Differences in the **Gender Pay Gap**

Across Job Categories and Majority-Male Workforces

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Research Question

How the **gender pay gap fluctuates** based on:

- **Type of job**
- How **male-dominated** a workforce is
  - Whether the majority of workers are men
  - Whether the median male wage is higher than the median female wage

Why it's important:

- Women are still seeking equal workplace rights
  - The gender pay gap only narrowed by 4% from 2003 to 2024
- Current politics and changes to DEI policies

Our Data Set

About

- Data collected from 2013-2016
- US Bureau of Labor (via the US Census)
- 2089 observations, 301 occupations
- Focusing on the variables: female wages as percent of male wages (wage gap), major job category & percentage of females in the workforce

Limitations

- No data later than 2016
- Only data from the US
- Only includes data about full time jobs (women are more likely to work part-time jobs)

Visualizations - Exploratory Data Analysis

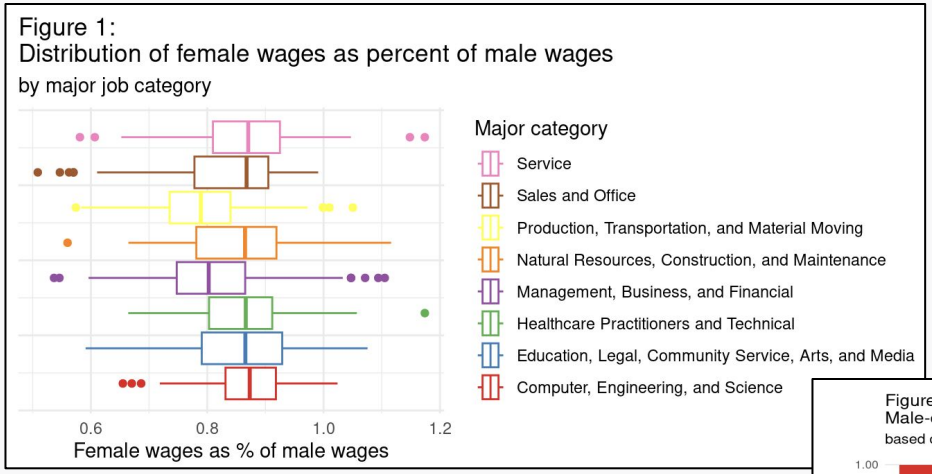
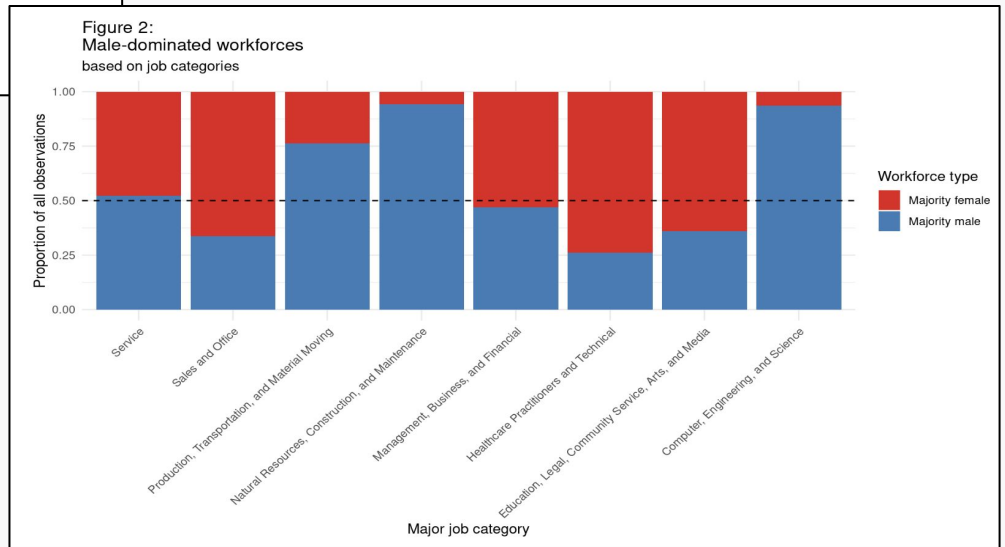


Figure 1:

- Equal pay/ women are paid more than men - outside the 75 percentile of all job categories
- Computer, engineering & science - smallest spread in wage inequality

Figure 2:

- Least female representation in “Natural Resources, Construction, and Maintenance”
- Female-dominated: “Sales/Office”, “Healthcare”, and “Education”



Visualizations - Linear Models

- Chose interaction model with highest Adjusted R^2 (0.144)

$$
\begin{aligned}
\widehat{wage\ percent\ of\ male} = {} & 0.909 - 0.138 \times percent\ female\ workforce \\
& -0.094 \times Education,\ Legal,\ Community\ Service,\ Arts,\ and\ Media \\
& -0.214 \times Healthcare\ Practitioners\ and\ Technical \\
& -0.076 \times Management,\ Business,\ and\ Financial \\
& -0.048 \times Natural\ Resources,\ Construction,\ and\ Maintenance \\
& -0.113 \times Production,\ Transportation,\ and\ Material\ Moving \\
& -0.168 \times Sales\ and\ Office \\
& -0.059 \times Service \\
& +0.222 \times percent\ female\ workforce * Education,\ Legal,\ Community\ Service,\ Arts,\ and\ Media \\
& +0.403 \times percent\ female\ workforce * Healthcare\ Practitioners\ and\ Technical \\
& +0.079 \times percent\ female\ workforce * Management,\ Business,\ and\ Financial \\
& +0.075 \times percent\ female\ workforce * Natural\ Resources,\ Construction,\ and\ Maintenance \\
& +0.128 \times percent\ female\ workforce * Production,\ Transportation,\ and\ Material\ Moving \\
& +0.302 \times percent\ female\ workforce * Sales\ and\ Office \\
& +0.171 \times percent\ female\ workforce * Service
\end{aligned}
$$

Primary Conclusions

Hypothesis Test

- H_0 - There is no relationship between gender pay gaps and job category, percent of females in the workforce, and their interaction.
- H_A - There is a relationship.

Results of Interest

```
# A tibble: 16 × 2
   term                                                                p_value
   <chr>                                                                 <dbl>
 1 intercept                                                             0
 2 major_categoryEducation, Legal, Community Service, Arts, and Media    0.008
 3 major_categoryHealthcare Practitioners and Technical                  0
 4 major_categoryManagement, Business, and Financial                     0
 5 major_categoryNatural Resources, Construction, and Maintenance        0.018
 6 major_categoryProduction, Transportation, and Material Moving         0
 7 major_categorySales and Office                                        0
 8 major_categoryService                                                 0.002
 9 percent_female                                                        0.008
10 percent_female:major_categoryEducation, Legal, Community Service, Ar… 0.002
11 percent_female:major_categoryHealthcare Practitioners and Technical   0
12 percent_female:major_categoryManagement, Business, and Financial      0.19
13 percent_female:major_categoryNatural Resources, Construction, and Ma… 0.438
14 percent_female:major_categoryProduction, Transportation, and Materia… 0.05
15 percent_female:major_categorySales and Office                         0
16 percent_female:major_categoryService                                  0.006
```

Broader Implications

Rejecting the Null

- Statistically significant non-zero relationship between
  - All job categories and female wage as a percent of male wage
  - The percent of females in a workforce and female wage as a percent of male wage
  - The majority (5/7) of interactions between the predictors and response variables

Future Research?

- Exploring confounding factors:
  - Race?
  - Age?
- Full vs part-time wages
- Other countries?

Thank you!