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GENDER PAY DISPARITIES AND THEIR DETERMINANTS: AN ANALYSIS OF BASE SALARY, BONUSES, JOB CHARACTERISTICS, AND EMPLOYEE ATTRIBUTES

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Abstract

The issue of gender pay gaps continues to be a significant workplace concern as pay differences may be due to gender discrimination or to difference in employee and work characteristics. The aim of this study was to review the base pay, bonuses and overall compensation differences between male and female workers, and determine the impact of age, performance rating, education, department, seniority and job title. The data used was a publicly available dataset that was initially uploaded onto Kaggle for a quantitative cross sectional secondary analysis with 1,000 employee records. The descriptive statistics, gender comparisons, correlation analysis and multiple linear regression were used. The results revealed that the unadjusted base pay and total compensation for male employees was greater than that for female employees, and bonus payments were generally similar by gender. The base pay and total compensation were positively related to age and seniority, while performance evaluation was strongly positively related with bonus payments. There were also statistically significant differences in gender across specific occupational categories. Gender was not a significant predictor of base pay or of total pay once these factors were taken into account, however. This analysis suggests that the raw gender pay gap found in this data is driven by factors in addition to gender, including characteristics of employees and jobs. The study identifies that the distribution of occupations, seniority, education and job position should all be taken into account when assessing issues of pay equity in the workplace and establishing transparent compensation practices.

Keyword: - *gender pay gap, base pay, total compensation, occupational characteristics, pay equity*

INTRODUCTION

Gender pay gap is a serious concern in the workplace that can impact employee loyalty, engagement, motivation and fairness. The salary difference isn't the only difference in pay; it could be bonuses and other forms of compensation. Additionally, gender inequality can stem from the same occupation, such as when the pay in an occupation is discretionary, or when there are unequal access opportunities to higher-paid occupations in the same occupation (Klein et al., 2021). Hence, it should be stressed that the issue of wage inequalities should be tackled by marketing the entire remuneration system of workers. The base pay is a fixed amount while bonuses may be related to performance, organizational policies, or managerial decisions. In spite of this, it is crucial to investigate compensation in addition to average wages as previous research has shown gender wage gaps can be accounted for by structural and organizational factors (Sanfey et al., 2017). Moreover, performance-based incentives can be linked to employee demographics and job attributes, so that the distribution of bonuses is determined in a few ways by characteristics of the job (Sockin & Sockin, 2019). Occupational distribution, job preferences and employment structures have an impact on gender wage differences. Overall, women and men may be overrepresented in different occupations or organizational-levels, which can result in differences in overall earnings (Redmond & McGuinness, 2019). However, when the procedures for managing compensation are not standardized 100% (Abraham, 2017), the results of compensation may be influenced by the way in which compensation is being managed. This is also true of cross-country evidence: The size of the gender pay gap depends on the institutional and labor market conditions (Boll & Lagemann, 2018). One equity to note is between the unadjusted and adjusted gender pay gap. The raw gap is the average difference between the earnings of men and women, and the adjusted gap is the difference that takes into account known factors like age, education, occupation and work experience (Blau & Kahn, 2017). Further, differences in these could stem from organizational factors that affect pay inequity, such as how workplace structures and job assignments are organized (Smith-Doerr et al., 2019).

While gender wage inequality has been discussed quite extensively, there are certain areas that are not explored. Demographic, organizational, and employment-related factors have been shown to influence the pay gap between genders, but the impact of base pay, bonus, and overall pay are not necessarily measured simultaneously (Choi, 2018). Experimental results also indicate that perceptions of fair compensation can vary by gender and job attributes (Auspurg et al., 2017). A further constraint is that many studies only consider overall earnings, leaving it unclear whether they are fixed or based on performance. Although pay transparency is part of the discussion as a key measure to bridge wage gaps, its impact could differ depending on compensation systems (Bennedsen et al., 2023). Gender pay gaps can also vary across organizational levels and job positions (Chen et al., 2022). Furthermore, transparency can impact the wage gap and the link between performance and compensation (Obloj & Zenger, 2022). Thus, more analysis at the level of the individual employee is required to see if there are still gender differences when relevant characteristics of the workplace are taken into account.

The present study is important because observed gender pay differences could be due to differences in the pay of the male and female employees, or due to the differences in the characteristics of the jobs they hold. Workplace expectations and perceptions about gender can influence the allocation of the rewards, and it is important to explore the factors that influence salary in greater detail (Wiedman, 2020). The willingness to accept lower and higher levels of compensation may also differ based on demographic and workplace characteristics (Fairfax et al., 2023). Employees' attitudes and outcomes in various work organizations may differ based on job characteristics (Gu et al., 2022). Wage levels and gender representation within job groups (occupational composition) may also be shaped by institutional arrangements (Budig et al., 2019). So, it is important to examine base pay, bonuses and total compensation in conjunction with age, seniority, performance, education, department and job title to gain more insight into gender pay differences.

Objectives of the Study

- To compare base pay, bonuses, and total compensation between male and female employees.
- To examine the relationships of age, seniority, performance, education, job title, and department with employee compensation.
- To determine whether gender remains associated with base pay and total compensation after adjustment for employee and job-related characteristics.

2. Materials and Methods

2.1 Study Design

A quantitative research design based on secondary data analysis was used in this study, which was a cross-sectional study aimed at examining gender differences in employee compensation and the factors associated with the differences. It was an observational study, since the analysis was done with an already existing and publicly available dataset; the study variables were not manipulated, and there was no direct involvement with the participants of the study.

2.2 Data Source

The secondary data was acquired from Kaggle with the title Analyze Gender Pay Gap (Anelim288, 2025). The data set comprised 1000 employee observations for demographic data, occupational data, performance data, and compensation data. The data were rich enough at the employee level to allow for analysis of differentials in base pay, bonuses and total compensation between males and females.

2.3 Study Variables
The dependent variables consisted of BasePay, Bonus and total compensation (BB), which is the sum of BasePay and Bonus. Gender was considered as main explanatory variable. Other explanatory variables were age, performance evaluation, education, department, seniority and job title. An additional description variable of dismissal status (Dismissal_2) was also included in the data set, if it was applicable to employee characteristics.

2.4 Data Preparation
The data set was checked for completeness of data, type of data, data coding consistency, missing variables, and duplicate observations for the purposes of statistical analysis. There were no values missing or duplicate records found. Categorical variables (gender, education, department, job title) were tested for consistency of classification. The BB variable was also verified as total compensation by checking if it is equal to the sum of BasePay and Bonus for each employee record.

2.5 Statistical Analysis
The employee and occupational characteristics were summarized using descriptive statistics, where categorical variables were presented as frequencies and percentages and continuous variables were presented as mean ± standard deviation or median (interquartile range). Independent-samples t test or Mann–Whitney U test was used to compare compensation measures for men and women employees based on distribution of data. The relationships between numerical variables were examined using Pearson or Spearman correlation analysis. They were separately subjected to multiple linear regression models, using as predictors gender, age, performance evaluation, education, department, seniority and job title. A p-value of < 0.05 was considered significant.

3. Results
3.1 Demographic and Workplace Characteristics
Table 1 shows the demographic and occupational profile of the employees. There were a relatively even split of males and females in this sample, and there was a slightly higher proportion of males. Performance evaluation ratings were similar overall across both genders and age and seniority profiles were comparable. There were also no significant gender differences for educational and departmental distributions. Significant differences between males and females were found between occupational groups. There was a larger percentage of females in Marketing Associate positions and a larger percentage of males in Manager and Software Engineer positions. The patterns show a significant gender difference in occupational representation in the labour force.

Table 1. Demographic and Workplace Characteristics by Gender

Characteristic	Female	Male
Employees, n (%)	468 (46.8%)	532 (53.2%)
Age, mean ± SD	41.83 ± 13.80	41.01 ± 14.72
Performance evaluation, mean ± SD	2.94 ± 1.43	3.13 ± 1.41
Seniority, mean ± SD	3.01 ± 1.39	2.93 ± 1.40
College, n (%)	123 (26.3%)	118 (22.2%)
High School, n (%)	132 (28.2%)	133 (25.0%)
Master's, n (%)	107 (22.9%)	149 (28.0%)
PhD, n (%)	106 (22.6%)	132 (24.8%)
Manager, n (%)	18 (3.8%)	72 (13.5%)
Marketing Associate, n (%)	107 (22.9%)	11 (2.1%)
Software Engineer, n (%)	8 (1.7%)	101 (19.0%)

3.2 Gender Differences in Employee Compensation
A summary of the comparison of compensation measures by gender is provided in Table 2. There were significant differences in average base pay and total compensation between males and females, with males having higher amounts. However, bonus payments were quite comparable for both gender groups, and not significantly different. This is reflected in the findings that the gender divide in overall compensation is primarily in base salary and not in the allocation of bonuses.

Table 2. Gender Comparison of Compensation Measures

Measure	Male, mean ± SD	Female, mean ± SD	Mean Difference	p-value
Base Pay	98,457.55 ± 25,517.52	89,942.82 ± 24,378.28	8,514.73	<0.001
Bonus	6,461.13 ± 2,001.76	6,474.01 ± 2,009.47	-12.88	0.919
Total Compensation	104,918.68 ± 25,329.57	96,416.83 ± 24,202.16	8,501.85	<0.001

Figure 1 shows the pattern of the mean compensation for different genders. As can be seen from the visual comparison, the average base pay and overall the compensation of male employees was higher, while the mean bonus was almost the same for both genders. This indicates that the overall compensation gap was largely due to base salary and not bonuses.

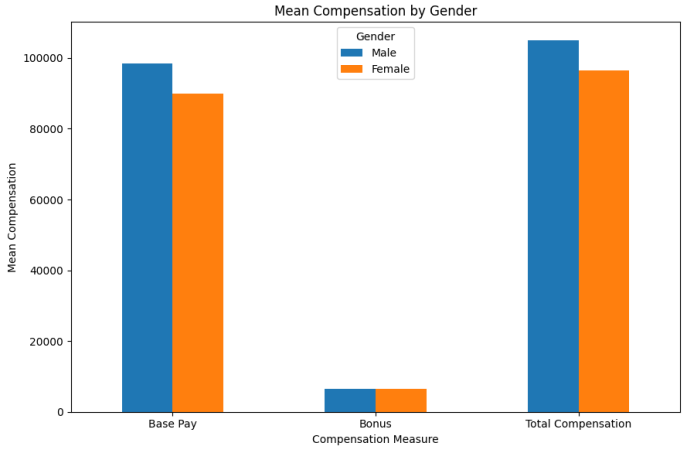


Figure 1. Mean Compensation by Gender

The figure illustrates the difference between fixed and variable compensation. Base rate was also a factor in the difference in total earnings between males and females, but bonuses were not as different between the genders, suggesting a more similar distribution of bonuses across gender groups.

3.3 Relationships Between Employee Characteristics and Compensation

A correlation analysis was used to explore relationships between employee characteristics and compensation measures. Age and seniority were positively related to base pay and total compensation, indicating that compensation generally increased with age and seniority as shown in Figure 2. Performance evaluation had a relatively low correlation with base pay and had a high positive correlation with bonus. Bonuses were not so, however; they were negatively related to age.

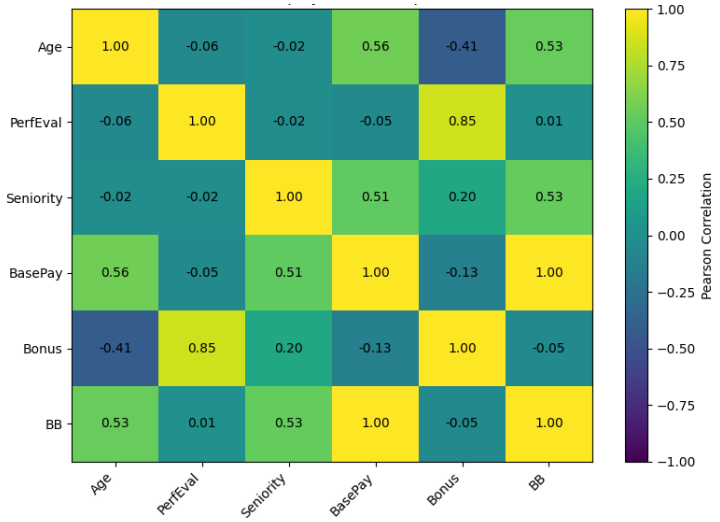


Figure 2. Correlation Heatmap of Employee and Compensation Variables

The correlation between base pay and total compensation was also extremely high as illustrated by the heatmap, suggesting that base pay was the main driver of total employee compensation. There were relatively weak correlations between base pay and total compensation and bonus payments. In general, the correlation pattern indicates that various types of compensation were more related to certain employee characteristics and other characteristics were more related to other types of compensation (e.g., age and seniority were more strongly related to fixed compensation components and performance evaluation was more strongly related to variable compensation components).

3.4 Factors Associated with Base Pay

Table 3 displays the results of the multiple linear regression for base pay. The overall regression model was significant and accounted for a large amount of variance in employee base salary. Once demographic and occupational characteristics were controlled for, the relationship of gender and base pay was not significant. Significant predictors were age, seniority, higher educational qualifications, selected departments and a number of job titles. Base salary had a positive correlation with Manager and Software Engineer positions, while Marketing Associate and Driver positions had less adjusted base salary than the reference position. However, after controlling for the other variables, performance evaluation was not a significant predictor of base salary.

Table 3. Multiple Linear Regression Predicting Base Pay

Predictor	B	SE	p-value

Male gender	777.79	714.38	0.277
Age	999.59	22.48	<0.001
Performance evaluation	-31.25	227.74	0.891
Seniority	9,621.88	231.03	<0.001
Master's degree	4,725.32	912.61	<0.001
PhD	5,824.66	927.86	<0.001
Engineering department	3,146.07	1,034.45	0.002
Management department	2,703.95	1,030.98	0.009
Sales department	6,294.74	1,018.66	<0.001
Manager	31,556.78	1,468.53	<0.001
Marketing Associate	-16,590.50	1,383.05	<0.001
Software Engineer	13,283.15	1,410.38	<0.001

3.5 Factors Associated With Total Compensation

Table 4 presents the results for the adjusted determinants of total compensation. The regression model was able to account for a high percentage of the variation in overall employee compensation. Again, like the base-pay model, gender was not significant when account for employee and occupational characteristics. Total compensation was found to be positively predicted by age, seniority and performance evaluation. More education and working in particular departments also correlated with higher salaries. The job title had strong associations in particular, with Manager and Software Engineer jobs having an increased adjusted compensation and Marketing Associate and Driver roles having a decreased adjusted compensation. These findings suggest that much of the unadjusted gender difference was due to differences in occupational and employee characteristics.

Table 4. Multiple Linear Regression Predicting Total Compensation

Predictor	**B**	**SE**	**p-value**
Male gender	392.32	715.80	0.584
Age	948.95	22.53	<0.001
Performance evaluation	1,156.88	228.19	<0.001
Seniority	9,903.71	231.49	<0.001
Master's degree	4,718.00	914.42	<0.001
PhD	6,026.29	929.71	<0.001
Engineering department	3,267.94	1,036.51	0.002
Management department	2,957.83	1,033.03	0.004
Sales department	6,193.50	1,020.68	<0.001
Manager	31,601.20	1,471.45	<0.001
Marketing Associate	-17,013.78	1,385.80	<0.001
Software Engineer	13,386.52	1,413.18	<0.001

4. Discussion

The gender difference in this study was examined in terms of total wage, base wage and bonuses, and employee and occupational characteristics were controlled. There was a difference in base pay and total compensation between men and women, which was not adjusted. The amount of bonus, however, was relatively comparable between the two groups, so that the amount of base salary received would account for most of the difference in total pay. Occupational Distribution was also profoundly distinct for each gender across the various occupations, particularly for Manager, Marketing Associate and Software Engineer. This indicates that there may be an important gender difference in the allocation of jobs.

Correlation results additionally revealed that compensation was connected in various ways with various characteristics of the employees. Overall, fixed compensation was found to be positively correlated with age and/or seniority, such that higher base pay and overall compensation were related to higher age and/or seniority. Evaluation of performance, however, was quite highly correlated with bonuses, and somewhat less with base pay. This separation suggests that there is a separation between base pay and variable pay, and that the method to determine the two is different. The regression results were especially significant, as gender was no longer significant when taking into account age, education, department, seniority, performance, and job title. Consequently, much of the raw difference in these data appears to be related to the employee/occupational characteristics and not just to gender.

Results are similar to earlier research which showed that part of the gender gap in wages could be explained by the occupational sorting of women and men, and by characteristics of their work. Cutillo and Centra found that the gender wage gap was attributed to the occupational choices and family-related employment patterns, which highlights the importance of labor-market positioning in explaining the gender wage gap (Cutillo & Centra, 2017). In the same manner, it was found that the magnitude of the gender wage gap among health care workers is influenced by differences in occupations or educational attainment, indicating that it is crucial to consider job-related characteristics in addition to overall salary comparisons (Dill & Frogner, 2024).

The significant variations found between occupations in the current study also reflect the evidence of occupational sex segregation and wage inequality. Freeland and Harnois discovered gender structures in wages are related to

occupational-level gender composition as well as gendered cultural processes (Freeland & Harnois, 2020). Similarly, Ismail et al. found that occupational segregation is one of the factors contributing to the gender wage gap in Malaysia (Ismail et al., 2017). The lack of significance of the gender coefficient can also be corroborated by the findings of the studies which indicate that differences in the wage structure and the characteristics of workers account for the majority of the wage gap observed (Rotman & Mandel, 2023). Meanwhile, the methodological decisions can have a significant impact on the gender pay gap estimates, and it is crucial to make the distinction between raw and adjusted estimates (Strittmatter & Wunsch, 2021).

The findings have a number of implications for workplace compensation management. For organisations it is not enough to measure pay equity based on the average of male and female salaries. Access to higher paying occupational categories, job title, seniority, education should also be considered in pay audits. The high score for job title reflects the fact that job title and recruitment, promotions and career progression procedures could be as important as salary setting procedures in explaining variations in compensation. Organizations can thus gain from clear guidelines and procedures for promotions, uniform wage bands and periodic pay reviews within jobs. Given the close linkage between bonuses and performance appraisal, well-defined and consistently applied performance measures can also contribute to variable compensation fairness.

The results must be viewed in the context of certain limitations. Secondary cross sectional data were used and so cause-and-effect relationships cannot be determined. Factors that may be important, such as years of experience, hours worked, years in job, family needs, interruptions in career, negotiation style and promotion history, are not included in the data. Thus, the modified models are not able to explain every possible factor that contributes to compensation. The dataset also does not provide the gender categories for more detailed analyses of gender diversity. Further, the results from this particular sample of employees may not extend directly to other countries' labor markets, industries, or organizations.

Future studies are needed to examine the dynamics of gender pay gaps using larger and more diverse (preferably longitudinal) data sets. Other factors, including promotion experience, work hours, job location, family employment patterns and experience should be added. A future study to consider is the pay disparity at the occupation level or department level as well as overall pay disparity level. The longitudinal information on promotions, pay increases and career changes would be of great value to determine if there are gender disparities in initial pay, distribution of occupations, likelihood of promotion and/or progression of careers.

5. Conclusion

The analysis in this study included examining the difference between genders of base pay, bonuses and total compensation and incorporated the demographical and occupational factors. The results showed that there was no significant difference in bonuses for male and female employees, but male employees did earn more in base pay and total compensation. There was also an imbalance between the number of men and women in specific occupations such as Manager, Marketing Associate, and Software Engineer. Results of the correlation analysis indicated that age and seniority positively correlated with base pay and total compensation, and performance evaluation strongly correlated with bonus. The results indicate that different characteristics of employees affected the fixed and variable compensation. Important, the multiple regression model indicated that after controlling for other factors (age, performance, education, department, seniority and job title), gender was not significant in predicting the base pay or total compensation. Instead, factors that were significant in compensation were age, seniority, education, department and job function. In general, the findings suggest that in this data, the raw-gender pay gap was mostly driven by factors related to employees and jobs, as opposed to gender. The study results highlight the importance of taking the occupational distribution, promotion opportunities, and remuneration structures into account when assessing workplace pay inequities and working towards more equitable and transparent remuneration structures.

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