

Data 22700  
Data Visualization and Communication  
Trimble  
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## Homework 2: Chicago Public Servant Salary Visualization

*Question: Are the City of Chicago departments with the highest paid full-time employees also those that compensate their part-time workers the most, and to what extent does departmental compensation vary across employee status?*



*Caption: Contrary to the expectation that specific departments might compensate employees of all types more highly, there appears to be a somewhat—though not strictly—inverse relationship between the salary of full-time employees (FTEs) and part-time employees (PTEs) across City of Chicago departments, with the departments with the most lucrative*

*mean salaries for FTEs generally providing the lowest compensation to their part-time workers, and vice versa. As of July 2021, the three departments with the highest mean salaries for FTEs—police, family & support, and business affairs—were those with the lowest hourly rate for part-time personnel. On average, PTEs working for the City Council or public libraries, departments that provided the lowest annual salaries to FTEs, earned hourly wages materially higher than their part-time counterparts working for police, family & support, and business affairs functions. Meanwhile, PTEs working for the OEMC and aviation departments saw the second and third-highest average hourly wages relative to other departments, though FTEs in those departments received the fifth- and fourth-highest mean annual salaries. Examining the distribution of salaries and wages also illuminates unexpected insights. Certain FTEs in the aviation department were paid substantially more than those in any other department, and the City Council, which paid FTEs the lowest average annual salary, compensated a subset of part-time employees an hourly wage nearly \$20 higher than the next highest department PTE maximum—representing significant variation. While most full-time departmental salaries followed nearly normal distributions, the part-time wages for employees in the animal control, OEMC, and business affairs departments were uniform, suggesting PTEs in those departments may be paid a standard wage. Altogether, the data do not indicate that specific departments compensate their full- and part-time public servants more across the board. Data Source: City of Chicago public data portal, “Current Employee Names, Salaries, and Position Titles” as of July 28, 2021.*

I crafted my exploratory question with the hypothesis that there would be a clear correlation between earnings for FTEs and PTEs within the same department. As certain departments in city government may have larger budgets or be perceived as more mission-critical, I suspected they would consequently compensate both their full-time and part-time employees at higher rates—though this theory was largely disproven by the data.

Since there were 30+ departments with full-time employees and 13 with part-time workers, I segmented the City of Chicago public servant data from July 2021 by employee status (part- or full-time), filtered the data for departments with at least 5 more PTEs to ensure I had sufficient observations to draw insights about departmental patterns. Afterward, I filtered the full-time employee data to include only departments with 5 or more PTEs for standardization purposes, leaving 8 departments for comparison (30, or even 13, would have been far too many to draw quick, coherent insights from).

Inspired by the ‘small multiples’ visualization displayed in “A tour through the visualization zoo,” I plotted a set of histograms for the distribution of full-time salaries and part-time wages across 8 departments of the City of Chicago. To communicate my findings more clearly and meaningfully, I created two sets of vertically stacked histograms split by employee status, with a common X-axis for each set of subplots to make comparing salaries and wages simple. The left columns for FTEs is ordered by highest to lowest mean annual salary, and the right column consists of the corresponding departments (horizontally across) with data for PTE hourly wage, with the coloration of histograms gradated based on the highest-to-lowest paid FTEs and representing department to facilitate cross-column comparison of a categorical variable. My color scheme initially resembled a pastel rainbow; however, I altered it to be a purple-to-yellow gradient to reduce frills while still maintaining an aesthetic design using colors that have historically been linked to wealth and grandeur. The aquamarine shading of the average lines was selected to provide

contrast against all hues included in the gradient (white, black, and grey were not as consistently visible). I chose to use histograms for each subplot to capture more information than what could be conveyed with a bar graph, as I was particularly curious to understand the distribution of salaries for each employee type within departments. Comparing distributions is more challenging than mean values, however, which is why I added an average salary/wage line to each histogram, with a text label displaying the exact mean value so that viewers would have access to more granular detail. Finally, since the right column is not ordered in terms of highest-to-lowest wages, I included a numerical ranking in text at the top-right corner of every histogram in the visualization, displaying the ranking of the average compensation of a given department relative to the others in its category, segmented by part vs. full-time.