

DOES ONE'S SEX IMPACT PAY? COMPARISON OF TRENDS AMONG DIFFERENT DISCIPLINES IN US PUBLIC UNIVERSITIES

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ABSTRACT

This study investigates the existence of salary disparity in various academic fields by sex, rank, and size of universities. We focus our study on three groups in the following fields: Business colleges; Science, Technology, Engineering, and Mathematics (STEM) programs; and Nursing and Social Sciences programs. The numbers of female and male faculties are approximately the same in these fields (i.e. male-dominant, and female-dominant, respectively). We support our research with an empirical analysis of data gathered from the faculty in these three main disciplines of 4-year public universities in one state in the south-central U.S. in 2018. Controlling for faculty heterogeneity, we use factorial N-way ANOVA for our analysis. Our findings indicate that smaller universities pay less than larger public universities and tenure-track professors earn more than non-tenure-track professors in the College of Business and STEM programs. In the Nursing and Social Sciences Disciplines, we found that women typically earn higher salaries than men at every rank in Tier 3 Universities.

Keywords: Wages, Sex Pay Gap, Academic Disciplines, Discrimination, Faculty Heterogeneity

INTRODUCTION

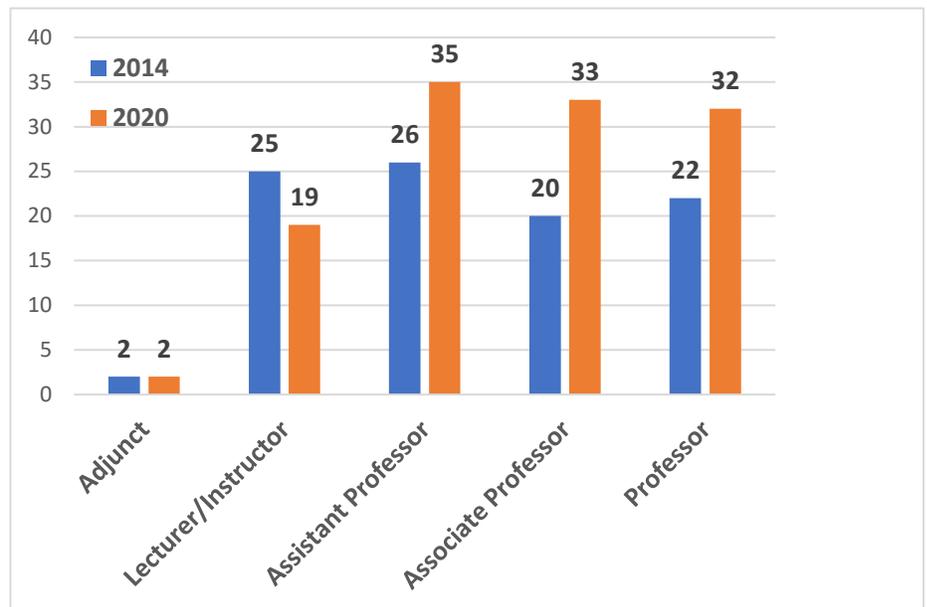
The existence, impact, and measurement of the gender pay gap in the US have been investigated for decades (Olivetti & Petrongolo, 2016; Strittmatter & Wunsch, 2021). However, there remains room for active and innovative research to understand the current trends to inform national and organizational efforts to resolve this issue. Research suggests that, despite the increased participation of women in the labor force, they tend to earn less than their male counterparts (Blau & Kahn, 2017; Ding, Ohyama, & Agarwal, 2021). In this study, we first survey the literature to identify what has been found about the causes of the gender pay gap and any improvements over the years. Even though the study of this topic has been explored across several countries in the world, we will limit our scope to the US. Following our review of existing studies, we will provide new empirical evidence of the extent and trends in the gender wage gap (if any) in the US and their potential explanations.

Recent studies suggest that, for many years beginning in 1955, the ratio of women to men's earnings was about 60%. However, there was an observed steep rise in women's relative pay in the 1980s and a continual but slower and irregular rise thereafter. This trend led to women in full-time jobs earning approximately 79% of what men did annually and about 83% weekly (Blau & Kahn, 2017). We aim to investigate more current trends and discuss possible explanations. Our current study is an update of another conducted in 2014, which was based on data from the faculty

from three different business colleges in Texas at tier 1, 2, and 3 AACSB accredited universities (Lewis & McKinzie, 2019), and another study in 2022 that investigated the existence of pay disparity in colleges of business (McKinzie, Otoo, & Nichols, 2022). We support our current study with updated information from four-year public universities in an entire state in the South-Central US for three major disciplines, namely colleges of business, STEM, and Social Sciences.

As detailed in Figure 1, our initial analysis showed that compared to 2014, the 2020 data showed proportionally more faculty in higher-ranked positions, even with new faculty hires and retirements. Not only were there more higher-ranked positions, but the percentage of faculty positions with women was higher. There was a 3% change in the percentage of female and male faculty members, as the percentage of female faculty members increased from 39% to 42% from 2014 to 2020 with a commensurate decline in the percentage of male faculty members from 61% to 58%.

Figure 1. The comparison of faculty ranks in 2014 and 2020



The previous analysis led us to ask the following research questions:

- What if we take an entire state, rather than just three colleges, and see what is happening?
- Could we also get pay information?
- Would there be differences if we considered the traditional dominant sex of the discipline?
 - Where there are about equal numbers by sex. (Business)
 - Where there are traditionally more men. (STEM)
 - Where there are traditionally more women. (Nursing/Counseling/Social Work – called Social Sciences for this paper)

Based on ANOVA analysis, we seek answers to the above questions. Our ultimate goal is to determine if there are rank and/or salary disparities by sex and compare these disparities by affiliation (discipline) and size of the public universities.

LITERATURE REVIEW

This section provides a review of the literature on the gender wage gap, with an emphasis on US university faculty. In the US, women are significantly underrepresented in the Science and Engineering (S&E) fields (Varma, 2018; Guy, 2022). This trend is observed in both S&E degrees earned and subsequent careers held (Iwasaki, 2015; Ong et al., 2011). In the past two decades, the drivers of women and minority (non-white) underrepresentation in the S&E fields has been extensively studied, however, the findings of such studies have not been successfully applied in

outreach efforts (Aspray, 2016; Varma, 2018). Underrepresentation of women in S&E fields affects high technology firms that will be unable to benefit from women's much-needed talent.

Research suggests that the underrepresentation of women in S&E fields results from the low levels of enrolment in STEM educational programs and not from the lack of women's ability to perform in the fields (Moso-Diez et al., 2021; Diekman et al., 2015). Studies further suggest that women's underrepresentation is attributable to the poor experiences women tend to have in the male-dominated science and engineering fields (Guy, 2022). This can motivate them to seek work in other fields or withdraw from the work field completely to focus on family life (Iwasaki, 2015).

Another factor that causes the wage gap is working overtime. A study by Cha and Weeden (2014) found that overtime work (50 and more work hours per week) and its associated increased wage returns had a significant effect on the gender pay gap. A study found that men were more likely to do overtime work and raise their wages compared to their female counterparts. The effect of overtime work on gender pay disparity was most pronounced in managerial and professional work environments where working long hours is expected and forms part of the organizational culture. With the standard workweek being a 40-hour week and faculty reporting working an average of 61 hours per week, this pay gap should also be notable for faculty (Flaherty, 2014).

The gap further widens for married people and even more for people with children (Goldin & Mitchell, 2017). This is because time-consuming roles are often associated with high wages. However, most individuals find it difficult to combine family life with long hours at work. The impact of marriage and family life on gender wage disparity is especially pronounced in high-prestige occupations (Magnusson & Neramo, 2017). This is because such roles often require time-consuming work arrangements, including demands for constant availability, substantial overtime work, and regular business travel. While the existence of gender wage disparity has been well-researched for prestigious occupations, there is a need for more granular studies which focus on specific fields. For example, academia, though prestigious is also notable for its flexible work schedule with a relatively balanced family and personal life (Crowder & Mouratidou, 2020) as well as having significant control over work travel. Studies however show that even in academia, gender pay disparities persist (AAUW, 2014). A study by Renzulli, Reynolds, Kelly, and Grant (2013) showed institution type and academic rank affect salary interdependently. Further, they found that the locations men and women occupy mediate the effect of gender on pay.

One disparity in pay is the discipline of employment including the different university disciplines (McCarron, 2021). Within universities, pay also is different based on the type of university (Bryant, 2021), namely public, private, independent, or religious. The concern about different pay within engineering and science fields raises the concern over differences based on sex. Within the US, women generally make less money than their male counterparts (Ohyama, & Agarwal, 2021). Some research has shown that women full professors earn more than their male counterparts (Chettri, 2021) however, the existence of controlling for other variables was not evident in that research. Which drove our research to control for some of these variables.

Just as one's pay can be impacted by gender, research has shown that the size of the university can impact one's pay (McCarron, 2021). As one would expect, the smaller the company you work for, the less you get paid (Keenan, 2017). This led us to include a factor to control for the size of the university. In addition to the size of the university, whether this university is research-based or not,

affects faculty salary. A study has shown there is a pay gap for full professor rank over time. In this research, they showed when the institution has greater S&E emphasis this pay gap decreases in comparison to universities with less emphasis on this field (Johnson & Taylor, 2019).

Much research has been done examining the pay gaps of minorities and alludes to this being based on discrimination (Sha, 2019). Focusing on state (public) universities allows us to eliminate another disparity. Research shows that there might be fewer disparities in pay in public universities as the outcomes in litigation appear to favor public sector organizations over private (Terpstra & Honoree, May 11, 2016). When focusing on faculty salaries at public vs private nonprofit universities, there is a distinct increase in the pay scales at the private institutions (Characteristics, 2020) which drew us to limit our research to only public institutions to control for these differences. In addition, women in the public sector can earn a significantly higher wage premium over their private sector counterparts (Mukhtarova et al., September 27, 2021) which might make up for the national lower pay for women. This led us to include controlling for the type of university.

In the U.S., gender pay disparity has been found to widen with age (more so 15 to 20 years after school). Within the academic profession pay increases are primarily tied to tenure-track promotions that are available at scheduled time intervals such as that from Assistant to Associate to Professor. If the pay gap increases with time, then it would also manifest differently at the different ranks. This could be confounded by the assertion that faculty salaries suffer from inversion and compression (Homer et al., 2020) with newer hires earning more than senior faculty who hold a higher rank. Which is the overriding factor? Where are the largest, if any, of the pay gaps? Are they with newer typically more junior in rank) or senior faculty with longer lengths of employment (tied to rank)?

To enter the academic workforce, it is desirable to have a terminal degree. A feat that has seen major strides in recent times (Nerad, 2020). The percentage of women who have been awarded doctoral degrees in the US has drastically increased over the years. For example, in the science and engineering fields, women who received their doctoral degrees increased from 13% in 1970 to 46% in 2018 (Thurgood et al., 2006; NSF, 2019) whereas women in business increased from 1.6% to 42.3% during the same period (National, n.d.). In general, women have earned more than 50% of all doctoral degrees in the US since 2006 (Johnson, 2017). Among these women, only a quarter chose to work in the industry rather than academia (NSF, 2019). However, research suggests that academia has a wider gender pay gap relative to industry (Ding et al., 2021). Our study aims to advance knowledge about the observed trend of the gender pay gap in specific academic disciplines.

METHOD

In this section, we outline the methodological process of our study. We begin by discussing the data source, the variables, and then the examined relationships in the study. We further discuss the variables we controlled for and the analytical methods considered.

Data

We utilized data from four-year public universities in one south-central US state. The data was collected for the year 2018. Since Carnegie no longer utilized the Tier 1, Tier 2, and Tier 3 categorization, we segmented our data based on the Southern Regional Education Board (SREB) categories; Thus, to classify the universities we considered the total student population of each of the colleges (CollegeSimply, n.d.). As seen in Table 1, we saw a clear delineation at the 10,000 and 20,000 student population levels and thus classified the universities by size where 1 is the largest and 3 are the smaller universities. This grouping also matched grouping universities by the SREB categories by grouping the Four-Year 1 university, the Four-Year 2 and 3 universities, and then all of the Four-Year 4 and below universities (Southern, n.d.). As the Carnegie classifications have recently changed to have multiple groupings from the former R1, R2, and R3 classifications, we chose to not use these criteria (The Carnegie, n.d.).

Table 1. Enrollment and Category

2018 Enrollment	Size Category
2,579	3
3,132	3
3,959	3
4,468	3
6,557	3
10,515	2
11,177	2
12,101	2
13,709	2
27,778	1

Table 1 shows the student population by university distribution coloring with enrollments under 10,000 (3) with grey, 10,000 to 19,000 (2) in orange, and (1) 20,000 or more in blue.

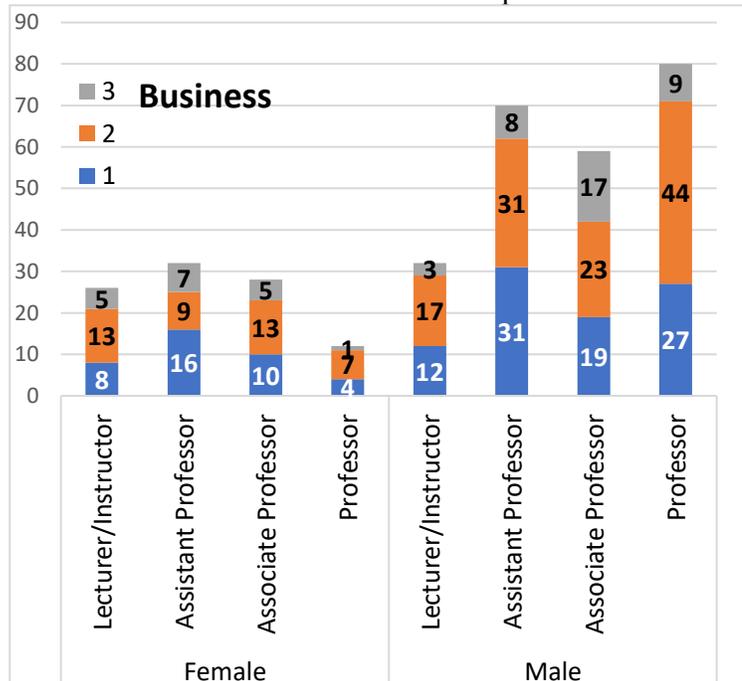
As depicted in Figure 2, we further observed that there were fewer women at higher ranks. These higher ranks also received higher pay. We observed more women at level 3, then level 2, and lastly level 1. The larger schools, higher levels, also paid more. These two criteria alone led us to wonder if it was the school size and rank more than one’s sex driving the pay disparities.

Data Analysis

We used measures of central tendency to compare our data by breaking out the income with our factors (sex, rank, size). This initial exploratory analysis allowed us to understand the relationships and representativeness of the data. Before continuing our analysis, we wanted to ensure our data was representative of our expected population and to understand if there were any gaps or under-represented categories.

We then used an N-way analysis of variance (ANOVA) to test for differences as this allows us to study the influence of multiple independent variables on a single dependent

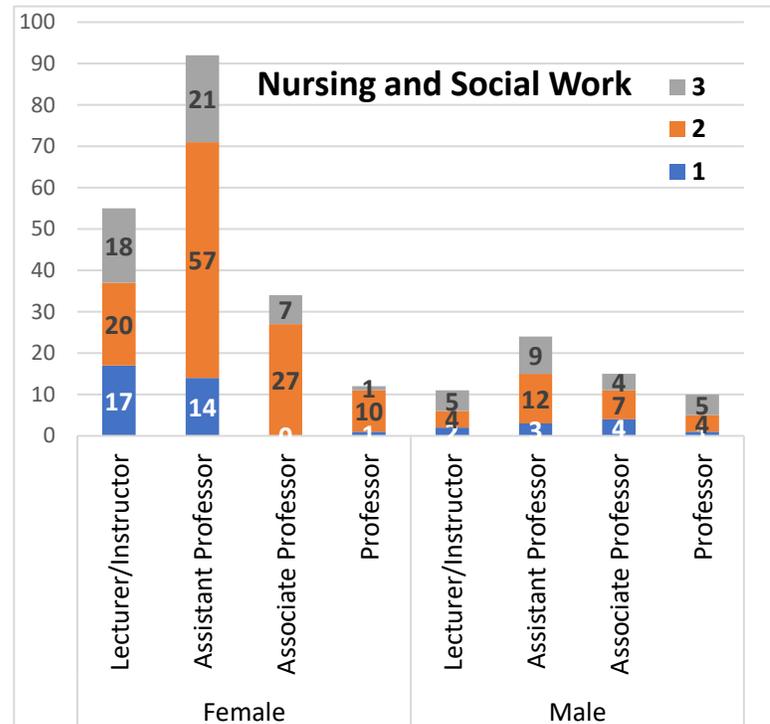
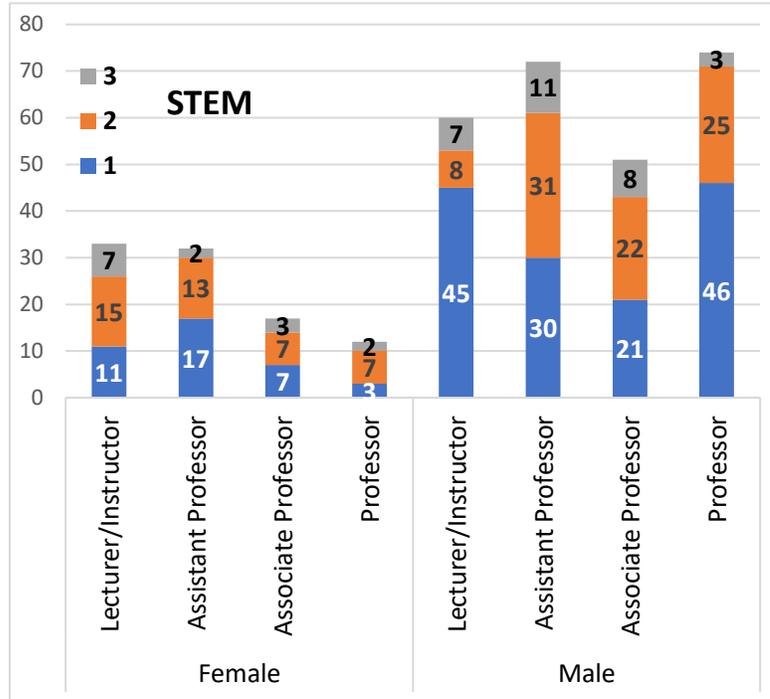
Figure 2. Distribution of faculty by University Level and Sex in Three Disciplines



variable. We had a numerical (interval) dependent variable and three categorical (ordinal and nominal) independent variables. Since we were studying salary (dependent variable) and wanted to control for sex, rank, and university size, this was the most appropriate statistical method. Factorial ANOVA (UCLA, n.d.) specifically allows us to test and partition this data using the Type I, II, and III sum of squares (SS) (Gottingen, n.d.). We had no missing data (empty cells) so Type IV SS was not necessary as this is the same as Type II when there are no empty cells.

The initial analysis using the measures of central tendency confirmed we had unbalanced data as we expected. This led us to consider the interaction effects and if there were impacts from these. Type I SS lets us know if men or women get paid more. We already know that different ranks get paid differently and our data was unbalanced at these ranks, we knew we needed to control for that imbalance (Cooper, 2011). We also hypothesized that people at larger universities get paid more and that was also unbalanced and needed to be controlled for. Thus, although we conducted Type I SS, we were not as concerned with that result. We do note that if there are no interaction effects, then we should rely on Type II over Type III as it will be more powerful. On the other hand, if there are significant interactions, then the main interactions should not be further analyzed.

Once we had the results from the ANOVA, we ran N-Way regression to determine the magnitude of the variable weights. When there were no interaction effects, we could assume that the impacts did not vary within the different variables, e.g. university size where 1 pays more than university



size 2, and lastly university size 3. But when there were interaction effects, the variation in pay became clearer with the regression results.

RESULTS

Data

The data of business and Social Sciences, faculty had interaction effects (Rank*Size) leading us to use SS Type III. The data of STEM faculty had no interaction effects leading us to use SS Type II. Although cursory research may lead one to believe that one’s pay is impacted by one’s sex, when you consider the faculty member’s rank and the size of their school, it is not. There remains a large imbalance in women faculty in STEM and men in Social Sciences across the board. In business (a field where there are approximately equal women/men) the imbalance is observed for women at level 2 and 3 schools and in the higher ranks.

Table 2. College of Business % Women

	1	2	3	Total
Lecturer/Instructor	38%	64%	69%	54%
Assistant Professor	43%	52%	56%	50%
Associate Professor	29%	48%	33%	39%
Professor	12%	28%	15%	20%

In STEM the proportion of women is 27.6% compared to 42% in business. We also observed very few women at the larger schools where the distribution of women by school level was as follows: 33% in level 3, 35% in level 2, and 21% in level 1. The observed distribution of women by rank was: (Lecturer/Instructor) 38%; (Assistant Professor) 31%; (Associate Professor) 25%; (Full Professor) 14%. As expected, the proportion of women in the Social Sciences discipline was significantly higher than men, 73.3%. The proportions of women in the various school levels were as follows: 24% in level 3, 59% in level 2, and 17% in level 1. Similar to STEM we observed a very low proportion of full professors were women in the Social Sciences discipline. The observed distribution of women by rank in the field is as follows: (Lecturer/Instructor) 28%; (Assistant Professor) 48%; (Associate Professor) 18%; (Full Professor) 6%.

Table 3. STEM % Women

	1	2	3	Total
Lecturer/Instructor	20%	70%	50%	38%
Assistant Professor	36%	30%	15%	31%
Associate Professor	25%	24%	27%	25%
Professor	6%	22%	40%	14%

Table 4. Social Sciences % Women

	1	2	3	Total
Lecturer/Instructor	40%	28%	77%	44%
Assistant Professor	33%	81%	90%	75%
Associate Professor	0%	38%	30%	30%
Professor	2%	14%	4%	9%

Our results suggest that significant imbalances exist for Business, STEM, and Social Sciences faculty. This confirmed the need for statistical research. Tables 2, 3 and 4 summarize our observations and show the percentage of women by rank and university size for the three different college groupings. Of note are the smaller percentages of women in STEM.

SS Type I

The analysis of the data from business and Social Sciences showed interaction effects (Rank*Size) leading us to use SS Type III. However, the data of STEM faculty had no interaction effects leading us to use SS Type II for that analysis. But let’s start with discussing the Type I results and why they might often bias one’s conclusions.

If a researcher did not consider the imbalance in the different factors, they may decide to only use an ANOVA SS Type I. In this case, they might only consider the 1-way ANOVA depending on their variable of focus. If they limited their research to differences in sex, then they would conclude there are differences and women are underpaid. As seen in Tables 5 and 6, all three variables (sex, size, and rank) are significant. In Table 7, sex was not significant.

Even if they considered 2-way or full factorial ANOVA, they might conclude that there are differences based on sex if they did not consider the interaction effects because both sex*size and size*rank were significant. However, SS Type I is not an appropriate method when the variables are imbalanced and one should not draw conclusions from Tables 5, 6, or 7.

STEM

SS type II. This method is only appropriate if there are no interaction effects. Our LR

showed interaction effects for Business and Social Sciences faculty, but not for STEM faculty. Therefore, SS Type II is appropriate for STEM. As seen in Table 8, using alpha = 0.05, our findings indicate that all three variables, when considered independently, do impact salary, but not when considered with the other variables. In STEM, men make more than women, faculty make more at larger universities, and (contrary to the belief in salary compression) higher-ranked faculty make more than lower-ranked faculty.

Table 5. Sum of Squares Type I - Business

Source	Pr>F		
	1-way	2-way	Full
Sex	<.0001	<.0001	<.0001
Size	<.0001	<.0001	<.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.001	0.0005
Sex*Rank		0.2479	0.4427
Size*Rank		<.0001	<.0001
Sex*Size*Rank			0.7076

Table 6. Sum of Squares Type I - STEM

Source	Pr>F		
	1-way	2-way	Full
Sex	<.0001	<.0001	<.0001
Size	<.0001	<.0001	<.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.5926	0.5963
Sex*Rank		0.6119	0.6164
Size*Rank		0.9736	0.9744
Sex*Size*Rank			0.9143

Table 7. Sum of Squares Type I-Social Sciences

Source	Pr>F		
	1-way	2-way	Full
Sex	0.1148	0.1015	0.105
Size	0.0002	0.0001	0.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.003	0.0034
Sex*Rank		0.7085	0.7151
Size*Rank		0.0103	0.0118
Sex*Size*Rank			0.9989

N-way regression. Noting that sex, size, and rank were significant, we also ran an N-Way factorial regression model using backward elimination to confirm the impact of each of the variables and their magnitude of impact. Per the SS Type II noted above, the interaction terms were removed, and although not as evident in the SS, the sex variable was also removed in the regression model. The results showed only school size and rank were present in the final model with the scale of impact as we predicted with the larger schools adding to one’s income and the lower ranks taking away from income and no interaction effects (different measures at different ranks or school sizes). The regression model results are noted in Table 9. As seen with the estimate (b) values, the higher the rank and large the school (independent of each other), the larger one’s income.

Table 8. STEM Sum of Square Type II

Source	Pr>F		
	1-way	2-way	Full
Sex	0.0344	0.0479	0.0492
Size	<.0001	<.0001	<.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.6278	0.6313
Sex*Rank		0.5815	0.5863
Size*Rank		0.9736	0.9744
Sex*Size*Rank			0.9143

Table 9. STEM Regression Results rank and size

Predictor	b	95% Confidence Limits		Pr > |t|	beta	sr ²	VIF
		LL	UL				
Intercept	79,988	68,027	91,949	<.0001	0	.	0
Lecturer/Instructor	-35,822	-45,409	-26,236	<.0001	-0.422	0.121	1.566
Assistant Professor	-22,368	-31,769	-12,966	<.0001	-0.271	0.005	1.589
Associate Professor	-18,991	-29,520	-8,463	0.0004	-0.198	0.002	1.472
Professor	0	.	.	.	.	.	.
Size 1	35,828	25,006	46,650	<.0001	0.475	0.123	2.521
Size 2	12,119	943	23,294	0.0336	0.155	0.010	2.506
Size 3	0	.	.	.	.	.	.

Fit statistic: Adj R2 = 0.6620 Note: beta is the standard regression weights. sr² is the squared semi-partial correlation Type I.

Business

SS type III. This method is only appropriate if there are interaction effects. Our ANOVA showed interaction effects noted in Table 10 for Business faculty, so we used SS Type III. In this case, one’s sex was not significant. The size of the university and one’s rank as well as the interaction term size*rank were significant. The interaction means that at different ranks and different-sized schools the pay differences are not the same. So, a(n) Lecturer/Instructor’s income at a Level 1 school might not be the same magnitude in difference from other professors’ income at a Level 2 or 3 school, etc. To understand the impact of these interactions, we ran N-way regression.

Table 10. Business Sum of Squares type III

N-way regression. The only variable that remained in the model was rank*size, the interaction term as shown in Table 11. Although the income of faculty of the same rank is mostly consistently larger at the larger universities, there is one exception and that is for Lecturers at the largest universities. Although there is consistency for all the other ranks, the very first variable (Lecturer/Instructor 1) should be smaller than the two estimates (b) below it if the model held. But it does not and that is why there is an interaction term. Thus, the one violation to pay is larger at larger schools and higher ranks is that Lecturer/Instructors of Business at the largest schools do not.

Source	Pr>F		
	1-way	2-way	Full
Sex	0.4026	0.2478	0.3332
Size	<.0001	<.0001	<.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.2173	0.3112
Sex*Rank		0.5134	0.6236
Size*Rank		<.0001	<.0001
Sex*Size*Rank			0.7076

Table 11. Business Regression Results rank*size

Predictor	b	95% Confidence Limits		Pr > |t|	beta	sr ²	VIF
		LL	UL				
		Intercept	104,015					85,306	122,723	<.0001	0	.	0
Lecturer/Instructor 1	-48,429	38,409	81,800	<.0001	-0.221	0.090	2.823
Lecturer/Instructor 2	-35,932	-16,830	25,466	0.0012	-0.198	0.135	3.646
Lecturer/Instructor 3	-49,379	-37,914	7,212	0.0006	-0.145	0.071	1.758
Assistant Professor 1	35,067	-71,342	-25,516	0.0009	0.235	0.031	4.910
Assistant Professor 2	-4,937	-57,535	-14,330	0.6427	-0.031	0.010	4.410
Assistant Professor 3	-25,748	-77,442	-21,317	0.0367	-0.103	0.024	2.389
Associate Professor 1	60,104	14,465	55,670	<.0001	0.325	0.080	3.566
Associate Professor 2	4,318	-25,854	15,979	0.6882	0.026	0.000	4.112
Associate Professor 3	-15,351	-49,900	-1,596	0.1817	-0.073	0.015	2.992
Professor 1	108,955	87,439	130,470	<.0001	0.608	0.217	3.725
Professor 2	13,535	-6,925	33,996	0.1940	0.094	0.002	5.182
Professor 3	0	.	.	.	.	.	.

Fit statistic: Adj R2 = 0.6620 Note: beta is the standard regression weights. sr² is the squared semi-partial correlation Type I.

Social Science

SS Type III. Social Science disciplines also showed interaction effects, so we used SS Type III for this discipline as well. As with the Business discipline, we had one interaction term of significant concern, size*rank. Unlike the Business discipline, we not only saw size and rank as

significant but also sex. Again, due to the interaction term, running regression allowed us to see what the interaction difference was as well as the magnitude of the parameter estimates.

N-Way Regression. With this regression not only did the rank remain in the model but one interaction term, sex*size. This is the only discipline where the sex variable showed a significant impact in the regression model. Here where we would expect women at medium-sized universities to have a salary between those women at the smaller and the larger-sized universities, they do not. They make less than those at the smallest universities.

Table 12. Social Sciences Sum of Squares type III

Source	Pr>F		
	1-way	2-way	Full
Sex	0.0623	0.002	0.0071
Size	<.0001	<.0001	0.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.0148	0.0928
Sex*Rank		0.4681	0.5346
Size*Rank		0.0103	0.0430
Sex*Size*Rank			0.9989

Table 13. Social Sciences Business N-Way Regression rank and sex*size

Predictor	b	95% Confidence Limits		Pr > |t|	beta	sr ²	VIF
		Limits					
		LL	UL				
Intercept	66,987	61,144	72,829	<.0001	0	.	0
Lecturer/Instructor	-21,601	-27,046	-16,156	<.0001	-0.761	0.136	3.189
Assistant Professor	-16,762	-21,803	-11,721	<.0001	-0.670	0.008	3.519
Associate Professor	-11,307	-16,834	-5,780	<.0001	-0.359	0.012	2.661
Professor	0	.	.	.	.	.	.
Female 1	18,443	12,462	24,425	<.0001	0.492	0.042	2.205
Female 2	10,936	6,022	15,850	<.0001	0.437	0.005	3.335
Female 3	12,702	7,184	18,219	<.0001	0.396	0.061	2.569
Male 1	15,961	7,844	24,077	0.0001	0.250	0.008	1.395
Male 2	10,499	4,438	16,559	0.0008	0.260	0.002	1.954
Male 3	0	.	.	.	.	.	.

Fit statistic: Adj R2 = 0.2501 Note: beta is the standard regression weights. sr² is the squared semi-partial correlation Type I.

Effect Size

In and of themselves these results are interesting, but knowing the effect size in this study also leads to knowing that this research has practical significance. For both size and rank, all the effect sizes were large indicating our conclusions about these two variables for all three disciplines were meaningful. The same could not be said for the sex variable as seen in Table 14.

Table 14. Effect Size

	Size		Sex		Rank	
Business	3.187	(large)	-0.327	(small)	-3.187	(large)
STEM	3.099	(large)	-0.508	(medium)	-3.099	(large)
Social Sciences	4.926	(large)	-0.191	(negligible)	-4.926	(large)

DISCUSSION

Our motivation for this study was to determine if one’s salary was impacted differently in disciplines where they are traditionally more male, more female, or relatively equally represented by sex. Based on our research we felt we should control this study by limiting it to public universities within one state and including variables of university size and faculty rank to limit bias in the data.

Size

The size of the university was significant for all disciplines when considering the Sum of Squares. The larger the university, the more one is paid. The effect size was large for all three disciplines indicating these findings might also be applicable at other institutions.

Rank

Faculty rank was also significant for all disciplines with faculty earning more at higher ranks. This is not consistent with the belief in faculty salary compression.

Sex

A faculty member’s sex was only significant in STEM and Social Sciences, the disciplines where there is typically an imbalance in one’s sex. In business colleges where the proportion of male and female faculty is closer to equal, sex was not a significant factor. Where we wondered if there was a different impact if the discipline was male vs female-dominated, this turned out to not be true with men earning more than women in both STEM and the Social Sciences.

Interactions

The interesting finding was with the interaction terms including size. This interaction further explained what was happening with these variables.

Rank*size. In business disciplines, the non-tenure track faculty (Lecturer/Instructor) at medium-sized universities got paid less than their peers at smaller universities.

Sex*size. In the Social Science disciplines, women at medium-sized universities got paid less than their peers at smaller universities.

With only these two exceptions, this study shows that in general, the larger the university, the higher your rank, and being male all contribute to larger salaries when the sex of the faculty is imbalanced.

Future Work

Impact of COVID-19. Our findings in this study and the impact of COVID-19 in recent years have led us to question if the proportion of women faculty changed since 2019. To answer this question, we look to update our 2018 data with 2021 data to observe the trends and find possible explanations. We will further investigate if there is any gap in the 2021 data. Based on the data we collect, we look to compare the different disciplines.

Other disciplines. This study groups faculty from different colleges to form STEM and Social Science disciplines and combines all faculty from a business college into one discipline. Further research of all faculty including disciplines not included here as well as looking into the disciplines within a business college might reveal imbalances within those disciplines.

Looking broader. This study was limited to one state in the US. An expansion of this study to include either all states from within one region or a representative sample from across the US could not only add to the significance due to a larger sample size but could also make the conclusions more generalizable.

Taking it outside public universities. Where this study solely looked at public universities, controlling for private universities as a variable could add valuable information to differences in public vs private universities. A similar study could be expanded outside universities into public institutions.

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