

June 5, 2009

**EXECUTIVE VICE CHANCELLOR & PROVOST MICHAEL GOTTFREDSON  
VICE PROVOST HERBERT KILLACKEY  
DIRECTOR DOUGLAS HAYNES, UCI ADVANCE PROGRAM**

**RE: CFW's CAMPUS WIDE ANALYSIS OF MEDIAN FACULTY SALARIES BY GENDER  
AND ETHNICITY AT UCI FOR 1998-2008**

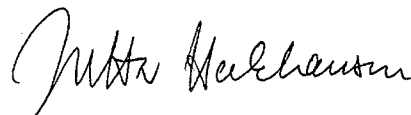
The Council on Faculty Welfare has completed its study which examined whether there were campus-wide disparities in faculty salaries based on gender or ethnicity. The report was based on the excellent work of Professor Dan Gillen from the Dept. of Statistics. CFW strongly endorsed the plan of analysis, as well as the conclusions of the report, and an executive summary is provided in their memo.

Let me add two observations:

First, Table 4 provides evidence that over the course of the last ten years, pay equity at UCI has improved. Until the year 2002, gender-related differences in salary were significant, since 2003 no significant differences by gender were observed. Isn't that an interesting coincidence with the start of the ADVANCE program in 2002?

Second, the figures on the annual pay equity studies on the webpage of Academic Personnel are interpreted by some as evidence for gender-related inequities in UCI's faculty salaries. The present study by CFW indicates that there is no empirical evidence for gender-related pay inequity on our campus during the last several years. I would like to encourage you to help disseminate this information.

CFW's executive summary and the report are attached for your consideration. It has also been posted on the CFW webpage. If you have any questions, please do not hesitate to contact me.



Jutta Heckhausen, Senate Chair

Attachment

C: Cornelia Pechmann, Chair, Council on Faculty Welfare  
Luisa Crespo, Executive Director, Academic Senate

May 18, 2009

**JUTTA HECKHAUSEN, CHAIR**  
**ACADEMIC SENATE, IRVINE DIVISION**

**RE: CFW's Campus-Wide Analysis of Median Faculty Salaries by Gender and Ethnicity at UCI for 1998-2008**

The Council on Faculty Welfare (CFW) reviewed the results of the analysis of the UCI Faculty Salary Data for 1998-2008 at its meetings on March 17 and April 14, 2009. The results of the analysis were organized into four sections:

- Section V: Cross-section of faculty characteristics at three points in time: 1998, 2003, and 2008.
- Section VI: Cross-sectional comparisons of median salary by gender and ethnicity
- Section VII: Comparison of Starting Salaries for faculty hired between 1998 and 2008.
- Section VIII: Changes in salary over time for the period between 1998 and 2008 by gender and school.

Summary of the Council's Conclusions

This study examined whether there were campus-wide disparities in faculty salaries based on gender or ethnicity, because there was concern about this issue. The EVC provided the data on individual faculty salaries for eleven years 1998 – 2008 (names were removed), and the analyses were conducted by an associate professor in the UCI Statistics Department, Daniel Gillen. The three primary aims stated for this analysis, as requested by the Council on Faculty Welfare, were to investigate campus-wide systematic differences (1) in cross-sectional salaries for each year, (2) in starting salary, and (3) in salary increases over time, based on gender or ethnicity. The purpose of the analysis was to quantify and compare aggregate summary measures of salary (specifically the median salary) by gender and ethnicity rather than to pinpoint particular individuals with relatively high or low salaries. The purpose of the analysis was *not* to flag individuals with salaries that may require closer scrutiny but instead to quantify *systematic trends* in salary differences across the campus. Also, this study did not address effects of gender or ethnicity on promotion or advancement, and therefore we cannot rule out the possibility of disparity in these decisions. However, the Council came to the following conclusions based on the analyses:

1. One conclusion (Section V, Tables 1-3) is that more males than females were hired, although some progress can be seen over the years sampled: females went from 24% of the faculty in 1998 to 26% in 2003 and 31% in 2008.
2. A second conclusion (Section VII, Table 7) is that prior to adjustment for starting rank, and step within rank, males were paid significantly more than females at first hire. The median salary was estimated to be 3.7% higher among males as compared to females. However, if rank and step are taken into account, there is no difference in salaries at the same rank and step. We believe this implies that males tended to be hired at higher step. We note that these results are controlled for year of highest degree, year of hire, ethnicity,

school, whether the faculty member received administrative pay, and highest degree earned.

3. A longitudinal analysis shows that female salaries increased at a significantly faster rate than males' salaries, even when adjusted for rank and step (Section VIII, Figure 1). The estimated slope in median salary was .4% higher among females as compared to males with no adjustment for rank or step (4.5% vs. 4.1% per year), and .2% higher with adjustment for rank and step (2.3% vs. 2.1% per year).

4. Overall, at the cross sectional level, males tended to have higher median salaries prior to adjustment for rank and step (Section VI, Table 4), with the median salary of males ranging between 1.3% and 3.2% higher than that of females over the years (some of these results were significant at the .05 level, but note that no adjustment for multiple comparisons has been made). After adjustment for rank and step within rank, the median salary of males ranged between 2.0% higher than that of females in early years (1998-2004) to 0.5% lower than females in later years (2005-2008). These results seem consistent with those of the differences in starting salary and salary increases above.

5. There are few consistent results by ethnicity which may be due to the small number of minorities available for analysis in most years. However the starting median salary for African-Americans vs. Whites was estimated to be 5.9% higher after controlling for rank and step (Section VII).

6. Since our goal was to investigate campus-wide systematic differences in salaries, the results were not stratified by school because there were no significant interactions between gender or ethnicity and school. We note that smaller schools were collapsed with larger ones to ensure adequate sample sizes and so these sets of schools were not evaluated individually. A description of this collapsing and the reasons for it are found in Section III.

The methodology used in the current analysis does differ in multiple ways from that of the faculty Pay Equity studies produced annually by UCI's Academic Personnel. The findings also differ. Below we briefly comment on these differences:

1. Findings: The UCI AP Equity Studies generally indicate larger negative disparities in female versus male salaries than our Council of Faculty Welfare Study. For instance, in 2008, the UCI AP Equity Study indicates more than a \$4,000 positive salary differential for males as compared to females. The Council of Faculty Welfare Study indicates that the median salary for males was 2.1% higher than that of females in 2008 (without adjustment for rank and step). Thus for a median salary of \$104,000 (estimated at the average hire date and average year of degree for the campus), this amounts to a difference of \$2,184. The differences in the study findings may be explained by one or more of the methodological differences discussed below.
2. Confidence intervals: The UCI AP Pay Equity Studies do not calculate confidence intervals around the estimates. The Council of Faculty Welfare Study does calculate

confidence intervals (based on sample sizes and error variances), and it considers the statistical significance of the findings using the standard criterion of  $p < .05$ .

3. Median vs. mean: The UCI AP Pay Equity Studies analyze mean salaries, and this gives greater weight to extreme salaries. The Council of Faculty Welfare Study uses median salaries. This ensures homogeneity of error variance which is a key assumption for computing confidence intervals.
4. School-specific analyses: The UCI AP Pay Equity Studies analyze the data for each school separately because of historical differences in school cultures. The Council for Faculty Welfare was interested in investigating systematic differences in salaries by gender or ethnicity on campus and so it was a priori decided that models would first be tested for interactions between gender or ethnicity and school (academic unit) to determine if differences in salary by gender or ethnicity varied significantly by school. In the event that significant differences were found, school-specific analyses would have been produced to further examine differences at the individual school level. However this was not the case, so the primary campus-wide analysis presented here gives aggregated results across schools, while adjusting for schools in the regression models. The Council for Faculty Welfare's approach of using interaction-term significance as the criterion for conducting school-specific analyses is the standard approach for studying group differences on an aggregated basis. Note that school-specific analyses are unlikely to show stronger gender effects (based on statistical significance) because sample sizes are lower and error variances are likely higher.
5. Faculty used for model fitting: The UCI AP Pay Equity Studies apply the model recommended by the American Association of University Professors (AAUP). In this case, only data for white male faculty members are used in model fitting to produce a predicted salary (regression line). From this prediction model salary residuals (the difference between a given faculty member's salary and the estimated mean salary based upon white males) are generated for all faculty members to illustrate how far each faculty member's salary is from the estimated mean salary for white males. The current analysis differs in that the goal of the Council for Faculty Welfare was to directly compare median salaries across gender and ethnicity groups. Thus the analysis presented here seeks to compare aggregate summary measures of salary differences by gender and ethnicity rather than to pinpoint particular individuals with relatively high or low salaries. As such, all data are used in the model fitting not just the data for white males and adjusted relative differences in median salaries are estimated for each group.
6. Adjustment variables: The recommended AAUP model adjusts for year of degree, year of hire, and an indicator of the highest degree obtained. The UCI AP Pay Equity Studies use this model and also stratify all analyses by academic unit. The analysis presented here also adjusts for year of degree, year of hire, and an indicator of the highest degree obtained. However, we have not excluded faculty with administrative duties but have adjusted for this with an indicator in the model. We do not stratify by academic unit. Finally we run models that both do and do not adjust for rank and step.

7. Analysis of starting salary and salary increases: The UCI AP Pay Equity Studies consider cross-sectional data in that, each year, data for that single year is used. While this analysis also considers cross-sectional comparisons, two of the main goals of the Faculty Welfare Study were to investigate whether there were differences in median starting salary for the faculty hired between 1998 and 2008 and to investigate whether there were differences in faculty salary increases over this time period. Neither of these is considered in the UCI AP Pay Equity Study.

The Council strongly approved the findings of the attached report with 12 in favor, and 0 opposed.

On behalf of the Council on Faculty Welfare,

A handwritten signature in black ink that reads "Cornelia Pechmann". The signature is written in a cursive, flowing style.

Connie Pechmann, Chair

c: Luisa Crespo, Executive Director  
Lonnie Alcaraz, Chair, Special Senate Committee on Diversity

Attachment

## **Council on Faculty Welfare's Campus-Wide Analysis of Median Faculty Salaries by Gender and Ethnicity at UCI**

May 13, 2009

### **Section I. Goals of the analysis**

The three primary aims stated for this analysis, as requested by the Council on Faculty Welfare, were to investigate systematic differences in (1) cross-sectional salaries for each year, (2) in starting salary, and (3) in salary increases over time. We emphasize here that the purpose of the analysis presented here is to quantify and compare aggregate summary measures (specifically the median) of salary by gender and ethnicity rather than to pinpoint particular individuals with relatively high or low salaries. The purpose of the analysis is *not* to flag individuals with salaries that may require closer scrutiny but instead to quantify *systematic trends* in salary differences across the Campus. In addition, as it does not include any latent measures of quality or merit, it is expected that some faculty members will have results that are not explained well by the model, which relies exclusively on quantifiable objective measures.

The remainder of this report is organized as follows:

- Section II provides a brief description of the data used for this analysis.
- Section III presents an overview of the statistical methods used for this analysis as a justification for the adjustment variables used in the modeling process.
- Section IV presents a brief summary of the fundamental differences in the goals and methods for this analysis as compared to the UCI Pay Equity Study.
- Section V gives a snapshot of the faculty population at three different points in time (years 1998, 2003, and 2008). This section is purely for descriptive purposes to illustrate what type of faculty are used in the remaining analyses.
- Section VI contains cross-sectional estimates of the adjusted relative difference in median salary by and ethnicity for each year.
- Section VII presents data on starting salaries among those faculty beginning employment between 1998 and 2008.
- Section VIII focuses on salary increases over time (during the years 1998-2008).

## **Section II. Data**

This study utilizes data on ladder rank faculty distributed to the Council on Faculty Welfare by the Executive Vice Chancellor's office. based on October 2008 Payroll/Personnel data combined with data from the Office of Academic Personnel. The data include only ladder rank faculty members who were on active pay status at any time during the years 1998 to 2008. The analysis does include faculty administrators but also includes an adjustment variable to indicate whether a faculty member received administrative pay in a given year (see Section III below). General campus faculty whose salaries are paid on a fiscal year basis were not excluded, but for purposes of the study we only considered their academic year regular rank salary, or its equivalent.

## **Section III. Regression analysis and adjustment variables**

Any fair comparison of faculty salaries must account for potential confounding factors in the relationship between gender and pay. That is, it is necessary to condition upon factors that influence salary levels and are also associated with gender. As a simple example, if one simply compares the salary between men and women it is likely that men would be observed to make more money on average than women, in part because men currently have more experience in the university system (the current population of faculty with the longest tenure is likely dominated by men because men were more likely to receive advanced degrees two to three decades ago). Thus a fairer comparison would consider the difference in salary between a population of men and women with similar experience.

Generally speaking, factors that affect salary can be broken down into factors that relate to (1) the individual faculty member, (2) the job duties of the faculty member, (3) market forces, and (4) the economic environment. While we do not believe that some of these factors are differential by gender, other factors are likely to be unbalanced with respect to sex. As such, we a priori decided to control for the following variables that we believe may be differential between males and females and that are likely to influence salary:

1. Year of degree: This is likely the best measure of experience that we have data on. Clearly, year of degree affects salary and for reasons stated above the distribution of year of degree is likely to be differential with respect to gender.
2. Starting year at UCI: After adjusting for year of degree, this variable may indicate those faculty who are recruited away from other institutions. This will likely affect salary and may be differential by gender if departments are more likely to recruit male faculty from outside institutions.
3. Department: Academic field is clearly related to salary and the prevalence of female faculty is likely to change with field do to historical discrimination against women.
4. School: School serves as a broad classification of academic field which is clearly related to salary and the prevalence of female faculty is likely to change with field. Because of limited numbers of faculty in some schools were collapsed to provide greater statistical precision. This collapsing was done *a priori* (before any regression models were fit) and was collapsed as follows: ICS/Engineering, Arts/Ed/Humanities, Business, Biological Sciences, Medicine (clinical and basic), Social Ecology, Physical Sciences, and Social Sciences. ICS was combined with

Engineering because there were only 28 faculty (5 females) available for analysis in 1998. Arts and Education were combined with Humanities because there were only 39 (14 females) and 6 (1 female) faculty in these schools in 1998. Clinical (14 female faculty in 1998) and basic medicine (12 female faculty in 1998) were collapsed because only institutional salaries were analyzed.

5. Administrative duties: Administrative responsibilities are related to increased salary and may be differential by gender due to lack of supply of women with long-term experience in the field. This variable is updated for each year the faculty member is employed at UCI.

6. Rank and step with rank: The adjustment of faculty rank is controversial in the comparison of faculty salaries. Clearly rank is predictive of faculty salary and provides some measure of a faculty member's skill and value. On these grounds some suggest that rank should be adjusted for in the analysis. The other argument is that after adjusting for year of degree, in the absence of discrimination and under the presumption that men and women are equally capable, the distribution of men and women is expected to be the same for each rank and if this is not true, then there may exist bias with respect to promotion by gender. In this case, adjustment for rank eliminates one pathway by which discrimination with respect to salary can exist and hence rank should not be adjusted for. The Council on Faculty Welfare took the approach that both sides of this debate have some merit and present analysis with and without adjustment for rank (and step within rank).

In addition to the above listed factors, all analyses included adjustment for ethnicity given interest in whether systematic differences in salary by ethnicity were also prevalent. Due to small samples for many ethnicity groups, data were collapsed into the following categories: white, Asian, African-American, Latin/Mexican, and other.

Technically, multiple linear regression was used to estimate log-transformed salary as a function gender and the adjustment covariates listed above. The a priori decision to log-transform salary was motivated by three factors. First, a basic assumption of the standard multiple linear regression model is that the variance of the outcome variable is constant across all observations. In addition, it is well known that salary increases are given multiplicatively so that the variance (or spread) of salaries increases as salaries increase (statistically this is referred to as heteroscedasticity). By modeling the log of salary this heteroscedasticity is removed thus fulfilling a basic assumption of the linear regression model. Second, one of the objectives of this analysis was to examine systematic differences in salary increases over time. Again noting that salary increases are given multiplicatively and not additively, transformation to the log-scale is most likely to yield a linear trend in log-salary over time. Finally, transforming to log-salary provides an interpretation of the regression parameters on the median salary scale and it was viewed by the Council on Faculty Welfare that comparison of median salaries by gender and ethnicity was most appropriate given the robustness of the median to outliers and the Council's specific interest in focusing on trends in the distribution of salary by gender and ethnicity.

As noted in Section I, the three primary aims of this analysis are investigate systematic differences in (1) cross-sectional salaries for each year, (2) in starting salary, and (3) in salary increases over time. For (1), all data on faculty members employed in each year were used (resulting in 11 different models, 1998-2008). For (2), only faculty members who were hired between 1998 and 2008 were included in the analysis with their first year salary used as the outcome. For (3), all records for any faculty paid at some time from 1998 to 2008 were included in the analysis and an indicator variable of the year of their salary was included to model the faculty member's change in salary over time. Given the correlated data used in the analysis for



(3) (each faculty member could contribute multiple measurements) linear mixed effects multiple regression was used to provide correct inference for model estimates.

Because of the Council on Faculty Welfare's interest in investigating systematic differences in salaries by gender at UCI it was a priori decided that models would first be tested for interactions between gender and school to determine if differences in starting salary or salary increases by gender varied significantly by school. In the event that significant differences were found, a school-stratified analysis would have been produced to further examine differences at the individual school level. However this was not the case, so the primary campus-wide analysis presented here gives aggregated results across schools, while adjusting for schools in the regression model.

## **Section IV. Fundamental differences between this analysis and the UCI Pay Equity studies**

The methodology used in the current analysis does differ in multiple ways from that of the faculty Pay Equity studies produced annually by UCI. Below we briefly comment on these differences:

1. Faculty used for model fitting: The UCI Pay Equity Study applies the model recommended by the American Association of University Professors (AAUP). In this case, only data for white male faculty members are used in model fitting to produce a predicted salary (regression line). From this prediction model salary residuals (the difference between a given faculty member's salary and the estimated mean salary based upon white males) are generated for all faculty members to illustrate how far each faculty member's salary is from the estimated mean salary for white males. The current analysis differs in that goal of the Council on Faculty Welfare was to directly compare median salaries across gender and ethnicity groups. Thus the analysis presented here seeks to compare aggregate summary measures of salary differences by gender and ethnicity rather than to pinpoint particular individuals with relatively high or low salaries. As such, all data is used in the model fitting and adjusted relative differences in median salaries are estimate across groups.
2. Adjustment variables: The AAUP model includes adjustment for year of degree, year of hire, and an indicator of the highest degree obtained. In addition, the UCI Pay Equity studies stratify all analyses by academic unit. The analysis presented here also adjusts for year of degree, year of hire, and an indicator of the highest degree obtained. In addition, we have not excluded those faculty with administrative duties but have adjusted for this with an indicator in the model. Finally, again noting the Council on Faculty Welfare's interest in investigating systematic differences in salaries by gender at UCI it was a priori decided that models would first be tested for interactions between gender and school (academic unit) to determine if differences in starting salary or salary increases by gender varied significantly by school. In the event that significant differences were found, a school-stratified analysis would have been produced to further examine differences at the individual school level. However this was not the case, so the primary campus-wide analysis presented here gives aggregated results across schools, while adjusting for schools in the regression model.

3. Analysis of starting salary and salary increases: The UCI Pay Equity Study considers cross-sectional data in that each year, the Pay Equity Study uses data for that single year. While this analysis also considers cross-sectional comparisons, two of the main goals of the Faculty Welfare study were to investigate whether there are systematic differences in median starting salary for those faculty hired between 1998 and 2008 and to investigate whether there are differences in faculty salary increases over this time period. Neither of these are considered in the UCI Pay Equity Study.

## **Section V. Cross-sectional faculty characteristics**

In this section we briefly describe the characteristics of the faculty used in this analysis. Specifically we provided descriptive statistics for the faculty at three points in time (1998, 2003, and 2005). In 1998, there were a total of N=181 female faculty members and N=582 male faculty members available for the analysis. In 2003 the number of female faculty grew to N=248 while the number of male faculty grew to N=699. Finally, in 2008 there were a total of N=342 female faculty members and N=769 male faculty members. Over all years the school with the largest number of faculty was the School of Humanities, with a large proportion of the remaining faculty coming from Biological Sciences, Physical Sciences, Social Sciences, Clinical Medicine, and Engineering.

**Table 1. Faculty characteristics in 1998.**

Characteristic	Females (N=181)	Males (N=582)
<b>Ethnicity</b>		
- White	138 (76.2%)	462 (79.4%)
- Asian	25 (13.8%)	58 (10%)
- African-American	7 (3.9%)	10 (1.7%)
- Latin/Mexican	7 (3.9%)	34 (5.8%)
- Other	4 (2.2%)	18 (3.1%)
<b>School</b>		
- ICS	5 (2.8%)	23 (4%)
- Arts	14 (7.7%)	25 (4.3%)
- Education	1 (0.6%)	5 (0.9%)
- Business	9 (5%)	25 (4.3%)
- Biological Sciences	12 (6.6%)	64 (11%)
- Humanities	53 (29.3%)	78 (13.4%)
- Medicine (Basic)	12 (6.6%)	45 (7.7%)
- Medicine (Clinical)	14 (7.7%)	81 (13.9%)
- Physical Sciences	12 (6.6%)	86 (14.8%)
- Social Ecology	19 (10.5%)	29 (5%)
- Social Sciences	23 (12.7%)	65 (11.2%)
- Engineering	7 (3.9%)	56 (9.6%)
<b>Highest Degree</b>		
- PhD	164 (90.6%)	493 (84.7%)
- Professional	8 (4.4%)	67 (11.5%)
- Other	9 (5%)	22 (3.8%)
<b>Year of Highest Degree</b>		
- 1947 to 1973	27 (14.9%)	236 (40.5%)
- 1974 to 1982	59 (32.6%)	154 (26.5%)
- 1983 to 1991	64 (35.4%)	149 (25.6%)
- 1992 to 2008	31 (17.1%)	43 (7.4%)
<b>Year of Hire</b>		
- 1965 to 1983	42 (23.2%)	237 (40.7%)
- 1984 to 1991	58 (32%)	186 (32%)
- 1992 to 1999	80 (44.2%)	159 (27.3%)
- 2000 to 2008	1 (0.6%)	0 (0%)
<b>Faculty Rank</b>		
- Assistant	46 (25.4%)	88 (15.1%)
- Associate	63 (34.8%)	114 (19.6%)
- Full	71 (39.2%)	377 (64.8%)
- Acting Series	1 (0.6%)	3 (0.5%)
<b>Administrative Duties</b>		
- No	174 (96.1%)	559 (96%)
- Yes	7 (3.9%)	23 (4%)

**Table 2. Faculty characteristics in 2003.**

Characteristic	Females (N=248)	Males (N=699)
<b>Ethnicity</b>		
- White	180 (72.9%)	533 (76.5%)
- Asian	36 (14.6%)	88 (12.6%)
- African-American	9 (3.6%)	12 (1.7%)
- Latin/Mexican	15 (6.1%)	34 (4.9%)
- Other	7 (2.8%)	30 (4.3%)
<b>School</b>		
- ICS	12 (4.8%)	38 (5.4%)
- Arts	20 (8.1%)	32 (4.6%)
- Education	2 (0.8%)	8 (1.1%)
- Business	13 (5.2%)	28 (4%)
- Biological Sciences	23 (9.3%)	71 (10.2%)
- Humanities	70 (28.2%)	86 (12.3%)
- Medicine (Basic)	15 (6%)	46 (6.6%)
- Medicine (Clinical)	18 (7.3%)	94 (13.4%)
- Physical Sciences	11 (4.4%)	103 (14.7%)
- Social Ecology	25 (10.1%)	34 (4.9%)
- Social Sciences	32 (12.9%)	81 (11.6%)
- Engineering	7 (2.8%)	78 (11.2%)
<b>Highest Degree</b>		
- PhD	226 (91.1%)	593 (84.8%)
- Professional	10 (4%)	70 (10%)
- Other	12 (4.8%)	36 (5.2%)
<b>Year of Highest Degree</b>		
- 1947 to 1973	26 (10.5%)	196 (28%)
- 1974 to 1982	65 (26.2%)	170 (24.3%)
- 1983 to 1991	75 (30.2%)	165 (23.6%)
- 1992 to 2008	82 (33.1%)	168 (24%)
<b>Year of Hire</b>		
- 1965 to 1983	38 (15.3%)	191 (27.3%)
- 1984 to 1991	48 (19.4%)	161 (23%)
- 1992 to 1999	80 (32.3%)	169 (24.2%)
- 2000 to 2008	82 (33.1%)	178 (25.5%)
<b>Faculty Rank</b>		
- Assistant	71 (28.6%)	152 (21.7%)
- Associate	64 (25.8%)	127 (18.2%)
- Full	112 (45.2%)	419 (59.9%)
- Acting Series	1 (0.4%)	1 (0.1%)
<b>Administrative Duties</b>		
- No	233 (94%)	665 (95.1%)
- Yes	15 (6%)	34 (4.9%)

**Table 3. Faculty characteristics in 2008.**

Characteristic	Females (N=342)	Males (N=769)
<b>Ethnicity</b>		
- White	241 (71.5%)	566 (74%)
- Asian	56 (16.6%)	104 (13.6%)
- African-American	9 (2.7%)	16 (2.1%)
- Latin/Mexican	19 (5.6%)	40 (5.2%)
- Other	12 (3.6%)	39 (5.1%)
<b>School</b>		
- ICS	19 (5.6%)	50 (6.5%)
- Arts	24 (7%)	38 (4.9%)
- Health Sciences	9 (2.6%)	9 (1.2%)
- Education	12 (3.5%)	7 (0.9%)
- Business	18 (5.3%)	30 (3.9%)
- Biological Sciences	24 (7%)	72 (9.4%)
- Humanities	84 (24.6%)	94 (12.2%)
- Law	3 (0.9%)	2 (0.3%)
- Medicine (Basic)	16 (4.7%)	42 (5.5%)
- Medicine (Clinical)	25 (7.3%)	94 (12.2%)
- Physical Sciences	23 (6.7%)	110 (14.3%)
- Social Ecology	29 (8.5%)	34 (4.4%)
- Social Sciences	47 (13.7%)	94 (12.2%)
- Engineering	9 (2.6%)	93 (12.1%)
<b>Highest Degree</b>		
- PhD	308 (90.1%)	667 (86.7%)
- Professional	15 (4.4%)	61 (7.9%)
- Other	19 (5.6%)	41 (5.3%)
<b>Year of Highest Degree</b>		
- 1947 to 1973	18 (5.3%)	133 (17.3%)
- 1974 to 1982	68 (19.9%)	176 (22.9%)
- 1983 to 1991	80 (23.4%)	174 (22.6%)
- 1992 to 2008	176 (51.5%)	286 (37.2%)
<b>Year of Hire</b>		
- 1965 to 1983	25 (7.3%)	119 (15.5%)
- 1984 to 1991	40 (11.7%)	131 (17%)
- 1992 to 1999	69 (20.2%)	138 (17.9%)
- 2000 to 2008	208 (60.8%)	381 (49.5%)
<b>Faculty Rank</b>		
- Assistant	108 (31.6%)	136 (17.7%)
- Associate	90 (26.3%)	165 (21.5%)
- Full	139 (40.6%)	461 (59.9%)
- Acting Series	5 (1.5%)	7 (0.9%)
<b>Administrative Duties</b>		
- No	326 (95.3%)	722 (93.9%)
- Yes	16 (4.7%)	47 (6.1%)

## Section VI. Cross-sectional comparisons of median salary by gender and ethnicity

This section contains estimates of the adjusted relative difference in median salary by gender (Table 4) and ethnicity (Tables 5a and 5b) for each year. All estimates are adjusted for gender, ethnicity, highest degree, year of degree, most recent year of hire, school, and presence of administrative duties in any particular year.

As noted in Section III, because of limited numbers of faculty in some schools I chose to collapse schools based upon my understanding of similarities of the faculty salaries across schools. This collapsing was done *a priori* (before any regression models were fit) and was collapsed as follows: ICS/Engineering, Arts/Ed/Humanities, Business, Biological Sciences, Medicine (clinical and basic), Social Ecology, Physical Sciences, and Social Sciences. ICS was combined with Engineering because there were only 28 faculty (5 females) available for analysis in 1998. Arts and Education were combined with Humanities because there were only 39 (14 females) and 6 (1 female) faculty in these schools in 1998. Clinical (14 female faculty in 1998) and basic medicine (12 female faculty in 1998) were collapsed because only institutional salaries were analyzed.

Finally, note that for each year there are two estimates: the first without adjustment for rank or step, and the second adjusted for rank and step within rank.

### VI.1 Cross-sectional comparisons of median salary by gender

Table 4 contains the adjusted relative difference in median salary comparing males to females for each year from 1998 to 2008. The following is an interpretation of the results for 1998. Estimates for other years can be interpreted analogously.

*Using data for faculty employed at UCI in 1998 it is estimated that the median salary for male faculty members was approximately 1.8% higher than that of female faculty members of similar ethnicity, highest degree earned, year of degree, year of most recent hire, school appointment, and presence of administrative duties (95% CI for ratio of median salaries: 0.991, 1.046). After further adjustment for step within rank, it is estimated that the median salary for male faculty members was approximately 1.1% higher than that of female faculty members (95% CI for ratio of median salaries: 0.999, 1.023).*

**Table 4. Cross-sectional comparisons of median salary by gender.\***

Year	Without Adjustment for Rank/Step		With Adjustment for Rank/Step	
	Est. Ratio (M:F) of Median Salary (95% CI)	p-Value	Est. Ratio (M:F) of Median Salary (95% CI)	p-Value
1998	1.018 (0.991, 1.046)	0.190	1.011 (0.999, 1.023)	0.072
1999	1.013 (0.986, 1.041)	0.366	1.014 (1.000, 1.028)	0.048
2000	1.032 (1.003, 1.061)	0.030	1.020 (1.005, 1.035)	0.011
2001	1.028 (1.000, 1.057)	0.051	1.016 (1.000, 1.032)	0.054
2002	1.028 (1.000, 1.057)	0.047	1.016 (1.001, 1.032)	0.042
2003	1.024 (0.997, 1.053)	0.086	1.010 (0.994, 1.027)	0.219
2004	1.030 (1.003, 1.059)	0.029	1.011 (0.995, 1.028)	0.183
2005	1.030 (1.004, 1.057)	0.026	1.009 (0.993, 1.025)	0.261
2006	1.023 (0.997, 1.051)	0.085	1.005 (0.988, 1.021)	0.571
2007	1.022 (0.997, 1.047)	0.087	0.995 (0.979, 1.011)	0.517
2008	1.021 (0.996, 1.047)	0.103	0.995 (0.979, 1.012)	0.547

\* Estimates are adjusted for ethnicity, highest degree, year of degree, year of hire, school, and presence of administrative duties.

## **VI.2 Cross-sectional comparisons of median salary by ethnicity**

Tables 5a and 5b contain the adjusted relative difference in median salary by ethnicity group for each year from 1998 to 2008. Note that due to small samples for many ethnicity groups, data were collapsed into the following categories: white, Asian, African-American, Latin/Mexican, and other. Despite this collapsing, many of the groups still had relatively few individuals in a given year, as can be observed from the fairly wide confidence limits on some of the estimates.

For each year, white ethnicity serves as the referent group so that all estimates correspond to the relative difference in median salary for a given ethnicity category relative to white. As before, all analyses are adjusted for gender, highest degree, year of degree, most recent year of hire, school, and presence of administrative duties.

The following is an interpretation of the results for 1998. Estimates for other years can be interpreted analogously.

*Using data for faculty employed at UCI in 1998 it is estimated that the median salary for Asian faculty members was approximately 1.3% lower than that of white faculty members of similar gender, highest degree earned, year of degree, year of most recent hire, school appointment, and presence of administrative duties (95% CI for ratio of median salaries: 0.952, 1.022). Additionally, it is estimated that the median salary for African American faculty members was approximately 2.8% higher than that of white faculty members of similar gender, highest degree earned, year of degree, most recent year of hire, school appointment, and presence of administrative duties (95% CI for ratio of median salaries: 0.955, 1.107). After further adjustment for rank and step within rank, it is estimated that the median salary for Asian faculty members was the same as that of white faculty members (95% CI for ratio of median salaries: 0.984, 1.016), while it is estimated that the median salary for African American faculty members was approximately 4.0% higher than that of white faculty members (95% CI for ratio of median salaries: 1.006, 1.075).*

**Table 5a. Cross-sectional comparisons of median salary by ethnicity (1998-2003).\***

Year	Ethnicity	<i>Without Adjustment for Rank/Step</i>		<i>With Adjustment for Rank/Step</i>	
		<i>Est. Ratio (relative to white) of Median Salary (95% CI)</i>	<i>p-Value</i>	<i>Est. Ratio (relative to white) of Median Salary (95% CI)</i>	<i>p-Value</i>
1998	White	1.0		1.0	
	Asian	0.987 (0.952, 1.022)	0.459	1.000 (0.984, 1.016)	0.9981
	African-American	1.028 (0.955, 1.107)	0.459	1.040 (1.006, 1.075)	0.0222
	Latin-Mexican	1.020 (0.972, 1.071)	0.420	1.010 (0.989, 1.032)	0.3593
	Other	0.990 (0.928, 1.056)	0.760	1.038 (1.006, 1.072)	0.0199
1999	White	1.0		1.0	
	Asian	0.987 (0.952, 1.022)	0.460	1.001 (0.984, 1.019)	0.8780
	African-American	1.005 (0.930, 1.086)	0.894	1.037 (0.998, 1.078)	0.0664
	Latin-Mexican	1.021 (0.970, 1.074)	0.430	1.011 (0.986, 1.037)	0.3778
	Other	0.981 (0.920, 1.045)	0.551	1.004 (0.970, 1.039)	0.8252
2000	White	1.0		1.0	
	Asian	0.993 (0.958, 1.029)	0.687	1.001 (0.982, 1.021)	0.8991
	African-American	0.925 (0.853, 1.003)	0.060	1.025 (0.982, 1.070)	0.2534
	Latin-Mexican	1.005 (0.951, 1.062)	0.852	1.008 (0.978, 1.038)	0.6055
	Other	0.981 (0.919, 1.048)	0.575	0.988 (0.951, 1.026)	0.5319
2001	White	1.0		1.0	
	Asian	0.98 (0.946, 1.015)	0.265	1.000 (0.980, 1.020)	0.9988
	African-American	0.913 (0.84, 0.991)	0.030	1.022 (0.975, 1.070)	0.3712
	Latin-Mexican	1.032 (0.979, 1.088)	0.243	1.011 (0.981, 1.043)	0.4718
	Other	0.999 (0.939, 1.063)	0.981	1.010 (0.972, 1.049)	0.6094
2002	White	1.0		1.0	
	Asian	0.976 (0.943, 1.010)	0.165	1.006 (0.986, 1.026)	0.5742
	African-American	0.961 (0.887, 1.040)	0.323	1.045 (1.000, 1.093)	0.0522
	Latin-Mexican	1.019 (0.968, 1.072)	0.483	1.009 (0.980, 1.040)	0.5397
	Other	1.018 (0.957, 1.082)	0.575	1.014 (0.977, 1.051)	0.4672
2003	White	1.0		1.0	
	Asian	0.978 (0.944, 1.012)	0.202	0.997 (0.976, 1.019)	0.7979
	African-American	0.950 (0.878, 1.027)	0.197	1.030 (0.983, 1.078)	0.2157
	Latin-Mexican	0.999 (0.948, 1.052)	0.960	1.003 (0.972, 1.035)	0.8574
	Other	1.007 (0.949, 1.069)	0.814	1.008 (0.971, 1.046)	0.6771

\* Estimates are adjusted for gender, highest degree, year of degree, year of hire, school, and presence of administrative duties.



**Table 5b. Cross-sectional comparisons of median salary by ethnicity (2004-2008).\***

Year	Ethnicity	Without Adjustment for Rank/Step		With Adjustment for Rank/Step	
		Est. Ratio (relative to white) of Median Salary (95% CI)	p-Value	Est. Ratio (relative to white) of Median Salary (95% CI)	p-Value
2004	White	1.0		1.0	
	Asian	0.984 (0.951, 1.018)	0.354	0.996 (0.976, 1.017)	0.7392
	African-American	0.973 (0.900, 1.051)	0.486	1.041 (0.996, 1.089)	0.0783
	Latin-Mexican	1.017 (0.968, 1.069)	0.506	1.008 (0.979, 1.039)	0.5845
	Other	1.025 (0.969, 1.085)	0.394	1.011 (0.977, 1.047)	0.5218
2005	White	1.0		1.0	
	Asian	0.991 (0.959, 1.024)	0.598	1.009 (0.989, 1.030)	0.3744
	African-American	1.005 (0.932, 1.083)	0.895	1.033 (0.988, 1.080)	0.1522
	Latin-Mexican	0.999 (0.952, 1.048)	0.962	1.002 (0.972, 1.032)	0.9121
	Other	1.009 (0.956, 1.064)	0.754	1.002 (0.969, 1.036)	0.9062
2006	White	1.0		1.0	
	Asian	0.986 (0.953, 1.020)	0.405	1.002 (0.981, 1.023)	0.8683
	African-American	1.001 (0.926, 1.083)	0.973	1.012 (0.966, 1.061)	0.6137
	Latin-Mexican	0.997 (0.949, 1.048)	0.919	1.002 (0.971, 1.035)	0.8788
	Other	0.992 (0.939, 1.049)	0.781	0.992 (0.958, 1.027)	0.6517
2007	White	1.0		1.0	
	Asian	0.994 (0.963, 1.026)	0.723	1.007 (0.987, 1.028)	0.5101
	African-American	1.023 (0.951, 1.101)	0.538	1.011 (0.966, 1.058)	0.6373
	Latin-Mexican	0.991 (0.946, 1.039)	0.715	0.997 (0.966, 1.029)	0.8468
	Other	1.020 (0.969, 1.075)	0.444	1.008 (0.975, 1.042)	0.6559
2008	White	1.0		1.0	
	Asian	0.984 (0.952, 1.016)	0.323	1.002 (0.982, 1.024)	0.8183
	African-American	1.038 (0.963, 1.120)	0.325	1.012 (0.964, 1.063)	0.6169
	Latin-Mexican	0.975 (0.928, 1.025)	0.318	0.989 (0.957, 1.022)	0.5216
	Other	1.005 (0.952, 1.060)	0.866	0.996 (0.962, 1.032)	0.8465

\* Estimates are adjusted for gender, highest degree, year of degree, year of higher, school, and presence of administrative duties.

## Section VII. Comparison of starting salaries

This section considers the relative difference in median starting salaries by gender using data on all faculty hired at UCI from 1998 to 2008. All estimates are adjusted for gender, ethnicity, highest degree, year of degree, most recent year of hire, school (collapsed as noted in the introduction to this document), and presence of administrative duties in any particular year. As before, note that for each year there are two estimates: the first without adjustment for rank or step, and the second adjusted for rank and step within rank.

Table 6 depicts the characteristics of the 662 faculty hired on at UCI during the years 1998 and 2008. From Table 6, we can see that of these 662 new hires N=234 were women and N=428 were men. The majority of new hires were white, followed by Asian, Latin/Mexican, and African-American. The School of Humanities hired the most faculty over this time period (66 women and 64 men). Most new hires were hired at the Assistant Professor level and relatively few of the new hires started with administrative duties.

Table 7 presents estimates of the relative difference in median starting salary associated with each of the adjustment covariates included in the regression model. The primary goal of this analysis was to investigate potential systematic differences in starting salaries by gender at UCI. As such, it was a priori decided that models would first be tested for interactions between gender and school to determine if differences in starting salary by gender varied significantly by school. If this had been the case, results for starting salary would have further been examined at the individual school level. The, p-Value for testing the interaction between gender and school was calculated to be 0.86 without adjustment for rank or step and 0.94 with adjustment for rank and step within rank. Based upon this, it was decided that results would be pulled across schools but still adjusting for school in the model. These are the results presented in Table 7.

Interpretations corresponding gender and ethnicity differences are as follows:

- *It is estimated that the median starting salary for male faculty members was approximately 3.7% higher than that of female faculty members of similar ethnicity, year of hire, highest degree earned, year of degree, most recent year of hire, school appointment, and presence of administrative (95% CI for ratio of median salaries: 1.007, 1.068). After further adjustment for rank and step within rank at the time of hire, it is estimated that the median starting salary for male faculty members was approximately 0.4% higher than that of female faculty members (95% CI for ratio of median salaries: 0.983, 1.026).*
- *It is estimated that the median starting salary for Asian faculty members was approximately 2.1% higher than that of white faculty members of similar gender, year of higher, highest degree earned, year of degree, most recent year of hire, school appointment, and presence of administrative duties at the time of hire (95% CI for ratio of median salaries: 0.983, 1.060). Additionally, it is estimated that the median starting salary for African American faculty members was approximately 2.3% higher than that of white faculty members of similar gender, year of higher, highest degree earned, year of degree, most recent year of hire, school appointment, and presence of administrative duties at the time of hire (95% CI for ratio of median salaries: 0.945, 1.109). After further adjustment for rank and step within rank at the time of hire, it is estimated that the median starting salary for Asian faculty members was approximately 2.6% higher than that of white faculty members (95% CI for ratio of median salaries: 0.999, 1.055), while it is estimated that the median salary for African American faculty members was approximately 5.9% higher than that of white faculty members (95% CI for ratio of median salaries: 1.000, 1.121).*

**Table 6. Characteristics of faculty hired between 1998 and 2008 by gender (N=662).**

Characteristic	Females (N=234)	Males (N=428)
<b>Ethnicity</b>		
- White	154 (67.2%)	303 (71.3%)
- Asian	40 (17.5%)	70 (16.5%)
- African-American	10 (4.4%)	10 (2.4%)
- Latin/Mexican	14 (6.1%)	17 (4%)
- Other	11 (4.8%)	25 (5.9%)
<b>School</b>		
- ICS	17 (7.3%)	32 (7.5%)
- Arts	19 (8.1%)	24 (5.6%)
- Health Sciences	6 (2.6%)	5 (1.2%)
- Education	12 (5.1%)	10 (2.3%)
- Business	14 (6%)	24 (5.6%)
- Biological Sciences	11 (4.7%)	30 (7%)
- Humanities	66 (28.2%)	64 (15%)
- Law	3 (1.3%)	2 (0.5%)
- Medicine (Basic)	4 (1.7%)	15 (3.5%)
- Medicine (Clinical)	12 (5.1%)	41 (9.6%)
- Physical Sciences	14 (6%)	57 (13.3%)
- Social Ecology	20 (8.5%)	14 (3.3%)
- Social Sciences	30 (12.8%)	59 (13.8%)
- Engineering	6 (2.6%)	51 (11.9%)
<b>Highest Degree</b>		
- PhD	211 (90.2%)	369 (86.2%)
- Professional	11 (4.7%)	32 (7.5%)
- Other	12 (5.1%)	27 (6.3%)
<b>Year of Highest Degree</b>		
- 1947 to 1973	7 (3%)	24 (5.6%)
- 1974 to 1982	23 (9.8%)	55 (12.9%)
- 1983 to 1991	32 (13.7%)	72 (16.8%)
- 1992 to 2008	172 (73.5%)	277 (64.7%)
<b>Faculty Rank</b>		
- Assistant	161 (68.8%)	265 (61.9%)
- Associate	26 (11.1%)	40 (9.3%)
- Full	38 (16.2%)	104 (24.3%)
- Acting Series	9 (3.8%)	19 (4.4%)
<b>Administrative Duties</b>		
- No	229 (97.9%)	420 (98.1%)
- Yes	5 (2.1%)	8 (1.9%)

**Table 7. Model based estimates of relative differences in median starting salary. Estimates are adjusted for all covariates listed.**

<i>Covariate</i>	<i>Without Adjustment for Rank/Step</i>		<i>With Adjustment for Rank/Step</i>	
	<i>Est. Ratio of Median Salary (95% CI)</i>	<i>p-Value</i>	<i>Est. Ratio of Median Salary (95% CI)</i>	<i>p-Value</i>
Gender (Male vs Female)	1.037 (1.007, 1.068)	0.0165	1.004 (0.983, 1.026)	0.7029
Ethnicity				
-White	1.0		1.0	
-Asian	1.021 (0.983, 1.060)	0.2856	1.026 (0.999, 1.055)	0.0594
-African-American	1.023 (0.945, 1.109)	0.5717	1.059 (1.000, 1.121)	0.0510
-Latin-Mexican	0.998 (0.937, 1.064)	0.9638	1.018 (0.972, 1.065)	0.4566
-Other	0.986 (0.929, 1.045)	0.6311	0.992 (0.952, 1.035)	0.7258
Highest degree				
-PhD	1.0		1.0	
-Professional	0.933 (0.863, 1.008)	0.0795	1.008 (0.953, 1.067)	0.7741
-Other	0.780 (0.733, 0.831)	<.0001	1.000 (0.949, 1.053)	0.9867
Year of degree (per year)	0.972 (0.971, 0.974)	<.0001	0.998 (0.995, 1.000)	0.0768
School				
-ICS/Engineering	1.0		1.0	
-Arts/Ed/Humanities	0.769 (0.736, 0.803)	<.0001	0.763 (0.739, 0.788)	<.0001
-Business	1.600 (1.499, 1.708)	<.0001	1.611 (1.535, 1.691)	<.0001
-Biological Sciences	0.768 (0.722, 0.818)	<.0001	0.823 (0.786, 0.862)	<.0001
-Medicine	0.762 (0.713, 0.813)	<.0001	0.810 (0.772, 0.850)	<.0001
-Physical Sciences	0.863 (0.819, 0.909)	<.0001	0.864 (0.830, 0.898)	<.0001
-Social Ecology	0.784 (0.733, 0.839)	<.0001	0.813 (0.774, 0.854)	<.0001
-Social Sciences	0.891 (0.848, 0.936)	<.0001	0.875 (0.844, 0.907)	<.0001
Admin duties (yes vs no)	1.128 (1.010, 1.260)	0.0326	0.996 (0.916, 1.083)	0.9234
Year of hire (per year)	1.057 (1.052, 1.062)	<.0001	1.030 (1.025, 1.034)	<.0001

*\*Note:* p-Value for testing the interaction between gender by school was 0.86 without adjustment for rank/step and 0.94 with adjustment for rank/step.

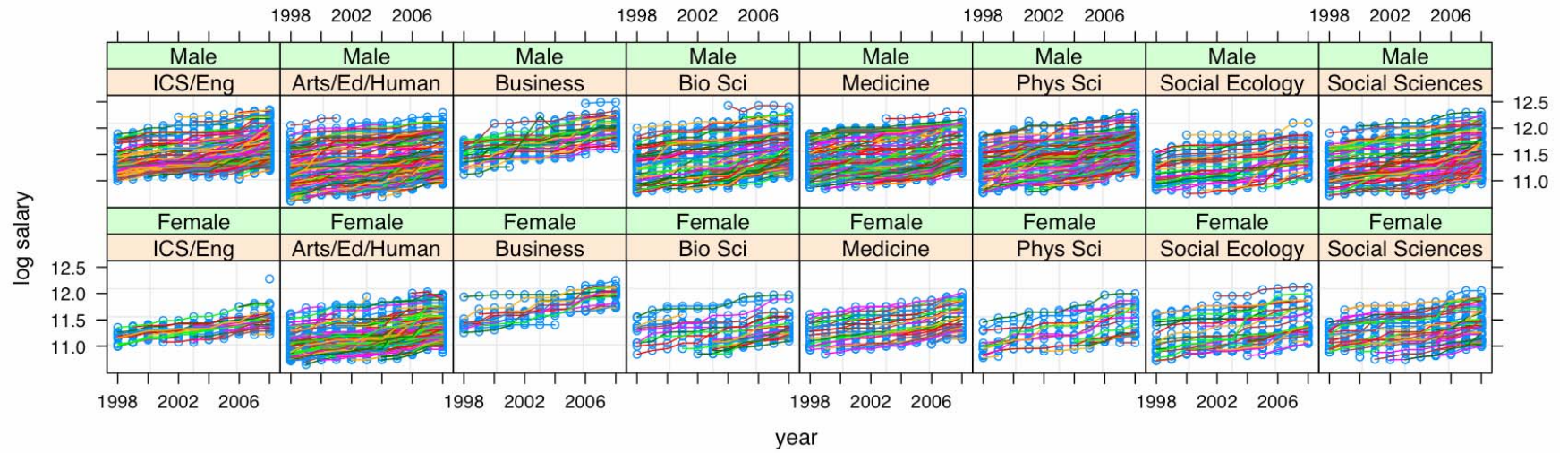
## Section VIII. Changes in salary over time

The third objective of the analysis proposed by the Council on Faculty Welfare was to investigate potential systematic differences in salary increases by gender for all faculty members employed at UCI during anytime between 1998 and 2008. As such, it was a priori decided that models would first be tested for interactions between gender and school to determine if differences in salary increases by gender varied significantly by school. If this had been the case, results for salary increases would have further been examined at the individual school level. The, p-Value for testing the interaction between gender and school was calculated to be 0.3180 without adjustment for rank or step and 0.7409 with adjustment for rank and step within rank. Based upon this, it was decided that results would be pulled across schools but still adjusting for school in the model.

Figure 1 of Appendix A depicts log-salary trajectories for faculty members by school. The purpose of this figure is to illustrate that log-salaries do in fact change relatively linearly over time (ie. faculty member salaries change multiplicatively over time). This was a priori stated in the analysis plan put forth by the Council on Faculty Welfare and was part of the motivation for modeling log-salary and interpreting results for relative differences in median salary.

After adjustment for ethnicity, highest degree, year of degree, most recent year of hire, school (collapsed as stated in the introduction of this document), and presence of administrative duties it is estimated that among females the median salary increased approximately 4.5% per year (95% CI: 4.3% to 4.7%) while among males it is estimated that the median salary increased approximately 4.1% per year (95% CI: 4.0% to 4.2%) (p-value for testing the difference in slopes was 0.0001). The test of interaction for the slope by gender and school resulted in a p-value of 0.3180. When also adjusting for rank and step it is estimated that among females the median salary increased approximately 2.3% per year (95% CI: 2.1% to 2.4%) while among males it is estimated that median salary increased approximately 2.1% per year (95% CI: 2.0% to 2.2%) (p-value for testing the difference in rank and step adjusted slopes was 0.0270). The test of interaction for the slope by gender and school resulted in a p-value of 0.7409. No appreciable differences in salary increases over time by ethnicity were found.

## Appendix A



**Figure 1. Individual trajectories of log-salary from 1998 to 2008 stratified by school and gender**