Analysis of H1B vs General Wages in Washington's Tech Sector

Department of Labor Data Analysis Project
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Introduction

The United States is an appealing destination for individuals seeking an H1B visa, and these companies conduct a lot of H1B hiring.In this study, our main focus will be on Washington State.

The H1B visa program has made Washington's technology sector more reliant on foreign talent. Understanding salary discrepancies between H1B workers and the general workforce is critical to ensuring fair labor practices and sustaining the state's technological competitiveness. This study examines Department of Labor H1B visa data and Washington state occupational wage statistics to address the question: *How do Microsoft, Google LLC, and Amazon Web Services (AWS) compare in terms of H1B wage offers versus general workforce wages in Washington's tech sector?*

Used Data

1. H1B Labor Condition Application (LCA) Dataset:
   - Source: U.S. Department of Labor
   - Period: Q3 FY2023 (April 2023 - June 2023)
   - Description: Contains detailed information about H1B visa applications, including employer names, job titles, and proposed wages
   - Structure: Includes case status, employer information, job codes (SOC), wage rates, and work locations

2. Occupational Employment and Wage Statistics (OEWS) Dataset:
   - Source: Washington State Employment Security Department
   - Description: Provides comprehensive wage data for various occupations in Washington state

- Structure: Contains SOC codes, occupation titles, and annual mean wages for the local workforce

Reasons for choosing these Data sources

- Relevance: both datasets are well maintained OEWS is specifically for washing state and H1b is also later filtered for washington area
- Coverage:OEWS is normally updated in May and it was last updated in may2023 it use data from previous years and new data .In case a company dont participate in their survey they do aggregation using previous year datas.So we filtered our h1b data set to get data for same period as oews
- Open data : Both data sets are openly available

Methodology

The analysis pipeline implemented several key data processing steps:
1. Data Preprocessing:
- Standardization of job codes (SOC) across both datasets
- Conversion of all wages to annual values
- Filtering for certified H1B cases only
- Aggregation of wages by employer and job code
2. Data Integration:
- Merged H1B and OEWS datasets using standardized job codes
- Calculated wage differentials between H1B and local wages
- Created visualizations for comparative analysis

Analysis Results

OEWS Data After preprocessing

occupation_title	job_code	avg_local...
General and Operations Managers	11-1021	149502
Marketing Managers	11-2021	178860
Computer and Information Systems Managers	11-3021	214688
Financial Managers	11-3031	194181
Purchasing Managers	11-3061	160692

H1B DataSet after preprocessing

employer_name	job_code
Amazon Web Services, Inc.	15-1255
Amazon Web Services, Inc.	15-1299

occupation_title	annual_wage
Video Game Designers	171400
Computer Occupations, All Other	73466

Combined based on Job Code for comparison

| job_code	occupation_title	annual_wage	avg_local...
15-1255	Video Game Designers	171400	124775
15-1299	Computer Occupations, All Other	73466	136190
15-1299	Computer Systems Engineers/Architects	193746.4	136190
15-1299	Information Security Engineers	90917	136190

| annual_wage	avg_local...	wage_diff
171400	124775	46625
73466	136190	-62724
193746.4	136190	57556.399999999994
90917	136190	-45273

Overall Wage Comparison

The analysis reveals significant differences between H1B wages and general workforce wages in Washington's tech sector:

1. Distribution Analysis:
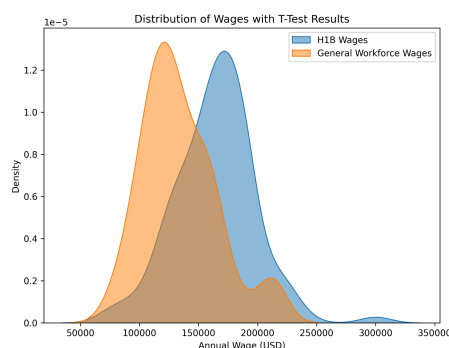
- Shape Features: There is a primary peak and a few smaller peaks at higher salary ranges in the slightly right-skewed H1B distribution.With a single peak, the overall workforce distribution seems more balanced.
- Overlap: The brown region where the distributions converge indicates a substantial overlap between the two distributions at about $150,000. This suggests that although the average salaries of the two groups vary, there is still a wide range where their earnings are comparable.
- Although there is a lot of overlap between the two categories, this image indicates that H1B workers in this dataset often make more money than the overall workforce. The H1B distribution's many peaks may represent various job tiers or levels of experience among H1B employees.

2. Correlation

Correlation Between H1B and General Workforce Wages (r = 0.23)
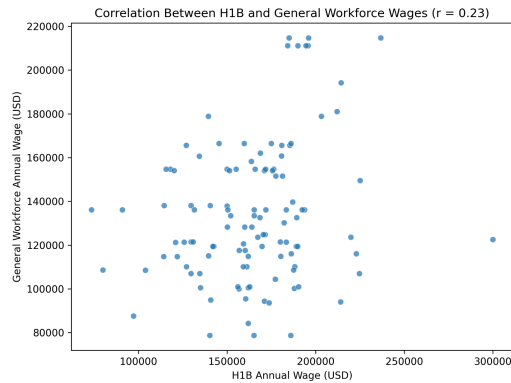
- Although there may be some relationship between H1B and general labor wages, the modest association indicates that they essentially function independently, maybe as a result of distinct variables affecting each group's pay.
- However, the correlation between H1B and local wages is only moderate (r = 0.23), indicating that while they do move in the same overall direction, one does not strongly predict the other.

Conclusions

Strong evidence that H1B employees in Washington's IT sector are typically paid at or above local wage levels is provided by the analysis, indicating usually fair compensation practices. Nonetheless, there are notable differences between various professions and employers.

Important conclusions:

1. In highly specialized technical professions, H1B pay sometimes surpass local averages.

2. H1B wages are typically more competitive at large technology enterprises.

3. Software development and rising tech roles account for the majority of H1B workers.

Restrictions

A number of variables could affect how thorough this analysis is:

1. Seasonal fluctuations may not be captured by the short time span (Q3 2023 only).

2. Additional pay (bonuses, stock options) is not included in wage data.

3. Experience levels and particular skill requirements are not taken into consideration in the study.