UNIVERSITY OF ILLINOIS AT SPRINGFIELD

Date: July 17, 2009

To: Harry Berman, Vice Chancellor of Academic Affairs and Provost

From: Salary Equity Budget Committee

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Subject: AY2008-2009 Salary Equity Report

The Salary Equity Committee met several times during the academic year with the idea of accomplishing three goals. First, the committee would construct and analyze the salary equity data for AY 2008-2009, including analysis of the model used in previous years. Second, the committee would develop an extended model that builds on the original model but deals with some issues raised with the model in previous years. The third goal was to conduct a preliminary external salary equity analysis. The attached report presents the analysis for these three initiatives. The purpose of this memo is to summarize the report highlights and make recommendations for the future.

- **AY2008-09 Data and Original Model Analysis:**

  As in previous years the salary equity data set was compiled and salary by individual faculty was adjusted for performance adjustments. A regression analysis was conducted on this "adjusted salary" (dependent variable) and the explanatory variables of rank, years-in-rank and eight discipline groups. Race and gender were also included in the analysis. The highlights of this analysis include:

  - There were no changes in the definition of faculty from the previous report. The final AY2008-2009 sample size was 170.

- The model regression results are similar to last year with little change in model fit, and regression coefficient size. The regression diagnostics were also similar to last year.
- The table below displays the results for race and gender and compares them to previous years. The race differences identified previously have decreased. The table below compares the estimated coefficient of gender (Female=1) across the three years. The gender differences have decreased slightly; last year female faculty earned, on average, $1,886 less and this year the difference is $1,274. However, there is a major issue with these estimates because as in previous years when the CBM is removed race and gender difference results change significantly.

Comparison of Results for Race and Gender By Academic year			
Variable	**Estimated Coefficient**		
	AY2006-07 (n=168)	**AY2007-08 (n=173)**	**AY2008-09 (n=170)**
Gender (Female=1)	-1,503	-1,886	-1,274
Race (Black, Hispanic, Native American=1)	5,635	4,097	2,631

- **Extended Model: Rationale and Results**

  For the past three years, the model analysis has produced results that seem to imply that there is a race and gender equity issue in salary in CBM. In examining this result, the committee felt that it was important to ensure that the model included all legitimate factors that affect salary in order to make the assertion that gender and race must explain any remaining salary variation. In order to do this the existing model was extended to include interaction terms between longevity and the disciplinary groups. These terms were included in an attempt to identify the impact of "differential compression" on the UIS salary structure. The results produced with this extended model confirm that different salary patterns have been observed in CBM, information technology areas and the campus as a whole. The extended model no longer requires the exclusion of CBM from the model, and shows little remaining variance that might be attributable to gender or race.

  In the development of this extended model some minor improvements were also made. They include:

  - *Log-linear model* is estimated, which means that the dependent variable is changed to the log of adjusted salary. Using this log-linear specification improves the fit of the model by decreasing variance in adjusted salary. Interpretation of the model is in terms of percentage differences rather than absolute differences. The salary difference among the various disciplines has

increased to the point that the impact of longevity and rank are best described in percentage terms rather than absolute dollar amounts.

- *Time on tenure track* is used rather than time in rank to evaluate experience or longevity beyond rank. Using years in rank in the model is a problem because it can reset on a couple of occasions in a typical academic career. Thus, years in rank can mask salary compression because it carries the implicit assumption that salary compression is corrected upon promotion, since use of that variable zeroes out any information about prior longevity.
- *CUPA Benchmarks* may be a possible replacement for rank and disciplinary groups in the model analysis; however this approach needs additional work, including the incorporation of "differential compression" variables. The application of the extended model to CUPA data confirmed the conclusion that race and gender have little, if any impact on UIS salary structure.

➢ Recommendations

In conclusion, the Salary Equity Committee makes the following recommendations:

- Future analysis of salary equity at UIS should use the extended model proposed in this memo and attached report. This can be defended on three grounds. First, the model provides a better fit of the data with no problem with the regression as revealed by the regression diagnostics. Second, the model is an "all UIS" model because the results indicate that the differences across programs, especially in CBM, have been captured and can be explained. The third reason is that the model better specifies longevity/experience and incorporates interaction terms to explain salary compression and differences in salary compression across programs. Finally, the model results can be used as an input into the salary equity process in the same way as previous years. Spreadsheets of the model results can be made available.
- The extended model revealed an interesting pattern of salary compression for the majority of faculty. One source of this compression may be the size of the promotion raises. The committee recommends examination of these raises and the possible consideration of changing the current level or instituting a policy of indexing.
- The committee recommends conducting further analysis of salary compression. The extended model has provided interesting results that explain previously revealed patterns in the data. Continued testing and refinement for validity is recommended. For example, further analysis of salary compression, especially for faculty that are "off cycle" in terms of promotion. Another model that combines data across years (pooling all years) will also address salary compression from a different perspective.

AY08-09 Salary Equity
Data Analysis and Model Results
July 17, 2009

This report summarizes the Salary Equity Committee analysis of AY08-09 salary data. There are 170 faculty in the sample, where faculty is defined as in previous years (see note in appendix table A1). The appendix at the end of the report provides the preliminary data analysis (description of the sample) and the regression diagnostics.

In addition to analyzing the data and estimating the model used in previous years, the Committee conducted two other analyses. First, the committee worked on revising the model to deal with previous issues identified. Second, the committee provided a preliminary external salary equity analysis. Thus, this report has the following parts:

- Part 1: Results for Original Model and Comparison With Previous Years
- Part 2: Functional Form Analysis—Linear versus Log-Linear
- Part 3: Salary Compression and Best Fit Model
- Part 4: External Salary Analysis Using CUPA data

Part 1: Regression Results

Table 1 presents the estimated model results using the AY08-09 data. The model explains 83.9 percent of the variation in adjusted salary. Table 2 presents the model results for this year (from table 1) next to the model results using last year's data. Comparing the results to last year's model estimation results indicate that again, the model is stable—there is little change in the model fit or estimated coefficient values.

Table 3 gives the model results when race and gender are included. Table 4 compares the race and gender coefficient estimates to previous years' results. The estimated coefficient on female became less negative by $612 relative to last year. This indicates lower differences, on average, by gender.

Part 2: Functional Form—Log Linear Versus Linear

The range of faculty salaries at UIS has gradually increased, to the point that the highest faculty salary is now four times the lowest. Attempting to describe the differences between ranks, for example, in terms of absolute dollar amounts (when the base salaries differ fourfold) is increasingly difficult to defend. Analyzing the log of salaries produces coefficients that represent differentials between ranks, for example, in terms of percentages, not absolute dollar amounts. The resulting model is more realistic and produces a better fit. The linear model and log-linear model that we suggest are:

$$\begin{aligned}\textit{Adjusted Salary} = {} & a + b_1 \times (\textit{Years in Rank}) + b_2 \times (\textit{ASSOC}) + b_3 \times (\textit{FULL}) + \\ & b_4 \times (\textit{GROUPA}) + b_5 \times (\textit{GROUPB}) + b_6 \times (\textit{GROUP C}) + \\ & b_7 \times (\textit{GROUP D}) + b_8 \times (\textit{GROUP E}) + b_9 \times (\textit{GROUP F}) + \\ & b_{10} \times (\textit{GROUP G}) + \text{Error Term}\end{aligned}$$

Where a is the constant term and b_i, i=1 to 10 are the coefficients to be estimated—all are in dollars

$$\begin{aligned}\textit{LN (Adjusted Salary)} = {} & c + d_1 \times (\textit{Years in Rank}) + d_2 \times (\textit{ASSOC}) + d_3 \times (\textit{FULL}) + \\ & d_4 \times (\textit{GROUPA}) + d_5 \times (\textit{GROUPB}) + d_6 \times (\textit{GROUP C}) + \\ & d_7 \times (\textit{GROUP D}) + d_8 \times (\textit{GROUP E}) + d_9 \times (\textit{GROUP F}) + \\ & d_{10} \times (\textit{GROUP G}) + \text{Error Term}\end{aligned}$$

Where c is the constant term in dollars and d_i, i=1 to 10 are the coefficients to be estimated in percentages.

Tables 5 and 6 report the regression results when the dependent variable is the log of salary (the log-linear model) for the model without and with race and gender. The model results for the corresponding linear model are also reported for comparison. The fit of the log-linear models is better as indicated by higher adjusted-R^2 and F-statistics.

The estimates of the coefficients are similar, but with slightly lower standard errors (higher t-values). The interpretations of the coefficients in this model are different. In the log-linear model, the transformed coefficients give estimated percentage changes (or differences) rather than dollar changes. For example, the increase for associate professors is, on average $6,491 in the linear model and in the logarithmic model, associate professors make on average 12.16% than their assistant professor counterparts (see table 5).

Part 3: Salary Compression and Best Fit Linear Model

Since the original report, the Salary Equity Committee has suggested that improvements are needed in the model in order to deal with two persistent issues. The first issue is that in previous years the model gives different results when College of Business and Management (CBM) faculty are excluded. This year the results excluding CBM yield similar results to previous year. Developing a model that fits all UIS faculty should be a priority. The second issue is how to deal with the notion of salary compression. The current way the model deals with salary compression is to use years in rank to measure longevity. The committee has long sought to better specify this variable and better estimate salary compression. The goal of the Salary Equity committee was to use analysis of the data and variable definitions to specify a new model to address these issues. A new model, that deals with CBM and isolates the salary compression issues, will more accurately address any gender and race issues in UIS salary structure.

The Salary Equity committee recommends the following three changes to the model.

1. **Years on Tenure Track:** In previous models, years in rank was used as a measure of longevity/experience beyond rank. The fact that this variable can reset on a couple of occasions in a typical academic career makes it difficult for this variable to capture the compression that might occur over an entire career. Using years in rank can mask salary compression because it carries the implicit assumption that salary compression is corrected upon promotion, since use of that variable zeroes out any information about prior longevity. In fact, the models here ascribe a value of about $6,000 to the promotion from assistant to associate. The raise associated with such a promotion has been $2,500 for some time. Arguably, promotion to associate does not correct any previous salary compression it actually exacerbates it substantially.

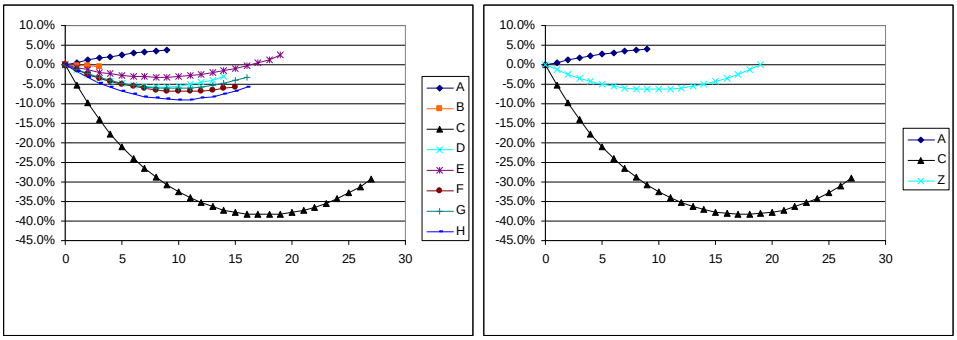
   Using years on tenure track along with rank deals with this issue and provides a similar fit with the model. Tables 7 and 8 present the results for these models with the different specification of longevity—using years in rank versus years on tenure track.

2. **Linear and Quadratic Terms:** The longevity variable can be further specified by including both linear and quadratic terms. The current model assumes a linear relationship between the variables, which means that time in tenure track increases, salary will increase and the change in salary will be by a constant amount equal to the regression coefficient. However, the relationship between salary and longevity probably will not be linear over a career that spans several decades. Including a quadratic term for time on tenure track captures at least some of that effect. When both time on tenure track and time on tenure track squared are included in the model, the adjusted R^2 increases from 0.864 to 0.878, as expected.

3. **Interaction Terms:** The estimated coefficients of the longevity variables (no matter how it is specified) is very low indicating that longevity or experience beyond rank has very little influence on salary. It could be that this result is because the model is for the entire campus and longevity may be different in different discipline groups. For example, using the entire campus, we could be masking two contradictory effects: the rapid escalation of salaries in CBM and generalized compression across the rest of the campus. To deal with this we can use interactions terms between longevity and discipline group to see if there are indeed differences in the relationship between salary and longevity by discipline group. Using several different models and being concerned about the number of coefficients to estimate, we specified six interaction variables. Three of the interaction variables are between time on tenure track and group A (Information Technology), group C (Business), and all other groups. Three more are the interaction between these groups and time on tenure track squared. We combined all the other groups with little loss of explanatory power of the model.

   Figure 1 show the cumulative effect of years on tenure track on predicted salary and the variations that occur in the disciplinary groups. While the effects seen in most of the disciplinary groups are similar, groups A and C do not fit the general pattern. Collapsing all the groups except A and C for the purpose of monitoring longevity simplifies the model without compromising the quality of the fit.

Figure 1: Predicted Salary by Years on Tenure Track By Program



The final model estimated then includes all the following changes

- The dependent variable is the log of adjusted salary
- Time on tenure track is used rather than time in rank to evaluate experience or longevity beyond rank
- Quadratic terms for longevity are included
- Interaction terms between longevity and discipline groups are used.

The results of the new model are reported in Table 9 for the model without and with race and gender. The model fit is now much higher, an adjusted R^2 of 0.928 and 0.924 for the model without and with race and gender, respectively.

The negative coefficient on the interaction term for the CBM programs, group C, shows the recent escalation of CBM salaries. The expected salary will be lower in these programs, the longer one has been here. For Group A, information technology, shows salaries that have declined from higher historical levels. This, too, reflects the reality that the bursting of the tech bubble led to decreasing enrollments in these programs. Program cutbacks led to a glut of qualified faculty in an area that was once a very difficult hire. Indeed, starting salaries in CSC are known to be lower than they once were. It is also interesting to note the general comparability of all the remaining groups. The pattern is one of generalized compression over the past two decades.

Incorporating the factors of race and gender into this model (last two columns of table 9) does not change quality of fit. The value on the gender coefficient is half what it was in the original model. This model suggests that what is going on in the CBM salary structure is rapid salary escalation and not a gender effect as the earlier analysis suggested. Further, the model does indicate more modest, pervasive salary compression at UIS.

Part 3: External Salary Analysis

This analysis provides one way to compare the level of UIS salaries to external salaries. While there are limitations to using CUPA data the committee decided that this was a feasible first step in external salary analysis. The process of comparing the UIS and CUPA salary structures for AY08-09 involved the following two steps:

1. Define a CUPA comparison group and obtain salary data for each program by rank. The All-Masters category of institutions was chosen as the comparison group because it covered most of the UIS programs, hence providing the most data points.[1] Categories were chosen according to the CIPS classification codes used for UIS' programs in most cases. The programs that were exceptions (and estimates used) were:
    - Legal Studies (LES) used the average of two programs: CRJ and POS. The rationale for this is that these three programs are in the same discipline group in the original model (see table A4).

[1] Two other CUPA data sets were analyzed in addition to the all masters for AY08-09. These were all masters institutions from 07-08 and all public institutions for 08-09. Using master's institutions arguably gives a better match to UIS. Using all public institutions, though, gives larger N values for the various ranks and disciplines. In a couple of instances, the master's institution data provides no value at all. The MA 0809 data was regressed against both other data sets. R^2 between the 0708 and 0809 MA data is 0.9893. Salaries increased 2.59% from one year to the next. R^2 between the 0809 MA and 0809 all public data was 0.9728. MA institutions paid, on average, 9.87% below the all publics group

- Human Services (HMS) used the Social Work (SWK) salaries as that was the closet fit.

- Sociology/Anthropology (SOA) is also unique at UIS. The averages of the CUPA sociology and anthropology were used.

- African-American Studies (AAS) and Women and Gender Studies (WGS), were not available in CUPA so the average of English and History was used.

- Astronomy/Physics (ASP) used the Chemistry program (CHE) data because of the unique combination of faculty in the ASP program.

Table 10 gives the CUPA salary data for AY08-09 by UIS program and rank. Note that five faculty are excluded from this analysis as there were no CUPA to match these faculty. These five include the 4 Library faculty and the 1 Modern Languages faculty. The final sample size is 165.

2. The second step was to specify the regression model for comparing UIS salary structure to CUPA salaries. Presumably, the CUPA is capturing the patterns in salary structure that result from differences in disciplines and ranks. The need to use logs to express those differences in relative terms is then obviated. A simpler, more easily understood question: What multiplier would translate CUPA salaries into UIS salaries? A multiplier of 1 would, of course, indicate perfect parity.

   Table 11 presents the estimation results for the simplest fit, which uses only the CUPA salary, and linear and quadratic terms in years on tenure track as variables. The need for terms representing ranks and disciplinary groups were removed by using CUPA data that incorporates those variables.

   This simplest model assumes that the translation between CUPA and UIS salaries is the same in all our programs and disciplines. We know, of course, that this is not the case. Salaries in some fields are much more market driven than others. In addition, even in the same field, market influences have changed over time. To capture these effects, interaction terms in the model allow difference multipliers for each of the disciplinary groups as in earlier analyses. Similarly, interaction terms can capture the changes that have occurred over time. Table 12 presents the results of this more complex CUPA model. The model fit has improved as evidenced by an increase in adjusted R^2 from 0.847 to 0.918.

   Addition of the variables race and gender produces the results shown in Table 13. The adjusted R^2 in this model does not increase at all. The previous model, which accounts for the market differences that occur between our disciplinary groups, as well as the changes that have occurred in those groups over time, accounts for a sizeable fraction of the yet unexplained variance in salaries. However, the factors of race and gender appear to have little ability to explain any further variance in salaries.

Table 1: AY08-09 Adjusted Salary Regression Results (N=170)			
	Estimated Coefficient	**Standard Error**	**t-value**
Constant[+]	46,773.14	1,365.49	34.3*
Years In Rank	250.81	114.75	2.2
Associate	6,491.05	1,309.39	5.0*
Full	18,043.29	2,132.28	8.5*
Group A: CSC_MIS (Info Tech)	36993.41	2,364.53	15.6*
Group B Library	-11,223.65	3,847.12	-2.9*
Group C: ACC_BUS_MGT (Business)	36,497.19	2,064.78	17.7*
Group D: ECO _MPH_PAD	14,010.12	2,460.88	5.7*
Group E: ASP_BIO_CHE_ENS_MAT_CLS	3,034.43	1,889.57	1.6
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	291.91	1,673.46	0.2
Group G: CRJ_LES_POS	7,352.44	2,067.00	3.6*
Model Fit: Adjusted R^2=0.840 F-Statistic=90.0			

Notes: +The baseline group is assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women and Gender Studies.

* Significant at 0.01 level or below.

Table 2:

Comparison and AY07-08 and AY08-09 Regression Results

Variable	Estimated Coefficient (t-statistic) AY2007-2008 (n=173)	AY2008-2009 (n=170)
Constant[+]	46,483 (33.7)*	46,773 (34.3)*
Years In Rank	256 (2.3)*	251 (2.2)
Associate	5,862 (4.3)*	6,491 (5.0)*
Full	16,352 (8.0)*	18,043 (8.5)*
Group A: CSC_MIS (Info Tech)	37,855 (15.2)*	36,993 (15.6)*
Group B Library	-12,317 (-3.2)*	-11,224 (-2.9)*
Group C: ACC_BUS_MGT (Business)	37,549 (18.7)*	36,497 (17.7)*
Group D: ECO _MPH_PAD	13,365 (5.5)*	14,010 (5.7)*
Group E: BIO_CHE_CLS_ENS_MAT	2,589 (1.3)	3,034 (1.6)
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	817 (0.5)	292 (0.2)
Group G: CRJ_LES_POS	7,272 (3.4)*	7,352 (3.6)*
Model Fit	Adjusted R^2=0.844 F-Statistic=94.2	Adjusted R^2=0.840 F-Statistic=90.0

Data for AY07-08 are from table 7 of the June 16, 2008 memo.

Notes: +The baseline group is assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

* Significant at 0.01 level or below.

Table 3:
AY08-09 Adjusted Salary Regression Results
With Gender and Race (N=170)

	Estimated Coefficient	Standard Error	t-value
Constant[+]	46,998	1,548	30.4*
Years In Rank	245	115	2.1
Associate	6,602	1,310	5.0*
Full	17,958	2,131	8.4*
Group A: CSC_MIS (Info Tech)	36,893	2,438	15.1*
Group B Library	-10,860	3,881	-2.8*
Group C: ACC_BUS_MGT (Business)	36,593	2,109	17.3*
Group D: ECO _MPH_PAD	13,862	2,485	5.6*
Group E: BIO_CHE_CLS_ENS_MAT	2,929	1,922	1.5
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	614	1,688	0.4
Group G: CRJ_LES_POS	7,378	2,071	3.6*
Gender (FEMALE =1)	-1,274	1,222	-1.0
Race (BLACK, HISPANIC, NATIVE IN =1)	2,631	2,074	1.3
Model Fit: Adjusted R^2=0.841 F-Statistic= 75.4			

Notes: +The baseline group is White or Asian, male assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

* Significant at 0.01 level or below.

Table 4: Comparison of Results for Race and Gender			
Variable	Estimated Coefficient (t-statistic)		
	AY2006-2007 (n=168)	**AY2007-2008 (n=173)**	**AY2008-2009 (n=170)**
Gender (Female=1)	-1,503 (-1.2)	-1,886 (-1.6)	-1,274 (-1.0)
Race (Black, Hispanic, Native American=1)	5,635 (2.8)*	4,097 (2.0)	2,631 (1.3)

Table 5:

Comparison and Function Form: Linear and Log-Linear# Regression Results:

Without Race and Gender (N=170)

Variable	**Estimated Coefficient (t-statistic)**	
	Linear	**Log-Linear #**
Constant[+]	46,773 (34.3)*	47,195 (611.6)*
Years In Rank	251 (2.2)	0.47% (3.2)*
Associate	6,491 (5.0)*	12.16% (6.8)*
Full	18,043 (8.5)*	30.13% (9.6)*
Group A: CSC_MIS (Info Tech)	36,993 (15.6)*	71.28% (17.7)*
Group B Library	-11,224 (-2.9)*	-23.68% (-5.4)*
Group C: ACC_BUS_MGT (Business)	36,497 (17.7)*	65.65% (19.0)
Group D: ECO _MPH_PAD	14,010 (5.7)*	25.65% (7.2)*
Group E: BIO_CHE_CLS_ENS_MAT	3,034 (1.6)	5.37% (2.1)
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	292 (0.2)	0.54% (0.2)
Group G: CRJ_LES_POS	7,352 (3.6)*	14.48% (5.1)*
Model Fit	Adjusted R^2=0.840 F-Statistic=90.0	Adjusted R^2=0.872 F-Statistic=116.4

Notes: +The baseline group is assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

#In the log-linear model lnY=a+bX, the interpretation of the estimated variable coefficient b is the percentage change in Y due to change in X. Unless X is a dummy variable in which case the percentage change in Y is given by e^b-1

* Significant at 0.01 level or below.

Table 6:
Linear and Log-Linear# Regression Results With Race and Gender: (n=170)

Variable	Estimated Coefficient (t-statistic)	
	Linear	**Log-Linear #**
Constant +	46,998 (30.4)*	47,097 (540.3)*
Years In Rank	245 (2.1)	0.47% (3.2)*
Associate	6,602 (5.0)*	12.29% (6.9)*
Full	17,958 (8.4)*	30.06% (9.6)*
Group A: CSC_MIS (Info Tech)	36,893 (15.1)*	71.79% (17.2)*
Group B Library	-10,860 (-2.8)*	-23.59% (-5.4)*
Group C: ACC_BUS_MGT (Business)	36,593 (17.3)*	66.38% (18.8)*
Group D: ECO _MPH_PAD	13,862 (5.6)*	25.72% (7.2)*
Group E: BIO_CHE_CLS_ENS_MAT	2,929 (1.5)	5.49% (2.2)
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	614 (0.4)	1.07% (0.5)
Group G: CRJ_LES_POS	7,378 (3.6)*	14.67% (5.1)*
GENDER (FEMALE=1)	-1,274 (-1.0)	-1.03% (-0.7)
RACE (BLACK, HISPANIC, NATIVE_AMER=1)	2,631 (1.3)	4.48% (1.6)
Model Fit	Adjusted R^2=0.841 F-Statistic=75.4	Adjusted R^2=0.873 F-Statistic=97.9

Notes: +The baseline group is male, White or Asian, assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

#In the log-linear model lnY=a+bX, the interpretation of the estimated variable coefficient b is the percentage change in Y due to change in X. Unless X is a dummy variable in which case the percentage change in Y is given by e^b-1

* Significant at 0.01 level or below.

Table 7:

Comparing Years-In-Rank to Years on Tenure Track Variables: Without Race and Gender

(Dependent Variable is Log of Adjusted Salary / N=170)

Variable	**Estimated Coefficient (t-statistic)**	
	Years-In-Rank	**Years-On-Tenure-Track**
Constant[+]	47,195 (611.6)*	47,321 (596.1)*
Longevity Variable	0.47% (3.2)*	0.25% (1.6)
Associate	12.16% (6.8)*	11.91% (5.3)*
Full	30.13% (9.6)*	27.16% (6.3)*
Group A: CSC_MIS (Info Tech)	71.28% (17.7)*	72.05% (17.4)*
Group B Library	-23.68% (-5.4)*	-24.03% (-5.4)*
Group C: ACC_BUS_MGT (Business)	65.65% (19.0)	67.09% (19.0)
Group D: ECO _MPH_PAD	25.65% (7.2)*	26.82% (7.4)*
Group E: BIO_CHE_CLS_ENS_MAT	5.37% (2.1)	5.80% (2.3)
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	0.54% (0.2)	0.45% (0.2)
Group G: CRJ_LES_POS	14.48% (5.1)*	14.66% (5.0)*
Model Fit	Adjusted R^2=0.872 F-Statistic=116.4	Adjusted R^2=0.866 F-Statistic=110.6

Notes: +The baseline group is assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

#In the log-linear model lnY=a+bX, the interpretation of the estimated variable coefficient b is the percentage change in Y due to change in X. Unless X is a dummy variable in which case the percentage change in Y is given by e^b-1

* Significant at 0.01 level or below.

Table 8:
Comparing Years-In-Rank to Years on Tenure Track Variables: With Race and Gender
(Dependent Variable is Log of Adjusted Salary / N=170)

Variable	Estimated Coefficient (t-statistic)	
	Years-In-Rank	**Years-On-Tenure-Track**
Constant [+]	47,097 (540.3)*	47,289 (527.7)*
Longevity Variable	0.47% (3.2)*	0.24% (1.6)
Associate	12.29% (6.9)*	12.08% (5.3)*
Full	30.06% (9.6)*	27.13% (6.3)*
Group A: CSC_MIS (Info Tech)	71.79% (17.2)*	72.36% (17.0)*
Group B Library	-23.59% (-5.4)*	-23.85% (-5.3)*
Group C: ACC_BUS_MGT (Business)	66.38% (18.8)*	67.69% (18.7)*
Group D: ECO _MPH_PAD	25.72% (7.2)*	26.79% (7.3)*
Group E: BIO_CHE_CLS_ENS_MAT	5.49% (2.2)	5.85% (2.2)
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	1.07% (0.5)	0.98% (0.4)
Group G: CRJ_LES_POS	14.67% (5.1)*	14.81% (5.1)*
GENDER (FEMALE=1)	-1.03% (-0.7)	-1.26% (-0.8)
RACE (BLACK, HISPANIC, NATIVE_AMER=1)	4.48% (1.6)	4.38% (1.6)
Model Fit	Adjusted R^2=0.873 F-Statistic=97.9	Adjusted R^2=0.867 F-Statistic=92.9

Notes: +The baseline group is male, White or Asian, assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.
#In the log-linear model lnY=a+bX, the interpretation of the estimated variable coefficient b is the percentage change in Y due to change in X. Unless X is a dummy variable in which case the percentage change in Y is given by e^b-1

* Significant at 0.01 level or below.

Table 9:
Final Model Regression Results
(Dependent Variable= Log of Adjusted Salary / N=170)

Variable	Without Race & Gender		With Race & Gender	
	Estimated Coefficient	t-Statistic	Estimated Coefficient	t-Statistic
Constant [+]	48,068	690.7*	47,775	605.6*
Associate	16.85%	7.6*	16.65%	7.4*
Full	30.67%	8.5*	30.50%	8.5*
Group A: CSC_MIS (Info Tech)	66.20%	13.1*	67.22%	13.1*
Group B Library	-25.06%	-7.5*	-25.10%	-7.5*
Group C: ACC_BUS_MGT (Business)	121.93%	19.9*	123.34%	19.4*
Group D: ECO _MPH_PAD	25.58%	9.6*	25.88%	9.5*
Group E: BIO_CHE_CLS_ENS_MAT	6.06%	3.2*	6.33%	3.3*
Group F: COM_EDL_HDC_HMS_PSY_SOA_SWK_TEP	1.02%	0.6	1.38%	0.8
Group G: CRJ_LES_POS	15.47%	7.2*	15.66%	7.2*
Time-On-Tenure Track * Group A	0.69%	0.7	0.71%	0.8
Time-On-Tenure Track * Group C	-5.31%	-7.6*	-5.29%	-7.4*
Time-On-Tenure Track * All Others	-1.31%	-3.2*	-1.24%	-3.0*
(Time-On-Tenure Track * A)^2	-0.023%	-0.7	-0.023%	-0.7
(Time-On-Tenure Track * C) ^{2}	0.156%	6.4*	0.155%	6.2*
(Time-On-Tenure Track * All Other Groups) ^{2}	0.073%	5.1*	0.070%	4.9*
Gender (Female=1)	-	-	-0.11%	-0.1
Race (Black, Hispanic, Native American=1)	-	-	3.11%	1.5
Model Fit	Adjusted R^2=0.928 F-Statistic=145.2		Adjusted R^2=0.928 F-Statistic=128.5	

Notes: +The baseline group is male, White or Asian, assistant professors in group H—African American Studies, English, History, Individual Option, Philosophy, Visual Arts and Women's Studies.

#In the log-linear model lnY=a+bX, the interpretation of the estimated variable coefficient b is the percentage change in Y due to change in X. Unless X is a dummy variable in which case the percentage change in Y is given by e^b-1

* Significant at 0.01 level or below.

Table 11:
AY08-09 Adjusted Salary/CUPA Regression Results (N=165)

	Estimated Coefficient	Standard Error	t-value
Constant	-7874.80	2587.14	-3.0*
Years On Tenure Track	-1480.83	252.97	-5.9*
Years On Tenure Track Squared	50.07	9.61	5.2*
CUPA Multiplier	1.216	0.044	27.4*
Model Fit: Adjusted R^2=0.847 F-Statistic=303.1			

* Significant at 0.01 level or below.

Table 10: CUPA Data: All Masters

UIS Program	6-Digit CIP	4-Digit CIP	CUPA Category	Assistant	Associate	Full
Environmental Studies	03.0103	03.01	Natural Resources Conservation & Research	$50,042	$63,693	$78,346
Environmental Science	03.0104	03.01				
Communication	09.0199	09.01	Communications and Media Studies	$49,746	$58,758	$74,467
Public Affairs Reporting	09.0401	09.04	Journalism	$47,809	$59,358	$75,215
Computer Science	11.0701	11.07	Computer Science	$71,662	$79,645	$96,168
Educational Leadership	13.0401	13.04	Educational Administration & Supervision	$55,933	$63,329	$81,310
Teacher Leadership	13.0404	13.04				
Legal Studies	22.9999	22.99	Legal Professions and Studies, Other (Used Avg of CRJ & POS)	$50,358	$60,557	$75,962
English	23.0101	23.01	English Language & Literature-Gen	$47,164	$56,203	$70,569
Liberal Studies	24.0101	24.01	Liberal Arts and Sciences, General Studies, and Humanities	$48,309	$60,646	$78,417*
Individual Option	24.0199	24.01				
Biology	26.0101	26.01	Biology, General	$51,062	$59,866	$75,766
Mathematical Sciences	27.0101	27.01	Mathematics	$51,168	$60,493	$74,541
Philosophy	38.0101	38.01	Philosophy	$47,882	$56,504	$73,557
Chemistry	40.0501	40.05	Chemistry	$50,691	$60,131	$76,398
Psychology	42.0101	42.01	Psychology, General	$50,310	$59,650	$75,585
Human Develop. Counseling	42.0601	42.06	Counseling Psychology	$46,503	$55,544*	$70,422
Criminal Justice	43.0104	43.01	Criminal Justice and Corrections	$51,766	$61,424	$76,822
Human Services	44.0000	44.00	Human Services, General (Used SWK)	$51,156	$62,270	$74,501
Public Administration	44.0401	44.04	Public Administration	$57,064	$65,485	$84,156

UIS Program	6-Digit CIP	4-Digit CIP	CUPA Category	Assistant	Associate	Full
Social Work	44.0701	44.07	Social Work	$51,156	$62,270	$74,501
Economics	45.0601	45.06	Economics	$69,060	$75,234	$89,494
Political Studies	45.1001	45.10	Political Science and Government	$48,949	$59,690	$75,102
Sociology/Anthropology	45.9999	45.99	Social Sciences, Other (Used average of SOC and ANT)	$48,983	$57,863	$76,080
Visual Arts	50.0702	50.07	Fine and Studio Art	$46,981	$55,549	$69,901
Clinical Laboratory Science	51.1005	51.10	Clinical/Medical Laboratory Sciences and Allied Professions	$55,410	$69,287	$73,484
Public Health	51.2201	51.22	Public Health	$52,895	$63,892	$74,636
Business Administration	52.0201	52.02	Business Admin Management & Operations	$79,196	$83,709	$95,863
Management	52.0299	52.02				
Accountancy	52.0301	52.03	Accounting and Related Services	$88,649	$92,275	$103,384
Management Info. Systems	52.1201	52.12	Management Info. Systems & Services	$82,621	$90,628	$97,052
History	54.0101	54.01	History	$47,565	$56,318	$73,364
Women & Gender Studies	05.0207	05.02	Area, Ethnic, Cultural, and Gender Studies (Used Average of ENG & HIS)	$47,365	$56,261	$71,967
African-American Studies	05.0201	05.02				
Teacher Education	13.1299	13.12	Teacher Ed & Prof Dev, Levels & Methods	$50,874	$59,209	$72,875
Astronomy/Physics	40.0201	40.02	Astronomy & Astrophysics (Used CHE)	$50,691	$60,131	$76,398

Note: *There was no salary data for this program/rank, using the “All Master’s Institutions” data. Comparable data using “All Public Institutions” (i.e., not limiting to just Master’s institutions) was used. Using the data for the larger group was used for the missing data because the “All Public Institutions” and “All Master’s Institutions” data were strongly correlated.

Table 12:
AY08-09 Adjusted Salary/CUPA Regression Results with Differential Effects(N=165)

	Estimated Coefficient	Standard Error	t-value
Constant	23232.77	4540.44	5.1*
GROUP A *CUPA	0.740	0.072	10.3*
GROUP C *CUPA	1.057	0.061	17.4*
GROUP D *CUPA	0.654	0.086	7.6*
GROUP E *CUPA	0.541	0.092	5.9*
GROUP F *CUPA	0.506	0.094	5.4*
GROUP G *CUPA	0.633	0.095	6.7*
GROUP H *CUPA	0.524	0.095	5.5*
GROUP A *Years on Tenure Track	1102.20	724.12	1.5
GROUP C *Years on Tenure Track	-4258.91	512.63	-8.3*
GROUP Other *Years on Tenure Track	-421.45	243.20	-1.7
GROUP A *Years on Tenure Track squared	-22.10	26.13	-0.8
GROUP C *Years on Tenure Track squared	123.49	17.72	7.0*
GROUP Other *Years on Tenure Track squared	33.61	8.68	3.9*
Model Fit: Adjusted R^2=0.918 F-Statistic=141.4			

* Significant at 0.01 level or below.

Table 13:
AY08-09 Adjusted Salary/CUPA Regression Results with Differential Effects with Race and Gender(N=165)

	Estimated Coefficient	Standard Error	t-value
Constant	22643.15	4553.06	5.0*
GROUP A *CUPA	0.748	0.072	10.4*
GROUP C *CUPA	1.063	0.061	17.5*
GROUP D *CUPA	0.659	0.086	7.7*
GROUP E *CUPA	0.547	0.092	6.0*
GROUP F *CUPA	0.513	0.094	5.5*
GROUP G *CUPA	0.638	0.095	6.7*
GROUP H *CUPA	0.528	0.095	5.5*
GROUP A *Years on Tenure Track	1087.23	723.76	1.5
GROUP C *Years on Tenure Track	-4265.69	524.22	-8.1*
GROUP Other *Years on Tenure Track	-403.61	243.38	-1.7
GROUP A *Years on Tenure Track squared	-21.81	26.11	-0.8
GROUP C *Years on Tenure Track squared	123.72	18.14	6.8*
GROUP Other *Years on Tenure Track squared	32.64	8.69	3.8*
Gender (Female=1)	40.97	893.48	-0.0
Race (Black, Hispanic, Native American=1)	2572.41	1575.95	1.6
Model Fit: Adjusted R^2=0.918 F-Statistic=123.3			

* Significant at 0.01 level or below.

APPENDIX

Tables A1 through A4 provide a description of the sample by rank, gender, ethnicity, college and discipline group. The definition of faculty is the same as in previous years' analysis (see footnote to table 1). The final AY2008-2009 cohort consists of 170 faculty.

Tables A5 and A6 provide descriptive statistics of the adjusted salary variable by rank and by discipline group and rank, respectively. Recall that adjusted salary is the actual salary adjusted for annual performance raises or reductions.

Similar to appendix C of the original report, regression diagnostics were performed in the following two areas:

- **Multicollinearity analysis**: Using traditional ways of detecting multicollinearity there was no multicollinear variables detected.

- **Outliers/Influential Observations:** Outliers or influential observations were identified using outlier detection and Cooks Distance measure. Table A7 summarizes the outlier analysis for the original model. These analyses have identified 13 observations that potentially influence the estimation results. Table A8 summarizes the outlier analysis for the final model. These analyses have identified 18 observations that potentially influence the estimation results. These outliers differ from the original model's set of outliers. Table A9 summarizes the outlier analysis for the CUPA model. There are 14 potential outliers for this model.

Table A1:
AY2008-2009 Tenured / Tenure-Track Faculty*:
By Rank and Gender

RANK	GENDER F	GENDER M	Total Sample
Assistant Professor	35	50	85 (50.0%)
Associate Professor	30	39	69 (40.6%)
Professor	4	12	16 (9.4%)
TOTAL	**69 (40.6%)**	**101 (59.4%)**	**170 (100.0%)**

*Excludes the following categories of faculty; full-time non-tenure track faculty; part-time/adjunct faculty; faculty currently or formerly holding endowed professorships/ chairs; academic administrators; former academic administrators.

Table A2:
Sample Description by Race

Ethnicity	Number	Percent
Asian	24	14.1
Black	7	4.1
Hispanic	5	2.9
Native American	2	1.2
White	132	77.6
Total	**170**	**100.0**

Table A3:
Sample Description by College

College	Number	Percent
BUS	29	17.0
EHS	20	11.8
LAS	85	50.0
LIB	4	2.4
PAA	32	18.8
Total	170	100.0

Table A4
Discipline Groups
(n=170)

Group A (n=13)	CSC-Computer Science MIS-Management Information Systems
Group B (n=4)	LIB-Library
Group C (n=20)	ACC-Accountancy BUS-Business MGT-Management
Group D (n=12)	ECO-Economics PAD-Public Administration MPH-Public Health
Group E (n=26)	ASP-Astronomy/Physics BIO-Biology CHE-Chemistry CLS-Clinical Laboratory Science ENS-Environmental Studies MAT-Mathematics
Group F (n=40)	COM-Communication EDL-Educational Leadership HDC-Human Development Counseling HMS-Human Services PSY-Psychology SWK-Social Work SOA-Sociology/Anthropology TEP-Teacher Education
Group G (n=19)	CRJ-Criminal Justice LES-Legal Studies POS-Political Studies
Group H (n=36)	AAS-African-American Studies ENG-CTL and English HIS-History INO-Individual Option MLG-Modern Language PHI-Philosophy ART-Visual Art WGS-Women and Gender Studies

Table A5:
Description Statistics for Adjusted-Salary:
Total Sample and By Rank

Rank (n)	Mean	St. Dev.	Minimum	Maximum
Assistant (85)	54,562	14,505	33,750	111,650
Associate (69)	64,321	15,809	41,439	116,522
Full (16)	85,331	21,827	59,193	135,249
Total (170)	**61,419**	**18,128**	**33,750**	**135,249**

Table A6:
Descriptive Statistics for Adjusted Salary
by Discipline Group and Rank

Group	Mean (Number of Observations)			
	Assistant	**Associate**	**Full**	**Total**
A	82,907 (8)	93,607 (2)	106,299 (3)	89,951 (13)
B	35,750 (3)	41,439 (1)	na (0)	37,172 (4)
C	93,566 (4)	89,929 (11)	99,982 (5)	93,170 (20)
D	55,862 (5)	73,871 (7)	na (0)	66,367 (12)
E	49,710 (15)	59,099 (11)	na (0)	53,682 (26)
F	48,393 (21)	53,669 (17)	68,257 (2)	51,629 (40)
G	54,477 (12)	63,522 (6)	68,322 (1)	58,062 (19)
H	46,945 (17)	54,253 (14)	68,332 (5)	52,757 (36)

Table A7:
Suspected Outlier For Original Model
Based on Residuals and Cook's Distance

Last Name	Program	Salary	Predicted Salary	Standardized Residual*	Cook's Distance**
	MGT	84,282	101,815	-17,533	-2.42
	PAD	86,219	67,525	18,694	2.58
	ACC	104,038	83,772	20,266	2.80
	WGS	92,013	69,080	22,933	3.17
	ACC	115,017	89,761	25,256	3.49
	MGT	116,522	90,263	26,259	3.63
	ACC	111,650	83,521	28,129	3.88
	MGT	135,249	102,066	33,183	4.58
	BUS	91,200	102,317	-11,117	-1.53
	CSC	71,050	84,017	-12,967	-1.79
	CSC	69,500	83,767	-14,267	-1.97
	BUS	80,188	94,527	-14,339	-1.98
	BUS	96,164	108,085	-11,921	-1.65

*Outliers are identified using the residuals as follows. Observations with a residual that is 2 standard deviations or more from the average residual (zero) are considered outliers. This results in a set of seven observations (the shaded ones).

**An observation is influential if removing the observation substantially changes the estimate of coefficients. The Cook's Distance measure can be used to detect influential observations. Large values of the Cook's D identify those observations with large impacts. A rule of thumb an influential observation is one with a Cook's D value that exceeds 4/N (where N is number of observations). In our case this rule of thumb cut-off is 0.023 (=4/170). Six additional outliers were added using this criteria.

Table A8:
Suspected Outlier For Final Model
Based on Residuals and Cook's Distance

Last Name	Program	Salary	Predicted Salary	Standardized Residual*	Cook's Distance**
	MGT	79,277	96,238	-2.757	0.106
	MGT	79,298	91,836	-2.088	0.048
	MIS	94,300	81,388	2.094	0.035
	ENS	65,707	56,269	2.205	0.019
	CLS	68,916	57,628	2.544	0.042
	PSY	57,530	46,975	2.883	0.018
	PAD	86,219	69,662	3.033	0.158
	CSC	69,500	79,886	-1.981	0.113
	MGT	79,965	91,795	-1.962	0.027
	CSC	71,050	79,886	-1.667	0.080
	CLS	64,135	70,765	-1.399	0.037
	LIB	33,750	36,023	-0.927	0.024
	CSC	103,227	109,687	-0.863	0.031
	MIS	110,795	106,308	0.588	3.166
	WGS	92,013	83,756	1.337	0.099
	ACC	111,650	101,164	1.403	0.039
	MGT	135,249	120,006	1.701	0.067
	MIS	91,553	80,922	1.756	0.031

*Outliers are identified using the residuals as follows. Observations with a residual that is 2 standard deviations or more from the average residual (zero) are considered outliers. This results in a set of seven observations (the shaded ones).

**An observation is influential if removing the observation substantially changes the estimate of coefficients. The Cook's Distance measure can be used to detect influential observations. Large values of the Cook's D identify those observations with large impacts. A rule of thumb an influential observation is one with a Cook's D value that exceeds 4/N (where N is number of observations). In our case this rule of thumb cut-off is 0.023 (=4/170). Eleven additional outliers were added using this criteria.

Table A9:
Suspected Outlier For CUPA Model
Based on Residuals and Cook's Distance

Last Name	Program	Salary	Predicted Salary	Standardized Residual*	Cook's Distance**
	MGT	79,277	98,885	-3.80	0.158
	MGT	79,298	95,243	-3.09	0.075
	WGS	92,013	80,210	2.29	0.334
	MGT	116,522	103,653	2.49	0.077
	PAD	86,219	65,673	3.98	0.192
	MGT	135,249	112,853	4.34	0.279
	MPH	77,547	70,033	1.46	0.024
	CSC	103,227	107,085	-0.75	0.026
	POS	68,322	75,753	-1.44	0.031
	CSC	71,050	76,269	-1.01	0.031
	CLS	68,916	59,756	1.77	0.040
	CSC	69,500	76,269	-1.31	0.053
	CLS	64,135	73,839	-1.88	0.070
	MIS	110,795	108,707	0.40	1.576

*Outliers are identified using the residuals as follows. Observations with a residual that is 2 standard deviations or more from the average residual (zero) are considered outliers. This results in a set of seven observations (the shaded ones).

**An observation is influential if removing the observation substantially changes the estimate of coefficients. The Cook's Distance measure can be used to detect influential observations. Large values of the Cook's D identify those observations with large impacts. A rule of thumb an influential observation is one with a Cook's D value that exceeds 4/N (where N is number of observations). In our case this rule of thumb cut-off is 0.023 (=4/170). Seven additional outliers were added using this criteria.