

# Empirical Investigation of Gender Pay Gap in Faculty Salaries

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## ***Abstract***

*Research on gender wage disparities reveals persistent global inequality across sectors and time. A long time has passed since 1979 when the U.S. Bureau of Labor Statistics first reported a 38% gender earnings gap. In academia, early 20th-century data showed only 1% of academic roles held by women globally, rising to 11% by 1969. A recent 2023 study of 7,000 universities worldwide identified enduring disparities in hiring, publications, citations, and promotions, though gaps in citations and promotions have narrowed over time. The current case study of a historically Black university found no gender wage gap but highlighted salary compression for long-serving faculty, with mobility and discipline influencing salaries. Fields in Marketing, Management, and Computer Science commanded higher wages, driven by rank and specialization. Regional studies in Louisiana show faculty salary disparities are smaller than general workforce gaps, emphasizing the importance of occupation-specific analysis. Adjusting for rank, experience, and discipline often renders gender pay gaps statistically insignificant. However, unexplained gaps persist, demanding ongoing research and tailored interventions to address inequality comprehensively.*

*Key terms: Gender, academia, salary, wages, pay gap*

## **Introduction**

The discourse surrounding gender wage disparities has been extensively analyzed across contexts, sectors, and regions, with studies providing historical, organizational, and systemic perspectives. Since 1979, when the US Bureau of Labor Statistics first compared male and female earnings, data revealed a stark 38% earnings gap favoring men (Statistics, 2023). In academia, early 20th-century discriminatory practices were evident, as only 226 women held academic roles globally, accounting for just 1% of the workforce. By 1969, this number had risen

to 11%, reflecting incremental progress (Iaria, Schwartz, & Waldinger, 2023). These findings underscore the long-standing, global nature of gender wage inequality. A 2023 study of academics at 7,000 universities in 130 countries across the globe spanning the 20<sup>th</sup> century found significant gender gaps in four key areas—hiring, publications, citations, and promotions. However, these gaps varied greatly across countries, disciplines, domains, and time periods. While gender disparities in citations and promotions have diminished to zero by the century's end, notable gaps persist based on hiring practices and publications (Iaria, Schwartz, & Waldinger, 2023)

In the United Kingdom, at a British post-1992 university, women were channeled into undervalued teaching and administrative roles, hindering their career progression. Emotional labor and gendered expectations perpetuate these inequalities, highlighting the need for systemic change (Crabtree & Shiel, 2019). Subsequent research on two Russell Group universities highlighted how organizational definitions of "merit" perpetuate wage disparities. While occupational segregation and human capital differences account for much of the variation, intersecting factors such as age and disability only heightened disadvantages. Despite initiatives promoting equality, pay structures based on "meritocracy" reinforce systemic biases, often leaving female academics to mitigate disadvantages (Woodhams, Trojanowski, & Wilkinson, 2022).

In Estonia, the gender pay gap in academia is influenced by the child penalty and bargaining power. Administrative data from the University of Tartu revealed that mothers faced no hourly wage penalty but lost two years of full-time work over four years due to reduced hours (Masso et al., 2024). The motherhood penalty was also underscored in Japan where female physicians would earn 25% less than their male counterparts due to their primary role as caretakers (Nishida, Usui, Oshio, Masumori, & Tsuchihashi, 2024). A study using data from 5,000 Master's Degree graduates in Germany found a significant wage gap even at the first employment, before most family-related decisions occur. Interestingly, the gap narrows in the first year as women benefit more from job and occupational changes, likely addressing skill mismatches, before gradually widening over time (Sandner & Yükselen, 2024). Weaker bargaining skills among women also contribute significantly to the pay gap, emphasizing the need for institutional support to address these disparities (Masso, Meriküll, Roosaar, Roigas, & Paas, 2024). At the University of Galway, a 2022 study reported a mean gender pay gap (GPG) of 21.3% and a median GPG of 5% for academic staff, underscoring the importance of using both metrics for a comprehensive analysis. Efforts to reduce the GPG have focused on academic promotions, but disparities persist among professional, managerial, and support staff, necessitating targeted interventions (Loftus, Madden, Scott, Cooke, & McNicholas, 2023).

Despite Iceland's leadership in gender equality, disparities among doctorate holders in STEM and SSH fields persist. Women benefit financially within academia early in their careers but experience greater financial gains outside academia later. Structural barriers, including vertical labor market segregation, contribute to these gaps, even under Iceland's Equal Pay Standard (Staub, Hjalmsdottir, & Rafnsdottir, 2024). In China, the gender wage gap has widened due to

structural and discriminatory factors, such as occupational segregation and rising demand for young, educated workers. Discriminatory practices identified through Blinder–Oaxaca and Juhn–Murphy–Pierce decompositions further highlight systemic issues driving inequality (Liao, 2024).

More than a decade has passed since the 2017 Blau and Kahn study examining Panel Study of Income Dynamics data from 1980-2010 found that industry and gender roles were key contributors of the gender wage gap, particularly in high-skilled jobs where workforce interruptions and shorter hours for women played a role in wage disparities (Blau & Kahn, 2017). Implicit bias accounted for wage differences of Marriage and Family Therapy Faculty where women had less peer-reviewed publications and time spent in the field, resulting in lower wages (Edwards, Torres Bernal, & Culver, 2022). Smith-Carrier, et al. (2021) found significant wage disparities in favor of male professors at universities in Canada, whereas in the United States, organizational priorities, such as an emphasis on science and engineering, also impact pay gaps, with systemic inequities persisting despite efforts to promote equity (Smith-Carrier, Cecala, Penner, & Agocs, 2021; Johnson & Taylor, 2018). At Ohio State University, an analysis of tenure-track faculty salaries between 2006 and 2016 found a 21.4% wage disparity, narrowing to 5.26% after adjusting for rank and job characteristics, though systemic biases in promotions remain (Chen & Crown, 2019). When tenured faculty from 15 institutions of higher education in the Western United States were examined with regards to the impact of salary negotiations on their initial salary as well as at the time of their tenure, holding other factors constant, women were found to earn \$7,350 less than men (Kilmer, McCauley, & Busacca, 2023). Other factors contributing to the gender pay gap among academic economists using data from faculty in agricultural/applied economics and economics departments at major public universities points to a raw gender pay gap of 12.8%, but after accounting for rank, experience, and university, it narrows to 4.1% when comparing faculty of Agricultural/Applied Economics and an 8.3% gap Economics Faculty. A key difference is that female associate professors in agricultural/applied economics are paid as much as or more than their male counterparts, unlike their counterparts in economics departments (Kim, Chen, & Weinberg, 2023). Recent studies confirm persistent gender wage gaps among academic faculty. For instance, women earned 12% less than men, with disciplinary differences accounting for some of the variation. Structural barriers, such as the "leaky pipeline" phenomenon, exacerbate these gaps, particularly in STEM fields which are typically male-dominated (Lu & Hannig, 2024). Other studies highlight the nuanced nature of gender pay disparities. At Simon Fraser University's Beedie School of Business, performance-based controls revealed that female academics earned higher salaries than males once research productivity and other factors were accounted for (Gordon, Hrazdil, & Spector, 2024).

Regional comparisons further illustrate the variability in gender pay gap study results. In Louisiana, faculty salary disparities are significantly lower than the 31% gap observed across all occupations, demonstrating the importance of occupation-specific analyses. Findings suggest that discipline and rank often explain salary differences, underscoring the risks of broad generalizations in gender pay studies (Humphries, Johnston, & Parker, 2021; Johnston et al., 2023). Similarly, an 18% unadjusted gender pay gap reported by the AAUP becomes statistically insignificant after accounting for experience, rank, and specialization, highlighting the role of

market-driven hiring practices in shaping pay disparities (Humphries, Johnston, & Nelson, 2023). Most recent research underscores our prior findings, whereas omitted variable bias in gender pay studies can be reduced when methods from causal inference research are adapted (Vafa, Athey, & Blei, 2024).

Overall, these studies emphasize the complexity of addressing gender wage inequality in academia. While some disparities can be attributed to rank, discipline, and institutional priorities, some unexplained gaps persist, necessitating sustained research and targeted interventions.

## **Methodology and Results**

Faculty demographic and salary data was obtained from a historically black university located in the South. The goal of the study was to explain differences in salaries among faculty at the university. One possible difference investigated was the gender pay gap. The study also investigated differences in salary due to discipline, rank, and years of experience.

The first regression divides the faculty by their broad discipline area of teaching. The university has four colleges: Arts and Science, Business, Education, and Professional Studies. Additionally, the rank of the faculty is included in the regression. This university has four levels of rank: Instructor, Assistant Professor, Associate Professor, and Full Professor. This first regression equation is as follows:

$$\text{Salary} = f(\text{Intercept, Gender, Full, Assoc, Asst, Admin, G\_Exper, T\_Exper, Busn, Educ, Prof})$$

Where Gender = 1 for female and 0 for male, Full = Full Professor, Assoc = Associate Professor, Asst = Assistant Professor, Admin = Administrative 12-mth position, G\_Exper = years of experience at current institution, T\_Exper = totals years of experience, Busn = College of Business, Educ = College of Education, and Prof = College of Professional Studies.

The dependent variable (Salary) is the 9-month salary of faculty members at the university. If a faculty member was on a 12-month contract, the adjusted 9-month salary was used. Therefore, the coefficients are in dollars of a 9-month salary. A variable (Admin) was included to allow for a 9-month pay difference for 12-month faculty who are typically in administrative positions. These positions typically require additional hours on campus to fulfill the requirements of the administrative position. We would anticipate an administrator's 9-month salary to be higher than a regular 9-month employee's due to the additional time requirements and responsibility related to an administrative position.

The results of this regression are available in Table One. The R-squared is .46, indicating that the variables in the equation explain 46% of the variance.

The Intercept value in the regression equation gives the average salary of a male, Arts and Sciences Instructor with zero years of experience. The expected salary is \$44,076.08 and is statistically significant at the 99% level of confidence, with a t-value of 10.79.

Gender has two values: 0 if male and 1 if female. The coefficient Gender's value is \$1,075.22. This is an unexpected positive value indicating that female faculty make \$1,075.22 more than their male counterparts on average. However, with a t-value of 0.59, the coefficient is not statistically significant.

The variable to account for a 12-month position for a faculty member (Admin) is a binary variable. The variable Admin is 0 if the faculty member is a 9-month employee and one if the faculty member is a 12-month employee. The coefficient value of Admin is \$1,315.57. A positive coefficient would be expected to compensate the employee for additional responsibilities and time requirements; however, the coefficient is statistically insignificant with a t-value of 0.57.

Two variables are included in the regression equation to test for the importance of experience in salary determination. One of the variables is the number of years of experience at the current institution (G\_Exper). The G\_Exper variable has a coefficient of -\$342.70, which indicates for every year of employment at the current university, the faculty member's salary becomes \$342.70 lower. This variable is statistically significant at the 99% percent confidence level with a t-value of -3.36; therefore, interpreting this coefficient is important. There is no history of explicit pay reductions at this institution. What is occurring at this institution, like many institutions, is that yearly pay raises, if they occur, are not keeping up with the academic salary market for new hires. Newly hired faculty will likely be paid a competitive salary, but with every passing year, existing faculty will fall behind the market. The other experience variable is the total years of experience at all institutions (T\_Exper). The coefficient of T\_Exper is \$316.65 with a t-value of 2.96, which makes it statistically significant. Unlike the G\_Exper variable, experience at other institutions does increase faculty pay. This can be interpreted that faculty who change jobs are rewarded financially for their experience. Faculty changing jobs can benefit from the current market salaries being offered and thus enjoy at least a boost in salary due to their experience. However, the two experience variables lend credence that faculty must be willing to change jobs and, therefore, change institutions of employment in order to try to keep up with market salaries. Unfortunately, staying at the same institution for an extended period of time leads to salary compression.

The rank of the faculty contributes to the salary in a statistically significant way. The coefficients for Full, Associate, and Assistant are \$21,000.80, \$13,423.28, and \$10,393.58, respectively. All of the rank coefficients are statistically significant. The results indicate, as would be expected, that a higher rank yields higher pay.

The next set of variables assign general areas of teaching to each faculty member by using the college designation that they are a part of (Busn, Educ, Prof). For the College of Business variable (Busn), the coefficient is \$15,809.13 and statistically significant at the 99% level of confidence with a t-value of 5.54. Being a faculty member within the College of Business yields, on average, a \$15,809.13 boost in 9-mth pay over the salary of an Arts and Science faculty member. The College of Education (Educ) and College of Professional Studies (Prof) coefficients are also positive but notably smaller than the Busn variable (\$2,685.04 and \$489.53, respectively). Not only are the coefficients smaller than the Busn variable, they are statistically

insignificant. Statistically speaking, the average faculty salary of the College of Arts and Science does not differ from the salaries of the College of Education and the College of Professional Studies at this university.

Table One:

Variable	Coefficient	T-value
Constant	\$44,076.08	10.79*
Gender	\$1,075.22	0.59
Admin	\$1,315.57	0.57
G_Exper	-\$342.70	-3.36*
T_Exper	\$316.65	2.96*
Full	\$21,000.80	4.96*
Associate	\$13,423.28	3.39*
Assistant	\$10,393.58	2.74*
Business	\$15,809.13	5.54*
Education	\$2,685.04	1.10
Professional	\$489.53	0.22
**" denotes a 99% level of statistical significance		

In an effort to explore the importance of the area of teaching to salaries, actual academic department variables replace the general college designations used in the first regression. This second regression is as follows:

Salary = f(Intercept, Gender, Full, Assoc, Asst, Admin, G\_Exper, T\_Exper, MgtMrkt, Acct, Curri, Kines, Hiedu, SocPsyc, Padm, Hist, Arts, Musc, Engl, Fcsci, Math, Csci, Biol, Nurs, Sowork, Comm, Cjust)

The newly added variables provide designations of teaching disciplines rather than the broader categories used in the first regression. Specifically, MgtMrkt = Management and Marketing, Acct = Accounting, Curri = Curriculum, Kines = Kinesiology, Hiedu = Higher Education, SocPsyc = Sociology and Psychology, Padm = Public Administration, Hist = History, Arts = Arts, Musc = Music, Engl = English, Fcsci = Family and Consumer Science, Math = Mathematics, Csci = Computer Science, Biol = Biology, Nurs = Nursing, Sowork = Social Work, Comm = Communications, and Cjust = Criminal Justice.

The results of this regression are available in Table Two. The R-squared for the equation is 0.63 indicating that 63% of the variance is explained by the variables in the equation.

The intercept coefficient is \$47,132.51. That is, the average salary of a male, Liberal Arts Instructor with zero years of experience is \$47,132.51.

The Gender coefficient is positive, implying that women make more than men; however, it is statistically insignificant. The coefficient is \$729.81 indicating more pay for women on an annual

basis compared to men. These results do not support gender pay disparity. These results also agree with the results from the first regression variation, both in sign and statistical insignificance.

As with the first regression, this regression found the administrative variable to be statistically insignificant with a t-value of 1.51. The coefficient was the anticipated sign and had a value of \$3,255.09.

The experience variables had a similar outcome to the first regression. The coefficient for the years of experience at the current university had a negative sign with a value of -274.43 and is statistically significant at the 99% level of confidence. This indicates the salary compression often experienced by faculty that remain at the same institution. Their salary simply doesn't keep up with market salaries the longer they remain in the same position at the same institution. The total experience variable does have the expected positive sign with a coefficient of \$293.99 and is statistically significant at the 99% level of confidence. That is, for every year of total experience, a faculty member would benefit from approximately a \$300 increase in pay.

Again, the rank of the faculty member is critical to determining salary. The results show, as we would anticipate, that the higher the rank, the higher the pay. The coefficients for Full Professor and Associate Professor are statistically significant at the 99% level of confidence and have values of \$18,225.42 and \$10,839.71, respectively. The coefficient for Assistant Professor is \$6,442.61 and is statistically significant at the 93% level of confidence. These coefficients translate into the amount of additional pay a faculty member would anticipate for ranks above the rank of Instructor.

The more specific areas of teaching indicate some key differences in faculty pay. In short, some disciplines clearly pay higher salaries than the default of English. Specifically, Management and Marketing, Accounting, and Computer Science have the highest salaries, with coefficients showing adjustments of \$15,399.42, \$14,461.27, and \$13,085.47, respectively, over the default of English faculty salary. These higher-paying disciplines show statistical significance at the 99% level of confidence. Two other areas that show additional pay over the base of English faculty salary and are statistically significant are Higher Education, with a coefficient of \$8,993.86, and Math, with a coefficient of \$7,063.31. There are also disciplines that show a statistically significant negative coefficient indicating lower paying disciplines than English. Specifically, the arts discipline had a coefficient of -\$12,661.72 that was significant at the 99% level of confidence. This translates into an expected \$12,661.72 lower salary than an average English faculty person. Criminal Justice and Biology also had negative coefficients (-\$5,718.33 and -\$6,703.46, respectively) that were significant at the 90% level of confidence.

Table Two:

Variable	Coefficient	T-value
Constant	\$47,132.51	10.82*

Gender	\$729.81	0.41
Admin	\$3,255.09	1.51
G Exper	-274.43	-2.83*
T Exper	293.99	2.93*
Full	\$18,225.42	4.58*
Associate	\$10,839.71	2.95*
Assistant	\$6,442.61	1.84**
MgtMrkt	\$15,399.42	3.96*
Acct	\$14,461.27	4.05*
Curri	-\$88.95	-0.02
Kines	\$420.18	0.12
HiEdu	\$8,993.86	2.14**
SocPsyc	-\$5,109.21	-1.28
Padm	-\$4,861.43	-1.25
Hist	-\$3,819.55	-0.79
Arts	-\$12,661.72	-2.90*
Music	\$6,077.10	1.14
Engi	-\$361.58	-0.08
Fcsci	-\$8,880.80	-1.04
Math	\$7,063.31	2.14**
Csci	\$13,085.47	2.82*
Biol	-\$6,703.46	-1.80***
Nurs	\$5,404.52	1.40
Sowork	\$6,6057.52	1.39
Comm	-\$2,175.35	-0.56
Cjust	-\$5,718.33	10.82*
“*” 99% statistical significance; “**” 95% statistical significance; “***” 90% statistical significance		

## Conclusion

The results from the analysis of faculty salaries from a historically black university do not provide evidence of a gender pay gap; however, several interesting findings were evident. The results show that remaining at the same university for an extended time does lead to salary compression as raises do not keep up with market salaries. That is, increasing years of experience at the current university penalizes the faculty member in terms of their salary. However, a faculty member who more readily changes universities can benefit from market salary improvements, as shown by positive salary increases due to total years of experience rather than just years of experience at the current university. The results show that rank and discipline definitely matter. As rank increases, the salary is shown to increase as we would expect.

Additionally, specific disciplines such as Marketing and Management, Accounting, and Computer Science demand significantly higher salaries. These areas are known for their higher market salaries. This study is important in that it shows differences in salary among faculty; however, the differences can primarily be explained by rank and discipline rather than gender.



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