with the lowest income were **Mississippi, South Dakota, and West Virginia**
- The states with the highest income were **California, Massachusetts, and Maryland**
- There were **0** states where men had more majors below livable wage than women



Conclusion

01

General Trends

US median income is higher on the coasts (California has the highest) and men make more than women on average

- Further explore why central states have lower income
- Explore additional data that includes people with children and people who did not go to college

02

Gender Gap

Only 18 categories of state and major had women paid more than men, 2.6% of data

- Women should be in executive roles

03

Liveable Wage

15 states made more than liveable wage across all majors and men had more majors above livable wage for every state