UNIVERSITY OF CENTRAL FLORIDA

FACULTY SALARY EQUITY STUDY

Summary of the UCF Working Group's Findings and Recommendations

An analysis of 2016-17 academic year salaries for full time, tenured and tenure earning faculty based on salaries and roles as of November 2016. This report includes descriptive and multivariate analyses by rank and summarizes aggregate findings and individual characteristics.

OCTOBER 2017

REPORT PREPARED BY FACULTY SALARY EQUITY STUDY WORKING GROUP
Members include representatives from Faculty Excellence, Faculty Senate, Human Resources, Office of Institutional Equity, and Institutional Knowledge Management

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UCF 2016 FACULTY SALARY EQUITY STUDY

EXECUTIVE SUMMARY

BACKGROUND

This single year "snapshot" study of 2016 tenured/tenure-earning faculty salaries explores salary differences by gender and ethnicity. This research was conducted between April and August 2017 and was informed by equity studies conducted at other institutions. This research does not analyze salary changes over time and does not intend to provide an exhaustive list of factors that contribute to salary differences.

The working group included representatives from Faculty Excellence, Faculty Senate, Human Resources, the Office of Institutional Equity, and Institutional Knowledge Management. The 7 faculty members on the working group represented 5 colleges; ranks = 3 Professors, 1 Associate Professor, 1 Assistant Professor, 2 Instructor/Lecturers.

The full report includes working group recommendations including replication efforts. The working group also recommends the consideration that sample size may affect significance or lack of significance found among certain groups, urging administration to supplement these analyses with individual level review.

FINDINGS

- **66% of the sample were men, and 66% were white**. Increasing gender and racial diversity emerged by rank, particularly among assistant professors.

- **Female associate professors earn 3.9% less** than their male peers, controlling for college, years as UCF faculty, ranks held, administrative roles, leave, awards, and merit increases ($p < 0.05$).

- **Underrepresented minority associate professors earn 4.8% less** than their white peers controlling for college, years as UCF faculty, ranks held, administrative roles, leave, awards, and merit increases ($p < 0.10$).

- No statistically significant gender or racial differences in salary emerged among full or assistant professors.

- Records of individual faculty whose salary falls below the lowest bounds of predicted salary intervals, based on the control factors, will be made available to appropriate administrators for review of salary.

RECOMMENDATIONS

1. Perform salary equity analyses every 3 to 5 years to monitor diversity and equity in faculty salaries over time, consistent with the UCF mission for equality.

2. The university commit to a plan to impose a salary floor by rank and degree attainment.

3. Conduct administrative review of individual faculty whose salary fall below the lowest bounds of predicted salary intervals, based on the control factors, and commit to alleviating any potential salary inequities among existing employees.

4. Conduct a similar analytic salary study of non-tenure-earning instructors and lecturers, and a follow-on study of salary compression for tenured/tenure-earning faculty.

5. Implement required training for faculty search committees to contribute to the diversity efforts consistent with the UCF mission.

SAMPLE DATA AND METHODOLOGY

Sample	Tenured or tenure-earning faculty employed full-time as of November 1, 2016 (n=935). High level administrative faculty and faculty for MD programs were excluded.
Methodology	This study includes descriptive and multivariate analyses. Three regression models were used to explore the effect of gender and race on salary, by rank. Additionally, prediction intervals were used to identify extreme and cautionary outliers: faculty whose salary was below the lowest predicted value.
Variables	*Dependent* – The logarithm of the 2016 9-month salary (or converted equivalent for 12-month faculty) as of November 1. *Predictors* – gender, race/ethnicity, gender x race/ethnicity *Controls* – college, total faculty years at UCF, number of ranks held at UCF, administrative roles, number of awards earned, number of merit increases, number of times on leave

UNIVERSITY OF CENTRAL FLORIDA
2016 FACULTY SALARY EQUITY

BACKGROUND

The following represents results from an exploration into faculty salaries by gender and ethnicity at the University of Central Florida. This research is being guided by studies conducted at Colorado State University (2017), the University of Missouri (2014), UC Berkeley (2015), and others, with modifications made to reflect the UCF community and available data.

All data are based on salaries and faculty roles for the 2016-17 academic year, excluding any retroactive increases applied after November 2016. This study consists of a single year "snapshot" of faculty salary by gender and ethnicity. It does not analyze salary changes over time among faculty members, nor is it to be considered an exhaustive analysis of the factors that contribute to salary rates and differences.

SAMPLE

A total of 935 full-time tenure/tenure track faculty members are included in three separate analyses by rank, including 282 full professors, 355 associate professors, and 298 assistant professors. Non-tenure-earning and less than full time faculty were excluded from the study. Additionally, College of Medicine faculty for MD programs[1] and faculty who predominantly serve in high level administrative roles[2] were excluded.

Salary and job data were based on the 2016-17 academic year as of November 1, 2016. Any salary increases (retroactive or otherwise) and any tenure status or job status changes applied after this date are not included in this sample. Salary, demographics, and other information on faculty members were gathered from PeopleSoft and Equal Employment Opportunities[3] databases. In order to ensure data integrity, some annual records kept for longstanding employees prior to 2002 may not be included in the sample[4]. However, all awards and pay increases are available for the duration of the employees' time at UCF.

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[1] Faculty whose home department is reported as College of Medicine Clinical Sciences, Internal Medicine, and Medical Education

[2] Administrative faculty whose admin codes include Academic Administrator; Deans (including Assistant and Associate Deans); Vice Presidents (including Assistant and Associate VPs and VPs of Research); President; Provost; and Vice Provost. Administrative faculty whose admin codes include Chair or Director (including Assistant Chairpersons/Directors, Associate Chairpersons/Directors, Coordinators, and Program Directors) remained in the study.

[3] Now called the Office of Institutional Equity

[4] In the current research model, this only affected the number of ranks held at UCF. Counts of rank(s) held prior to, but not during or after, 2002 may not be accounted for in the analysis.

DATA AND METHODS

OUTCOME VARIABLE

The main outcome variable includes the reported 9-month salary for 2016 for each faculty member. Salaries were converted to a 9-month equivalent amount for faculty members on 12-month contracts. Multivariate analyses consider the natural logarithm of the annual salary, which is used to more closely represent a normal curve in the distribution (See Appendix C).

PREDICTOR VARIABLES

Demographics include gender (male and female) and race/ethnicity. The race/ethnicity variable was coded into four categories including White, Asian, Underrepresented Minority, and International. Underrepresented minorities include faculty identified as Black/African American, Hispanic or Latino, American Indian, Alaska Native, or multi-racial. International faculty include all faculty currently identified as "Non-Resident Alien" according to IPEDS definitions ("Definitions for New Race and Ethnicity Categories" n.d.). The multivariate models also include an interaction term between gender and race.

Control Variables include total number of years employed as a faculty member at UCF[5]; total number of distinct ranks that the faculty have held at UCF; college (based on home department assignment); whether the faculty is currently serving in an administrative position (Yes or No); the total number of TIP, RIA, and SoTL awards earned; and the total number of merit pay increases earned (regardless of dollar amount)[6]. The number of times faculty have been away on paid or unpaid leave is also included in the models[7].

ANALYSES

Descriptive, bivariate, and multivariate quantitative methods were used to analyze factors correlated with faculty salaries for the 2016-17 academic year. The multivariate model consists of a linear regression of the logarithms of faculty members' annual salaries. Appendix B includes a detailed table of findings of significance for each variable included in the three rank models, and Appendix C includes a detailed description of the analysis and modeling approaches.

Additionally, predictive intervals were used to approximate the expected salary of each faculty member based on all variables in the model, with the exception of race and gender. Individual faculty members whose actual salary fell below the bounds of the predicted interval ($p < 0.10$)

[5] Calculated as the total number of years that the faculty member has been actively employed as a faculty at UCF, subtracting any "gap" years where the faculty was not actively employed.
[6] Pay increases with Action Reasons including (a) Merit; (b) Merit, Market, Equity Pay Increase; (c) Merit Salary Increase; (d) Out of Cycle Merit Increase; (e) Professorial Excellence Pay; (f) Special Pay Increase; and (g) Counteroffers.
[7] This variable does not include regular annual or sick leave awarded to faculty members but rather serves as a proxy for time off for sabbaticals, parental leave, etc. There were no significant differences identified between leave reasons (i.e. sabbatical vs. FMLA) or leave types (i.e. paid leave vs. unpaid leave). Thus, all leave reasons are counted as one total sum.

were flagged for review. The names and characteristics of these individuals will be made available to appropriate college administrators for review.

National salary data (CUPA-HR, 2017) was also made available by 4-digit CIP code and rank, for descriptive comparative purposes. The distribution of faculty salaries by 4-digit CIP, rank, and college in relation to national distributions will be made available to appropriate college administrators for review.

RESULTS

DESCRIPTIVE ANALYSIS

Overall, approximately two-thirds (66%) of the faculty included in the sample are men, and two-thirds (66%) of all faculty included are white. More than three-quarters of the full professors (76%) are male, and 71% of full professors are white. Approximately two-thirds (66%) of associate professors are male, and 70% of associate professors are white. On the other hand, there is slightly more gender and racial diversity among assistant professors[8]. Men represent 55% of assistant professors, and 56% are white (See Appendix A for descriptive characteristics by rank).

As of November 2016, faculty members included in the sample have been employed as faculty at UCF for an average of 10.8 years. Approximately 8% of the faculty included in this sample were hired in 2016, including nine full professors, nine associate professors, and fifty-eight (58) assistant professors. Approximately 51% of the faculty have been employed with UCF for ten or more years, including 217 full professors, 253 associate professors, and seven (7) assistant professors. Although high level administrators were removed from the current study, approximately 9% of faculty in this sample were serving an administrative role[9]. Approximately 6.5% of faculty members in the sample were employed on 12-month contracts. All salaries reported here include 9-month equivalency for 12-month based employees.

Overall, the median salary for all faculty included in the sample (n = 935) is $92,198. As a group, Asian faculty have the highest median salary ($104,628), followed by white faculty ($92,800) and underrepresented minority faculty ($83,430). As a group, international faculty have the lowest salary ($78,000). Regardless of ethnicity, among the entire sample of faculty, men have a higher median salary ($97,567) compared to women ($80,923). Within each ethnicity, men have higher median salaries compared to their female peers (see Appendix A for median salary characteristics by gender and ethnicity within each rank).

As would be expected, full professors have a higher median salary compared to associate professors, whose median salary is also greater than assistant professors. Among full professors, the median salary among men is approximately $9,000 higher than the median salary among women. The median salary for male associate professors is approximately $7,000 higher than

[8] T-tests were used to identify whether females or minority faculty were disproportionately likely to spend more time in the assistant professor rank. No significant differences were found between groups, regarding time spent in current rank or total years at UCF among assistant professors.
[9] Including Chairperson, Associate Chairperson, Assistant Chairperson; Director, Associate Director, Assistant Director; Program Director; or Coordinator

female associate professors, and male assistant professors earn approximately $4,600 more than female assistant professors, as a group.

Particularly among full professors, colleges with the lowest median salaries are more likely to be female-dominated than those with the highest median salaries. Overall, the proportion of women within each college is gradually increasing, particularly among assistant professors (see Table 1; note that median salary represents the median for all faculty within a college, both male and female).

Table 1 Overall Median Salary and Proportion of College Faculty that are Female, by College and Rank (2016)

	Full Professors		Associate Professors		Assistant Professors	
	Median ($)	% Female	Median ($)	% Female	Median ($)	% Female
CAH	$106,948	29%	$74,925	48%	$59,093	49%
CBA	$225,526	14%	$154,294	15%	$152,363	42%
CEDHP	$112,850	56%	$83,750	53%	$66,000	76%
CECS	$142,722	6%	$106,559	19%	$90,398	18%
COHPA	$120,501	46%	$88,358	46%	$70,000	50%
RCHM	$134,902	20%	$95,793	40%	$72,020	58%
COM	$154,663	18%	$107,672	32%	$76,500	40%
CON	$134,722	80%	$90,000	80%	$78,117	80%
CREOL	$160,227	7%	$112,885	0%	$82,000	14%
COS	$118,762	19%	$83,500	21%	$73,000	43%
INST	$159,608	0%	$94,673	10%	$81,000	38%
Total	$126,436	24%	$87,418	34%	$74,878	45%

MULTIVARIATE MODEL RESULTS

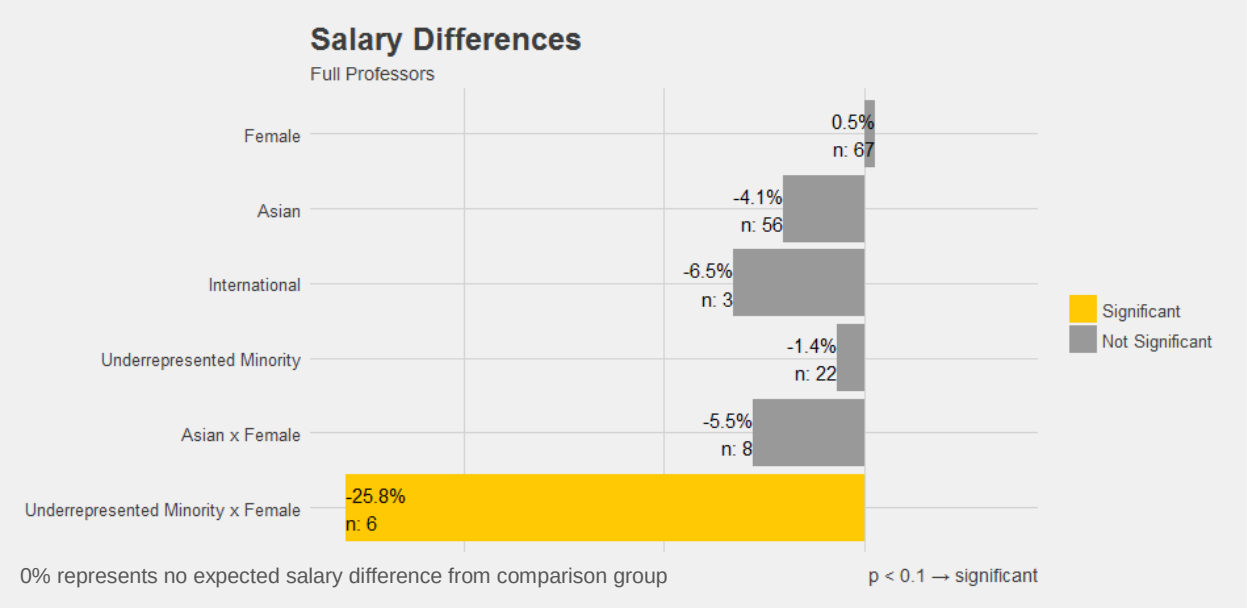
Each of the models presented below highlight the independent effects of multiple factors that may contribute to salary differences among faculty at UCF. The effect of each variable assumes that all other factors are held constant. For example, a comparison between male and female would indicate that those two professors of the same rank are in the same department/college, ethnicity, and so on, where their only distinguishing difference would be their gender. Only variables that are relevant to the aim of the current study (gender and race/ethnicity) are discussed below. See Appendix B for an illustration of the complete regression model and variable significance.

MODEL 1: FULL PROFESSORS

This study did not find a statistically significant difference in salary by gender or ethnicity among full professors. The interaction term for underrepresented minority females was statistically significant ($p < 0.01$), controlling for all other characteristics. However, it is possible that significance is impacted by disproportionately small sample size ($n = 6$) relative to the comparison group, as significant differences among small samples are "more likely to be spurious than with large samples" (Bland, 2008, p. 2). Despite the potential of spurious significance, the names of

these faculty have been made available for review for colleges to identify and alleviate any issues at the individual level.

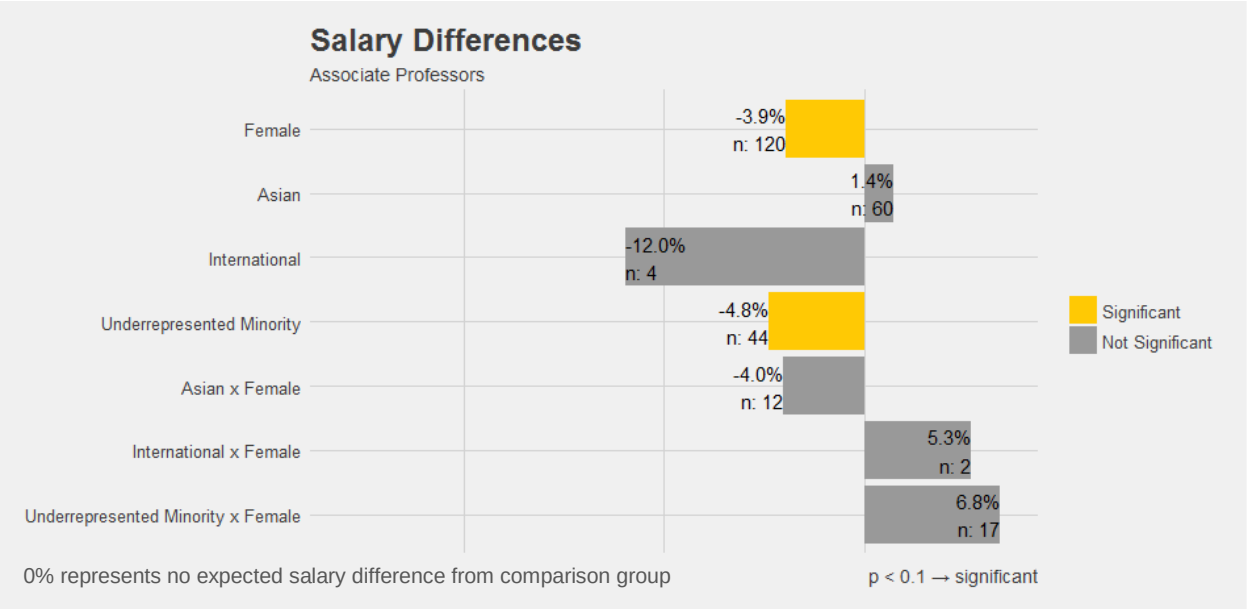
Model 1: Significance of Demographic Characteristics as Contributors to Salary Differences among Full Professors



MODEL 2: ASSOCIATE PROFESSORS

Female associate professors earn approximately 4% less than male associate professors ($p < 0.05$), controlling for all other characteristics. Underrepresented minority associate professors earn approximately 5% less than white associate professors ($p < 0.10$), controlling for all other variables in the model.

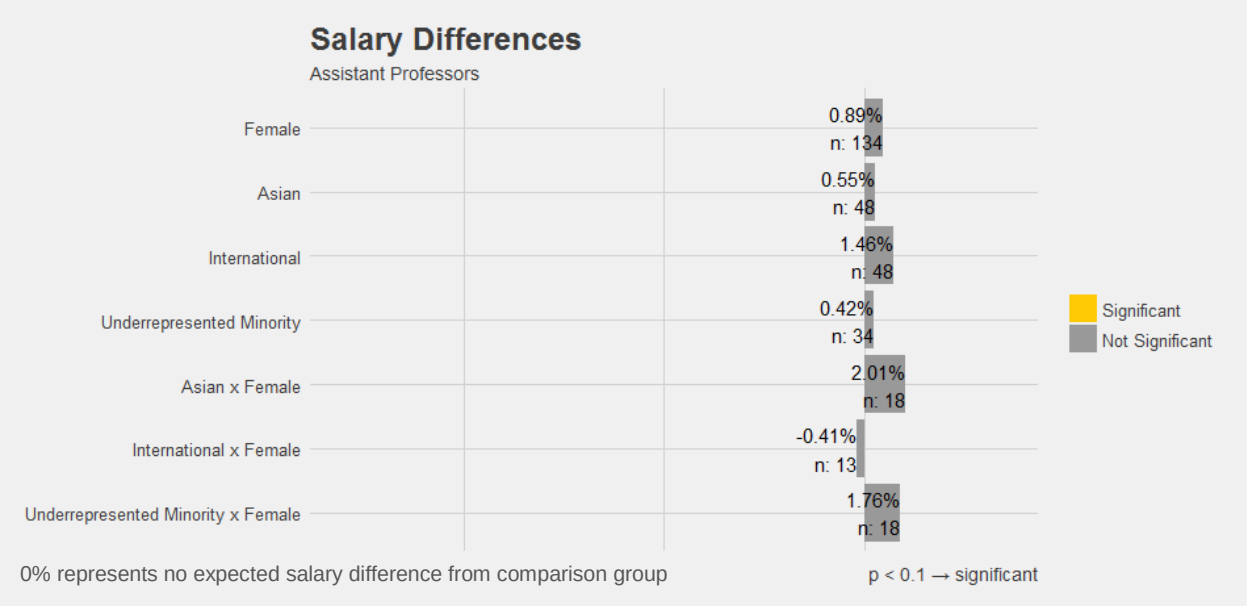
Model 2: Significance of Demographic Characteristics as Contributors to Salary Differences among Associate Professors



MODEL 3: ASSISTANT PROFESSORS

Demographic characteristics were not significant predictors of salary among assistant professors. Colleges and the sum of TIP, RIA, and SoTL awards were the only statistically significant predictors of differences in salary among assistant professors, controlling for all other characteristics. For each additional award received, salary increased by approximately 5%, controlling for all other factors.

Model 3: Significance of Demographic Characteristics as Contributors to Salary Differences



INDIVIDUAL OUTLIERS

A total of 32 faculty members were identified as having a salary below the lowest end of their predicted salary interval. Among them, 18 are considered to have a critical need for salary review

($p < 0.05$) and the remaining 14 are considered to have a cautionary need for salary review ($p < 0.10$). There were no distinct patterns identified by race or gender. Outliers include men (69%) and women (31%), as well as white (72%) and faculty of color (28%)[10]. Outlier faculty are more likely to be assistant (44%) or associate (44%) professors, compared to full professors (12%). Four percent (4%) of assistant professors and five percent (5%) of associate professors are represented among the outliers, compared to one percent (1%) of full professors. Outlier faculty are represented in 18 departments within nine colleges[11]. Approximately 43% of the outlier faculty members' salaries fall below the 10th national percentile for their 4-digit CIP codes. Three outlier faculty have CIP codes with no national comparison data available. Additionally, only four of the outlier faculty earned salaries above the UCF median salary for all faculty[12] within their rank and 4-digit CIP.

CONCLUSION

Despite gains in recent decades, women and minorities remain underrepresented in academia and among tenured faculty (Menges and Exum, 1983; Deutsch & Yao, 2014). Descriptive characteristics suggest that the University of Central Florida (UCF) is making strides to decrease the gender gap among faculty, particularly among more recently hired assistant professors. The proportion of underrepresented minorities is also increasing among assistant and associate professors. However, non-white groups remain underrepresented among UCF faculty, overall.

In the statistical analyses, gender was a significant factor in salary differences among associate professors, controlling for college market differences and other experience and merit-based characteristics that would be expected to contribute to salary differences. Underrepresented minority associate professors also earned less than white associate professors in this model.

There were no statistically significant demographic differences in the full professor model, with the exception of underrepresented minority females. This group warrants further investigation to identify potential salary inequities, however this significance may be partially explained by small sample size. The model-fit for full professors ($r^2 = .60$) suggests that there are additional characteristics not measured in this analysis that contribute to salary differences in this group.

There were also no statistically significant demographic characteristics among assistant professors, suggesting that UCF is increasingly committed to salary equity among newer hires in the first five to seven years of their tenure-earning role at this institution. This analysis should be periodically replicated to identify whether salaries remain equitable by race and gender, controlling for anticipated salary differences, as these faculty members earn their way to associate and full professorship.

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[10] Approximately three percent of each race and three percent of both genders are represented in the outliers. Although men and white faculty represent larger proportions of the outlier faculty, neither group is disproportionately represented compared to their overall representation among UCF faculty in the sample.
[11] Nine of eleven total colleges. All institutes and centers are categorized as one "college." No outliers were identified in the College of Nursing and Rosen College of Hospitality Management
[12] UCF median faculty was calculated only using salaries of faculty included in the current sample. Calculating the UCF median served the purpose of identifying where UCF compares to national data for each 4-digit CIP and rank, overall. This allows for a more comprehensive understanding of how faculty members' salaries compare among faculty at this institution as well as compared to other institutions.

Some demographic differences in salary may be attributed to the more frequent representation of women and minorities in fields of study that may have a more overt impact on salary differences. For this reason, it is important for analyses to include structural controls. However, it is equally as important for universities to commit to diverse representation, particularly within fields where women and minorities continue to be underrepresented, such as STEM oriented colleges. It is also important for administrators to commit to equity within colleges and departments, through diversity training and promotion processes which eliminate the potential for latent biases.

This study does not include an analyses of subjective measures of work/life balance, nor did available data provide the research team with the opportunity to explore faculty productivity measures such as publications, presentations, etc. (Claypool, Janssen, Kim & Mitchell, 2017; Toutkoushian, 2015). Future research is needed by this university to identify differences between men and women, as well as minorities and non-minorities regarding other factors that may have a direct effect on salary differences presented here.

RECOMMENDATIONS

1. The working group recommends the development of a plan to perform salary equity analyses every 3 to 5 years (Colorado State University, 2017; Toutkoushian, 2015; University of California Berkley, 2015) to monitor diversity and equity in faculty salaries over time, consistent with the UCF mission for equality. As stated above, the lack of significance in demographic characteristics among assistant professors (and significance among associate professors) highlights the importance of periodic review to identify whether the demographic significance among associate professors is a product of time, which can be alleviated, or if there are institutional processes that are disproportionately affecting the salary of women and underrepresented minorities as they earn associate professor status.

2. Similarly, the working group recommends that the university commit to a plan to impose a salary floor by rank and degree attainment.

3. In addition to the aggregate models, the working group ran analyses on all faculty members to identify outliers whose salary fell below the lowest bounds of their predicted salary interval. The working group will make the lists of outlier faculty members available to the appropriate administration within each college to conduct further investigations to identify whether the salary is appropriate for the individual circumstance and what adjustments may be needed. At the same time, the working group will also provide each college a list of the underrepresented minority female full professors, and female and underrepresented minority associate professors whose salaries fall below the 40th national percentile for review, in order to create individualized actionable efforts based on the aggregate model findings. Information for faculty in these groups will be provided even if they are not listed among the outliers described above, due to their group level statistical significance in the aggregate models. UCF Human Resources will provide additional relevant 2017 HR-CUPA faculty data to colleges, as needed, for additional detail and resources in planning salary investigations and revisions.

The working group strongly urges college administrators to make it a priority to review these faculty lists and commit to alleviating any potential salary inequities among existing employees.

4. The working group considers it particularly important to conduct a similar analytical project for non-tenure-earning instructors and lecturers whom are currently excluded from this analysis. Additionally, a follow-on study of salary compression is recommended for determination of compression effects on salary equity.

5. In addition to the preceding recommendations directly related to salary differences, the working group considers hiring practices a key factor in achieving diversity and salary equity. The working group recommends implementing required training for faculty search committees to contribute to the diversity efforts consistent with the UCF mission. This required training will assist in the reduction and elimination in implicit biases that may contribute to the disproportionate underrepresentation of minority and female faculty members. For example, the vast overall underrepresentation of minorities, women's underrepresentation within STEM fields, and the underrepresentation of men in colleges such as the College of Nursing.

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APPENDIX A – DESCRIPTIVE CHARACTERISTICS BY RANK

DESCRIPTIVE CHARACTERISTICS: FULL PROFESSORS (N = 282)

Among full professors:

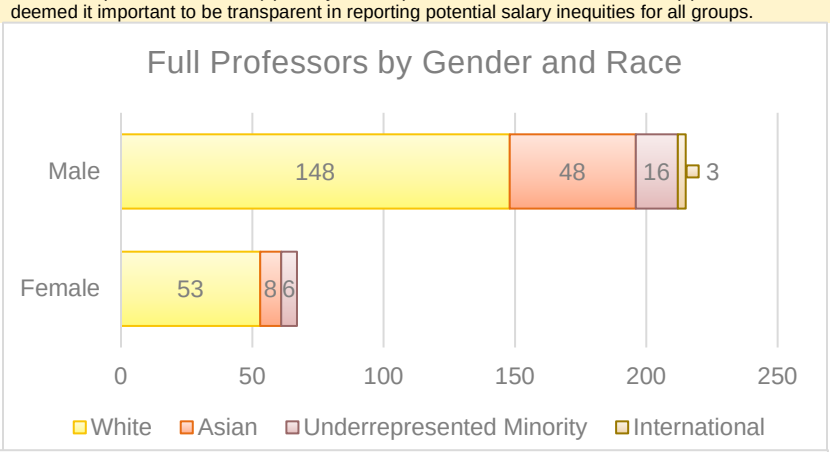
- 76% are male
- 71% are white
- International males have the highest median salary, followed by white males.
- Underrepresented minority females have the lowest median salary, followed by Asian females
- Full professors in the College of Business Administration (CBA) have the highest median salary
- Full professors in the College of Arts and Humanities (CAH) have the lowest median salary

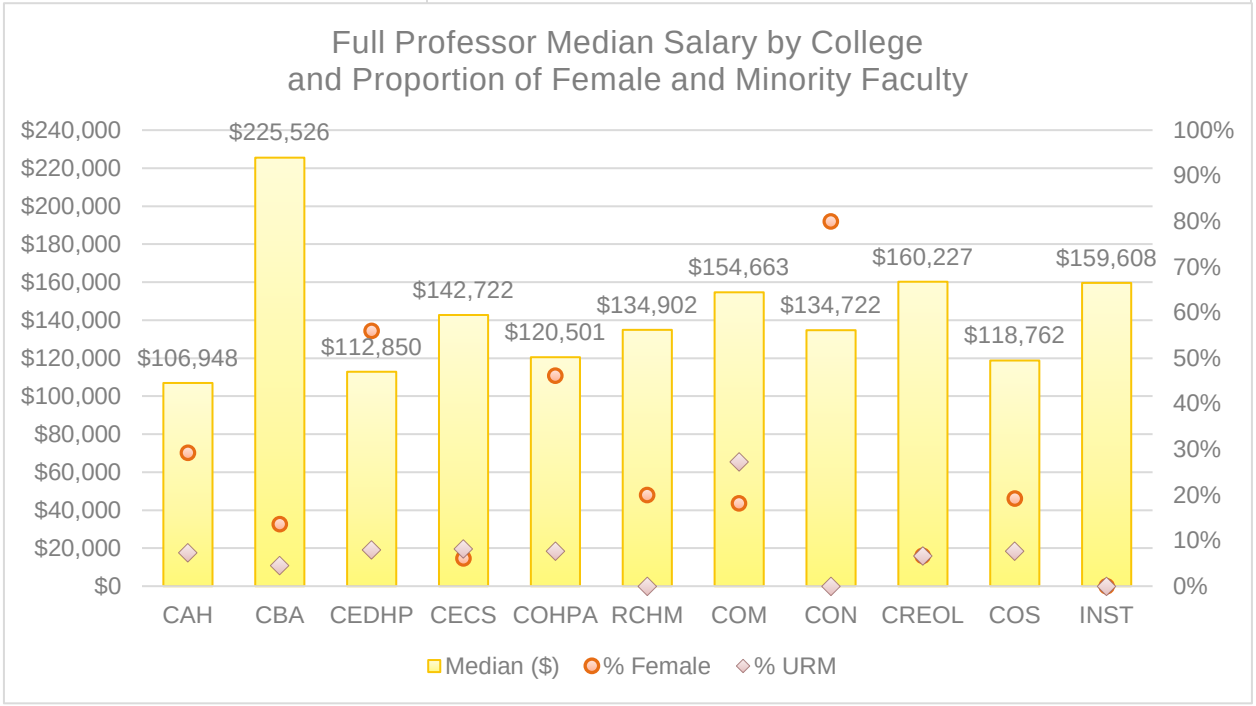
Table 1: Median Salary and Count of Full Professors by Gender and Ethnicity

Ethnic Category	Female		Male		Total	
White	53	$122,126	148	$130,995	**201**	**$128,397**
Asian	8	$110,605	48	$126,841	**56**	**$125,613**
Underrepresented Minority [a]	6	$107,253	16	$127,145	**22**	**$123,325**
International	0	-	3	$143,542	**3**	**$143,542**
Total	**67**	**$121,597**	**215**	**$130,670**	**282**	**$126,436**

[a] includes those identifying as Black/African American, Hispanic or Latino, American Indian, Alaska Native, or multi-racial

NOTE: Although conventionally, only cells with counts of 5 or more are displayed, small cell counts have been provided because (a) salary data is public in the state of Florida and (b) the committee deemed it important to be transparent in reporting potential salary inequities for all groups.





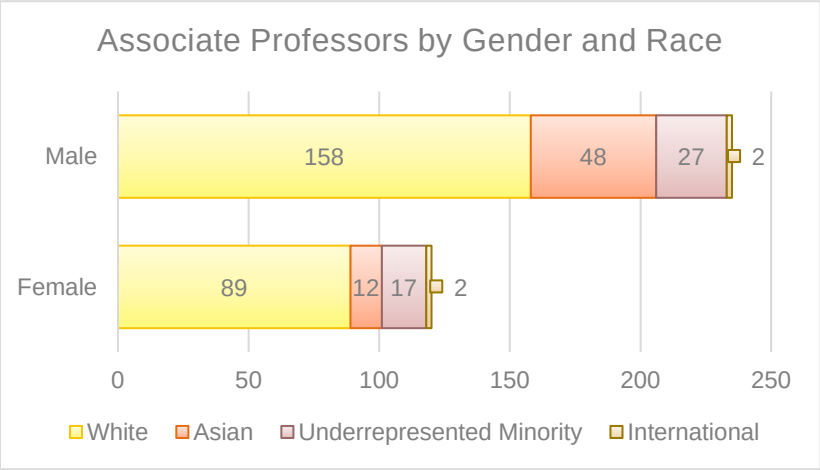
DESCRIPTIVE CHARACTERISTICS: ASSOCIATE PROFESSORS (N = 355)

Table 2: Median Salary and Count of Associate Professors by Gender and Ethnicity

Ethnic Category	Female		Male		Total	
White	89	$85,098	158	$88,392	**247**	**$86,713**
Asian	12	$95,329	48	$108,168	**60**	**$105,283**
Underrepresented Minority [a]	17	$74,529	27	$87,312	**44**	**$84,156**
International	2	$72,643	2	$84,366	**4**	**$78,515**
Total	**120**	**$84,529**	**235**	**$91,520**	**355**	**$87,418**

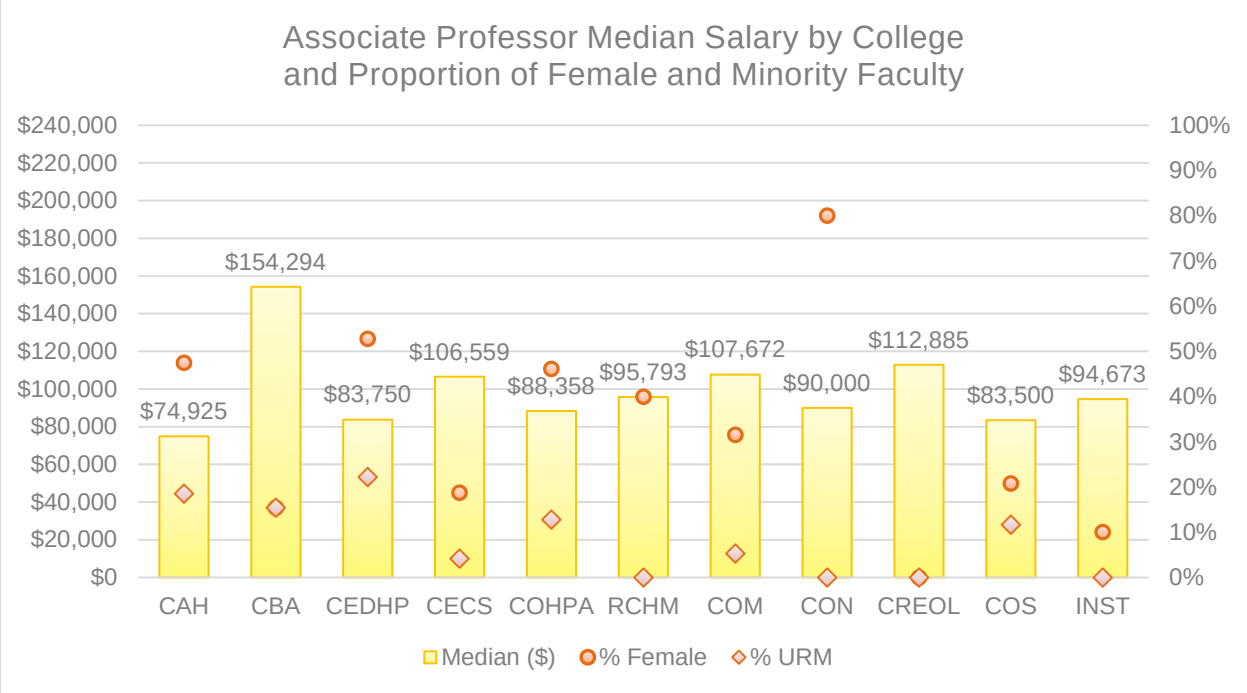
[a] includes those identifying as Black/African American, Hispanic or Latino, American Indian, Alaska Native, or multi-racial

NOTE: Although conventionally, only cells with counts of 5 or more are displayed, small cell counts have been provided because (a) salary data is public in the state of Florida and (b) the committee deemed it important to be transparent in reporting potential salary inequities for all groups.



Among associate professors:

- 66% are male
- 70% are white
- Asian males have the highest median salary, followed by white males.
- International females have the lowest median salary, followed by underrep-resented minority females
- Associate professors in the College of Business Administration (CBA) have the highest median salary
- Associate professors in the College of Arts and Humanities (CAH) have the lowest median salary



DESCRIPTIVE CHARACTERISTICS: ASSISTANT PROFESSORS (N = 298)

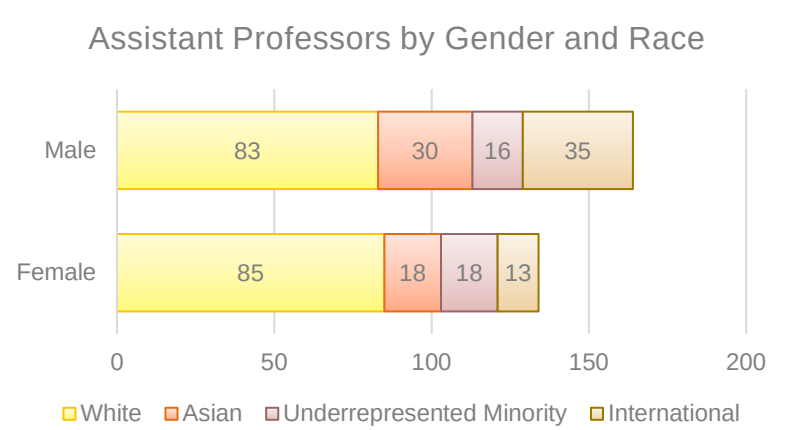
Among assistant professors:

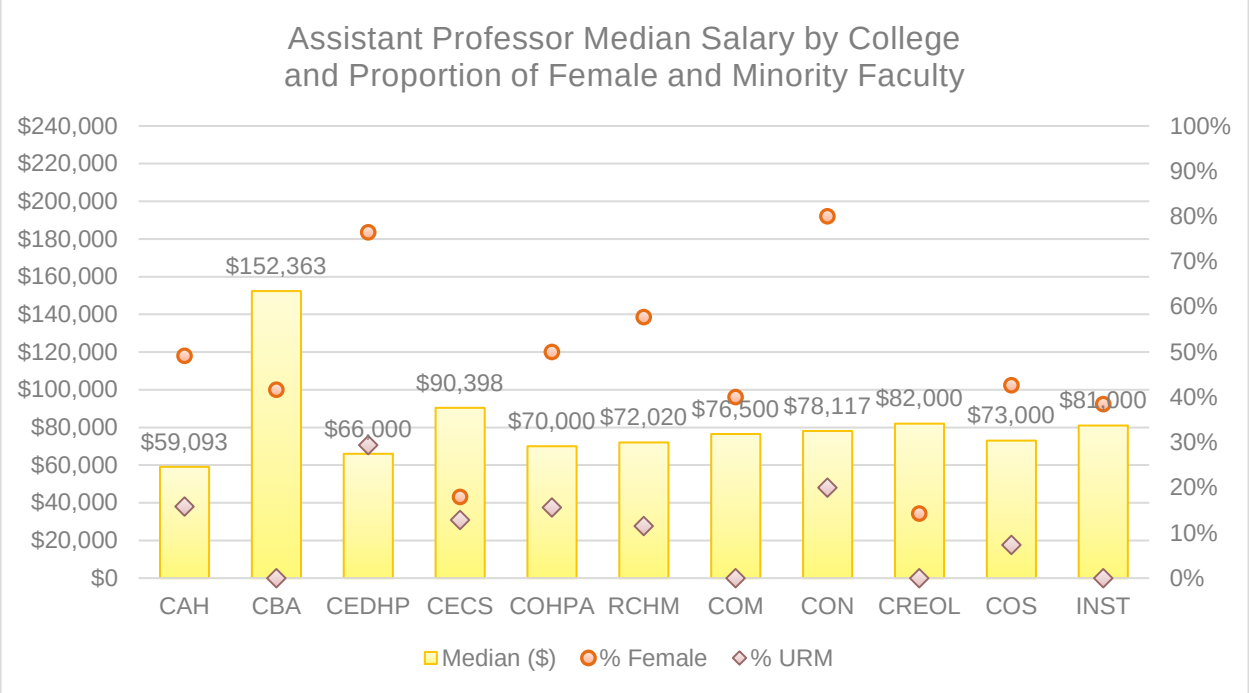
- 55% are male
- 56% are white
- Asian males have the highest median salary, followed by international males.
- Underrepresented minority males and females have the lowest median salary, followed by white females
- Assistant professors in the College of Business Administration (CBA) have the highest median salary
- Assistant professors in the College of Arts and Humanities (CAH) have the lowest median salary

Table 3: Median Salary and Count of Assistant Professors by Gender and Ethnicity

Ethnic Category	Female		Male		Total	
White	85	$70,262	83	$73,294	**168**	**$72,789**
Asian	18	$76,028	30	$80,741	**48**	**$78,250**
Underrepresented Minority [a]	18	$70,007	16	$69,214	**34**	**$70,000**
International	13	$73,968	35	$77,461	**48**	**$76,980**
Total	**134**	**$71,774**	**164**	**$76,391**	**298**	**$74,878**

[a] includes those identifying as Black/African American, Hispanic or Latino, American Indian, Alaska Native, or multi-racial





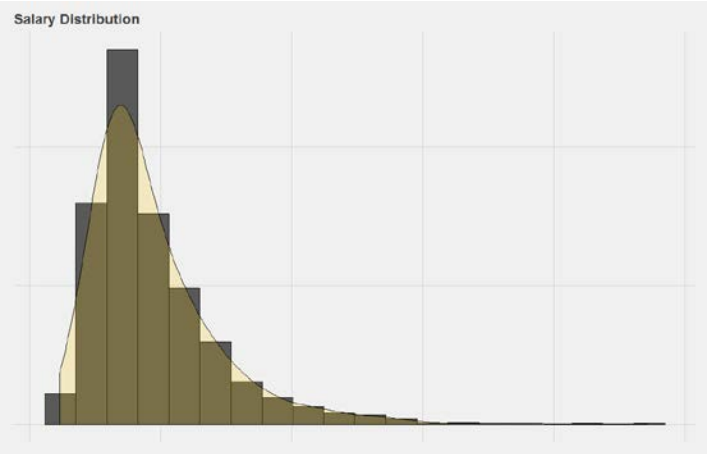
APPENDIX B - RANK MODELS OUTPUT TABLE

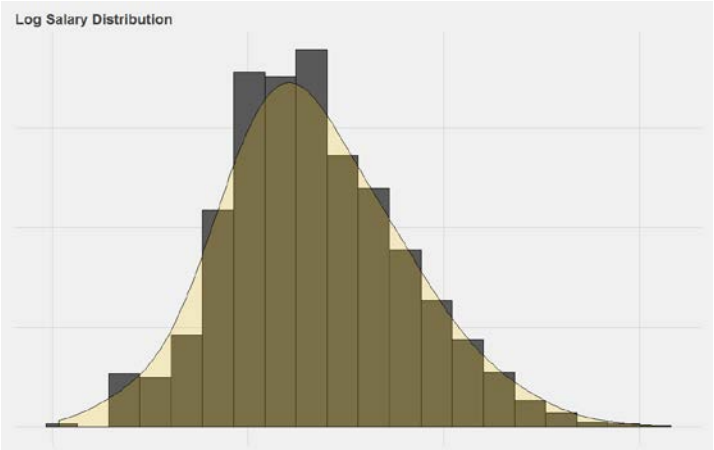
	Log of Adjusted 9 Month Salary by Faculty Rank		
	Full Professor	Associate Professor	Assistant Professor
	(1)	(2)	(3)
Female	0.005 (0.035)	-0.040 (0.020) *	0.009 (0.018)
Race/Ethnicity [a]			
Asian	-0.041 (0.035)	0.014 (0.025)	0.005 (0.025)
International	-0.068 (0.122)	-0.127 (0.099)	0.015 (0.023)
Underrepresented Minority	-0.014 (0.053)	-0.049 (0.029) †	0.004 (0.032)
Total Faculty Years at UCF	-0.009 (0.002) ***	-0.009 (0.001) ***	-0.001 (0.002)
Number of Ranks Held at UCF	-0.141 (0.018) ***	-0.050 (0.014) ***	0.025 (0.023)
College [b]			
Business Administration	0.610 (0.056) ***	0.624 (0.034) ***	0.967 (0.029) ***
Education and Human Performance	0.068 (0.053)	0.068 (0.029) *	0.109 (0.032) ***
Engineering and Computer Science	0.327 (0.046) ***	0.341 (0.029) ***	0.442 (0.025) ***
Health and Public Affairs	0.105 (0.053) *	0.146 (0.028) ***	0.178 (0.026) ***
Hospitality Management	0.185 (0.098) †	0.221 (0.048) ***	0.235 (0.027) ***
Medicine	0.334 (0.070) ***	0.252 (0.038) ***	0.262 (0.053) ***
Nursing	0.187 (0.100) †	0.162 (0.065) *	0.293 (0.039) ***
Optics and Photonics	0.422 (0.062) ***	0.363 (0.072) ***	0.350 (0.046) ***
Sciences	0.132 (0.039) ***	0.079 (0.023) ***	0.206 (0.021) ***
Institutes and Centers	0.266 (0.099) **	0.226 (0.048) ***	0.380 (0.036) ***
Serving Administrative Role	0.143 (0.032) ***	0.155 (0.030) ***	0.015 (0.082)
Number of Awards (TIP/RIA/SoTL)	0.030 (0.006) ***	0.053 (0.006) ***	0.049 (0.013) ***
Number of Merit Pay Increases	0.017 (0.005) **	0.009 (0.004) *	0.001 (0.006)
Number of Times Paid/Unpaid Leave	0.004 (0.014)	0.012 (0.010)	-0.003 (0.016)
Female x Asian	-0.057 (0.085)	-0.041 (0.049)	0.020 (0.039)
Female x International	-	0.051 (0.140)	-0.004 (0.042)
Female x Underrepresented Minority	-0.299 (0.105) ***	0.065 (0.047)	0.017 (0.043)
Constant	11.796 (0.056) ***	11.330 (0.038) ***	10.934 (0.032) ***
Observations (N)	282	355	298
R^2	0.599	0.706	0.838
Adjusted R^2	0.565	0.686	0.825
Residual Std. Error	0.198	0.138	0.112
F Statistic	17.601 *** (df = 22; 259)	34.582 *** (df = 23; 331)	61.796 *** (df = 23; 274)

Note: Entries are given as log estimate (standard deviation). Negative log estimates = lower (log) salary relative to the reference group while positive log estimates = higher (log) salary relative to the reference group. Percent differences can be identified by 100*(coefficient)
† p <.01 * p<.05 ** p<.01. ***p<.001
[a] Whites as reference group [b] College of Arts and Humanities as reference group

APPENDIX C – DATA AND ANALYSIS

SALARY VS. LOG SALARY





Changing our dependent variable has a drastic effect on how we interpret our results. Namely, do we believe that the factors in our data have an additive effect on salary, or a multiplicative one? Based on the available literature in similar salary equity studies, we chose to make the log salary our dependent variable.

INTERPRETING LOG SALARY MODEL RESULTS

The multivariate model for salary is relatively simple, and looks like

$$\text{Adjusted 9 Month Salary} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p$$

Where p is the number of factors considered, and x is the value of a particular factor. The interpretation is equally straightforward. Say that x_1 was the total number of years a faculty member has been at UCF. For an increase of one year at UCF, we can expect an increase of β_1 dollars to the faculty member's salary. There is more nuance to interpreting categorical variables, but the point is that each variable is assumed to have an *additive* effect on salary.

The multivariate model for log salary, on the other hand, takes the form

$$\log(\text{Adjusted 9 Month Salary}) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p$$

When we exponentiate both sides, the equation becomes

$$e^{\log(\text{Adjusted 9 Month Salary})} = e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p}$$
$$\text{Adjusted 9 Month Salary} = e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p}$$
$$\text{Adjusted 9 Month Salary} = e^{\beta_0} * e^{\beta_1 x_1} * e^{\beta_2 x_2} * \ldots * e^{\beta_p x_p}$$

Note that the variables in this model have a *multiplicative* effect on salary, which changes how results are reported. Neither method is right or wrong, necessarily, just different.

IDENTIFYING OUTLIERS

The multivariate regression model can help identify issues on an aggregate level, but it is difficult to take corrective action on such results. To target individuals rather than broad groups, a slightly different method is necessary. Using models *with demographics factors excluded*, we can obtain a point estimate for predicted log salary and a prediction interval. If any faculty member's actual log salary falls below the lower bound for their prediction interval, they are flagged for further investigation.

PREDICTION INTERVALS

Consider a hypothetical faculty member, Dr. Jane Doe. If we enter Jane's information into the model, we get an estimated log salary and prediction interval for her based on her experience, field, awards, etc. If a new faculty member came in with exactly the same qualifications, we can say with 95% confidence that her log salary should fall within that prediction interval.

If Dr. Doe's actual log salary is below the lower bound for the prediction interval, we should investigate further to see if there is a reason she is being underpaid. Note that if we wish to be more confident that the true salary falls within the prediction interval, we have to widen it, so fewer faculty members will be flagged for review. Conversely, reducing the level of confidence to something like 90% narrows the intervals, so more faculty will be flagged.

Why use prediction intervals rather than confidence intervals? Dr. Doe's 95% confidence interval means that we can say with 95% confidence that the *average* faculty member with her qualifications has a log salary in that range. Confidence intervals are considerably narrower than prediction intervals, and many individual observations fall outside it. Comparing the equations for calculating each is useful:

Let y_{new} be a new faculty member, $\widehat{y_h}$ be their predicted log salary, and x be the factors about them that affect their salary.

Prediction interval

$$\widehat{y_h} \pm t_{\frac{\alpha}{2},n-2} \times \sqrt{MSE \times \left(1 + \frac{1}{n} + \frac{(x - \bar{x})^2}{\sum(x_i - \bar{x})^2}\right)}$$

Confidence interval

$$\widehat{y_h} \pm t_{\frac{\alpha}{2},n-2} \times \sqrt{MSE \times \left(\frac{1}{n} + \frac{(x - \bar{x})^2}{\sum(x_i - \bar{x})^2}\right)}$$

Note that there is an extra term in the standard error of the prediction interval, which makes them wider.

APPENDIX D – RECENT SALARY STUDIES (OUTCOMES)

Colorado State University (2017) – Found statistical salary difference between full professors by gender (~5% less), and between associate professors by race (~6% less). Study focus: tenured/tenure-earning faculty; control variables included (log) salary, gender, minority, years in rank, and department. A single-year snapshot and change over time were modeled. Study conducted over 18 months.

University of Missouri (2015) – Found no consistent statistical significance for gender (0.3% - 1.5%), race (0.03% - 3.5%), or salary compression; a 15% wage gap was mostly attributed to other factors. Some statistical differences noted within specific colleges. Salary compression was reviewed. Study focus: full-time tenured/tenure-earning faculty; control variables included (log) base salary, years of experience at Missouri, highest degree, academic field/discipline, race, gender, academic rank, years of employment at Missouri, and standardized research productivity (Academic Analytics data) A single-year snapshot was used. Study conducted over one year.

University of California, Berkeley (2015) – Identified presence of salary differences, but was unable to establish cause of the differences. Study focus: ladder-rank faculty; salaries of white males extrapolated to minority (only male minorities included in relation to race) and female faculty. Control variables included (log) salary, gender, ethnicity, professional experience, field, and rank. Multi-year data were used. Study conducted over three years.

University of California, Riverside (2014) – Found no strong indication of inequity related to gender or ethnicity in either initial or current salaries. Study focus: ladder-rank faculty, with comparisons of initial salary to current salary. Control variables included gender, ethnicity, college, and selected departments. A single-year snapshot was used. Study conducted over 8 months.

APPENDIX E – WORKING GROUP MEMBERSHIP

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