# Faculty Equity Regression Study – 2025-26

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## Introduction

Multiple regression analysis is a statistical technique that determines which independent variables appear to have a significant effect on a single dependent variable. The University of Illinois Urbana-Champaign (UIUC) began using multiple regression analysis in the early 1990s to examine the factors that might contribute to faculty salaries; this report describes the results of the 2025-26 study.

The study is divided into two parts. The first can be considered "diagnostic"; it attempts to determine whether there is a systematic, campus-wide bias in the setting of salaries based on inappropriate factors such as sex or race/ethnicity. If the regression coefficients for the sex and race/ethnicity terms are significantly different from zero, then these factors may be affecting salaries. We build regression models separately for each rank (full, associate, and assistant professors) and for all ranks combined to examine this question. In addition, we examine new assistant professors (in their first three years of assistant professor position) in a separate regression to see if there are any biases at this early, critical stage of salary determination.

The second part of this study aims to identify individual faculty members whose salaries are lower than would be expected given their rank, discipline, time in the workforce, and other "appropriate" factors; the inappropriate factors of sex and race/ethnicity are omitted. Each faculty member's factors are substituted into a regression equation to compute a "predicted" salary. Because our model lacks good measures of quality and productivity, it cannot predict salaries perfectly; we expect salaries to vary from the predictions due to quality and productivity. Nevertheless, the predictions give the campus and deans a place to begin discussions of whether individual salaries are set appropriately.

## Summary of current results

**Diagnostic models:**
Five regression models (professors, associate professors, all assistant professors, new assistant professors, and all ranks combined) were constructed to examine whether there were any systematic biases in setting of salaries based on sex or race/ethnicity. At the 5% significance level, none of the models showed a noticeable sex bias.

At the 5% significance level, three models showed bias on race/ethnicity groups. In the Full professor model, the Hispanic group was paid $9,266 higher than the White group, but the Other Non-White group was paid $14,693 less than the White group. In the Assistant professor model, the Black/African American group was paid $3,949 less than the White group, and the Other Non-White group was paid $1,591 less than the White group. In the new Assistant professor model, the Asian group was paid $2,487 less than the White group, and the Other Non-White group was paid $2,302 less than the White group. It is possible that the interactive effects of race/ethnicity and other variables may explain some of the difference.

All results are summarized in Table 1, with additional details shown in Appendix A.

**Table 1. Summary of Significant Effects (p<.0500) found in diagnostic models**

| Model | Sex effects | Race/ethnicity effects |
|---|---|---|
| All faculty ranks combined | not significant | not significant |
| Full professors | not significant | Hispanic was paid $9,266 more than White (p=0.0264); Other Non-White was paid $14,693 less than White (p=0.0127) |
| Associate professors | not significant | not significant |
| All Assistant professors | not significant | Black was paid $3,949 less than White (p=0.0011); Other Non-White was paid $1,591 less than White (p=0.0348) |
| New assistant professors (in their first three years of assistant professor position) (also included in "All Assistant professors") | not significant | Asian was paid $2,487 less than White (p=0.0226); Other Non-White was paid $2,302 less than White (p=0.0054) |

**Identification of potentially underpaid faculty:**
To analyze individual salaries, a regression model was built omitting the sex and race/ethnicity terms. The "all-ranks-combined" regression cannot include some "quality" indicators such as years to reach full professor; the only "quality" indicator among the independent variables is whether the faculty member was hired in as an assistant professor or at a higher rank. Thus, the predicted salaries are based on factors that largely ignore quality and productivity.
The coefficients from this regression were then used to predict salaries of individual faculty members. The salaries predicted for each individual using this model represent the best estimate of salary from available and measurable faculty characteristics. Any deviation of a faculty member's actual salary from the predicted salary should be due entirely to characteristics we have not attempted to measure, notably quality and productivity.

The distribution of differences between actual and predicted salary, expressed as a percent of the predicted salary, is shown in Table 2.

**Table 2. Faculty whose salaries vary from predicted salary**

| Range | Women Number | Women Row % | Women Col % | Men Number | Men Row % | Men Col % | All Number |
|---|---|---|---|---|---|---|---|
| 15% or more below prediction | 76 | 37% | 9% | 132 | 63% | 11% | 208 |
| 10-15% below | 81 | 39% | 10% | 127 | 61% | 10% | 208 |
| 7-10% below | 72 | 44% | 9% | 91 | 56% | 7% | 163 |
| 0- 7% below | 186 | 39% | 22% | 285 | 61% | 23% | 471 |
| 0- 7% above | 207 | 43% | 25% | 274 | 57% | 23% | 481 |
| 7-10% above | 46 | 37% | 6% | 78 | 63% | 6% | 124 |
| 10-15% above | 70 | 46% | 8% | 82 | 54% | 7% | 152 |
| 15% or more above prediction | 92 | 38% | 11% | 148 | 62% | 12% | 240 |
| **All** | **830** | **41%** | **100%** | **1217** | **59%** | **100%** | **2047** |

The percentages in Table 2 shows no significant difference from those expected given the proportion of men and women on the faculty.

## Next Steps

The salaries and predicted salaries of all faculty members will be examined by campus administrators, deans, and department heads to identify any inappropriate salaries and, if warranted, salary adjustments may be made.

**More Details:** This report is a management overview and omits much of the detail that would be presented in a published paper.

# Appendix A. Regression Results

**Model used: Department dummy variables instead of peer salaries**
**Estimate of Coefficients for Each Independent Variable**

**Notes**: The coefficients for each of the 80 departmental dummy variables are not included here.
n/s (not significant) = Coefficients are not significantly different from zero at the 5% level (Student's T test)
Fiscal Year (FY) 26 Probability (Prob) |T| > 0: Using a two-tailed T-test, the probability that a parameter estimate for FY26 data is different from 0.0500 (5%) was used as the cutoff for significance in this study.
Starting year 2016-17, we report Faculty Salary Equity Regressions every three years.

| A1. All Faculty Combined | FY15 | FY16 | FY17 | FY20 | FY23 | FY26 | FY26 Prob > \|T\| |
|---|---|---|---|---|---|---|---|
| Full Professor=Y | 37,425 | 36,137 | 36,275 | 37,727 | 40,962 | 42,958 | <.0001 |
| Associate Prof=Y | 6,662 | 5,966 | 7,294 | n/s | 6,594 | 5,935 | 0.0005 |
| Administrator=Y | 17,191 | 18,011 | 18,799 | 15,033 | 17,590 | 19,492 | <.0001 |
| Number of departments. | 10,752 | 8,609 | 8,847 | 11,916 | 11,015 | 10,336 | <.0001 |
| First hired as an asst prof=Y | -13,052 | -13,270 | -13,252 | -15,010 | -12,781 | -13,223 | <.0001 |
| Doctorate=Y | n/s | n/s | n/s | n/s | n/s | n/s | 0.0600 |
| Years from degree | 536 | 608 | 633 | 725 | 701 | 786 | <.0001 |
| Sex=male | n/s | n/s | n/s | n/s | n/s | n/s | 0.6718 |
| Race=Native American | n/s | n/s | n/s | n/s | n/s | n/s | 0.2061 |
| Race=African American | n/s | n/s | n/s | n/s | n/s | n/s | 0.4723 |
| Race=Hispanic | 5,355 | n/s | n/s | n/s | 6,509 | n/s | 0.0612 |
| Race=Asian | n/s | n/s | n/s | n/s | n/s | n/s | 0.7352 |
| Race=Other | -4,995 | n/s | n/s | n/s | n/s | n/s | 0.2744 |
| Y-axis intercept ($b_0$) | 88,469 | 90,087 | 91,414 | 97,925 | 113,968 | 117,845 | <.0001 |

| A2. Full Professors | FY15 | FY16 | FY17 | FY20 | FY23 | FY26 | FY26 Prob > \|T\| |
|---|---|---|---|---|---|---|---|
| Administrator=Y | 22,137 | 21,659 | 22,624 | 19,827 | 21,921 | 22,223 | <.0001 |
| Number of departments. | 14,141 | 12,532 | 10,265 | 11,560 | 10,559 | 11,552 | <.0001 |
| First hired as an asst prof=Y | 9,843 | 10,822 | 11,242 | n/s | 14,116 | 15,469 | <.0001 |
| Doctorate=Y | n/s | n/s | n/s | n/s | 15,841 | 16,313 | 0.0071 |
| Years from degree | 1,050 | 1,087 | 1,123 | 1,274 | 1,304 | 1,408 | <.0001 |
| Sex=male | n/s | n/s | n/s | n/s | n/s | n/s | 0.4457 |
| Race=Native American | n/s | n/s | n/s | n/s | n/s | n/s | 0.3643 |
| Race=African American | n/s | n/s | n/s | n/s | n/s | n/s | 0.7680 |
| Race=Hispanic | 12,935 | n/s | 11,042 | n/s | 15,591 | 9,266 | 0.0264 |
| Race=Asian | n/s | n/s | n/s | n/s | 5,943 | n/s | 0.1421 |
| Race=Other | n/s | n/s | n/s | n/s | -15,983 | -14,693 | 0.0127 |
| Years to reach full prof | -2,607 | -2,764 | -2,708 | -3,045 | -2,899 | -3,086 | <.0001 |
| Y-axis intercept ($b_0$) | 107,778 | 109,945 | 121,606 | 124,612 | 147,356 | 145,125 | <.0001 |

| A3. Associate Professors | FY15 | FY16 | FY17 | FY20 | FY23 | FY26 | FY26 Prob > \|T\| |
|---|---|---|---|---|---|---|---|
| Administrator=Y | 7,678 | 9,931 | 13,429 | 8,779 | 9,628 | 13,163 | <.0001 |
| Tenured=Y | n/s | n/s | n/s | n/s | n/s | n/s | 0.2032 |
| Number of departments. | n/s | n/s | 4,224 | n/s | 9,377 | 6,000 | 0.0015 |
| First hired as an asst prof=Y | n/s | n/s | n/s | n/s | n/s | n/s | 0.2501 |
| Doctorate=Y | n/s | n/s | n/s | n/s | n/s | n/s | 0.0677 |
| Years from degree | -279 | -205 | -175 | n/s | -288 | -357 | 0.0001 |
| Sex=male | n/s | n/s | n/s | n/s | n/s | n/s | 0.9423 |
| Race=Native American | n/s | n/s | n/s | n/s | n/s | n/s | 0.6279 |
| Race=African American | n/s | n/s | n/s | n/s | n/s | n/s | 0.7966 |
| Race=Hispanic | n/s | n/s | n/s | n/s | n/s | n/s | 0.2897 |
| Race=Asian | n/s | n/s | n/s | n/s | n/s | n/s | 0.1576 |
| Race=Other | n/s | n/s | n/s | n/s | n/s | n/s | 0.6354 |
| Years to reach assoc prof | n/s | n/s | n/s | n/s | n/s | n/s | 0.2872 |
| Y-axis intercept ($b_0$) | 113,241 | 111,086 | 106,703 | 112,696 | 125,477 | 144,353 | <.0001 |

| A4. All Assistant Professors | FY15 | FY16 | FY17 | FY20 | FY23 | FY26 | FY26 Prob > \|T\| |
|---|---|---|---|---|---|---|---|
| Number of departments | 5,531 | 6,278 | 5,120 | 4,049 | 8,325 | 8,667 | <.0001 |
| Doctorate=Y | n/s | n/s | n/s | n/s | n/s | n/s | 0.9239 |
| Years from degree | 421 | 287 | 226 | 355 | n/s | 245 | 0.0030 |
| Sex=male | n/s | n/s | n/s | n/s | n/s | n/s | 0.9142 |
| Race=Native American | n/s | n/s | n/s | n/s | n/s | n/s | 0.9692 |
| Race=African American | n/s | n/s | n/s | n/s | n/s | -3,949 | 0.0011 |
| Race=Hispanic | n/s | n/s | n/s | n/s | n/s | n/s | 0.6763 |
| Race=Asian | n/s | n/s | n/s | n/s | n/s | n/s | 0.3202 |
| Race=Other | n/s | -2,085 | n/s | n/s | n/s | -1,591 | 0.0348 |
| Y-axis intercept ($b_0$) | 91,145 | 91,194 | 94,601 | 105,017 | 109,589 | 118,633 | <.0001 |

| A5. New Assistant Professors* | FY15 | FY16 | FY17 | FY20 | FY23 | FY26 | FY26 Prob > \|T\| |
|---|---|---|---|---|---|---|---|
| Number of departments | 6,538 | 7,301 | 4,418 | n/s | 8,969 | 6,415 | 0.0047 |
| Doctorate=Y | n/s | 3,769 | n/s | n/s | n/s | n/s | 0.9368 |
| Years from degree | 332 | 351 | n/s | n/s | n/s | 305 | 0.0019 |
| Sex=male | n/s | n/s | n/s | n/s | n/s | n/s | 0.7433 |
| Race=Native American | n/s | n/s | n/s | n/a | n/a | n/s | 0.5719 |
| Race=African American | n/s | n/s | n/s | n/s | n/s | n/s | 0.1647 |
| Race=Hispanic | n/s | n/s | n/s | n/s | n/s | n/s | 0.3641 |
| Race=Asian | n/s | n/s | n/s | n/s | n/s | -2,487 | 0.0226 |
| Race=Other | n/s | n/s | n/s | n/s | n/s | -2,302 | 0.0054 |
| Y-axis intercept ($b_0$) | 89,362 | 92,041 | 100,066 | 102,026 | 106,845 | 119,133 | <.0001 |

* New assistant professors are reported separately here and in the regression for all assistant professors.

## Appendix B -- Demographic Profile of Faculty Selected

### B1. Men and Women Combined

| | | All Faculty | Full Professors | Associate Professors | Assistant Professors |
|---|---|---|---|---|---|
| Number | | 2047 | 875 | 559 | 613 |
| Percent with an administrative appointment | | 19.5% | 33.8% | 17.7% | 0.7% |
| **Sex** | Women | 830 | 269 | 261 | 300 |
| | Men | 1217 | 606 | 298 | 313 |
| **Race/Ethnic Group** | American Indian/Alaska Native (AIAN) | 9 | 2 | 3 | 4 |
| | Asian | 401 | 172 | 130 | 99 |
| | African-American | 106 | 33 | 26 | 47 |
| | Native Hawaiian/Pacific Islander (NHPI) | 0 | 0 | 0 | 0 |
| | Hispanic | 174 | 73 | 43 | 58 |
| | White | 1124 | 563 | 330 | 231 |
| | Other Non-White | 233 | 32 | 27 | 174 |
| **Faculty Type** | Regular | 1970 | 859 | 521 | 590 |
| | Library | 77 | 16 | 38 | 23 |
| **Tenure status** | Tenure Track | 618 | 1 | 4 | 613 |
| | Indefinite Tenure | 1429 | 874 | 555 | 0 |
| **First rank Hired In** | Associate or full professor | 409 | 317 | 92 | 0 |
| | Assistant Professor | 1638 | 558 | 467 | 613 |
| **Highest Degree** | Not doctoral level | 179 | 65 | 68 | 46 |
| | Doctoral level | 1868 | 810 | 491 | 567 |
| **Years since degree** | Mean | 18.6 | 27.9 | 17.0 | 6.9 |
| | High | 60.7 | 60.7 | 54.0 | 27.7 |
| **Age** | Mean | 49.4 | 57.8 | 48.4 | 38.4 |
| | High | 86.5 | 86.5 | 80.3 | 56.9 |
| | Low | 26.7 | 38.3 | 33.1 | 26.7 |
| **9-month, 100% salary** | Mean | 148,711 | 186,320 | 127,652 | 114,232 |
| | High | 492,918 | 492,918 | 335,100 | 298,384 |
| | Low | 56,213 | 87,133 | 65,510 | 56,213 |
| **Years at UIUC** | Mean | 12.5 | 19.7 | 11.5 | 3.2 |
| | High | 51.2 | 51.2 | 50.4 | 11.0 |
| **Mean Years from hire** | To Associate professor | 5.0 | 4.7 | 5.3 | - |
| | To Full professor | 9.1 | 9.1 | - | - |

## Appendix B -- Demographic Profile of Faculty Selected

### B2. Women only

| | | All Faculty | Full Professors | Associate Professors | Assistant Professors |
|---|---|---|---|---|---|
| Number | | 830 | 269 | 261 | 300 |
| Percent with an administrative appointment | | 19.4% | 40.1% | 19.2% | 1.0% |
| **Race/Ethnic Group** | AIAN | 7 | 2 | 2 | 3 |
| | Asian | 153 | 43 | 58 | 52 |
| | African-American | 61 | 14 | 14 | 33 |
| | NHPI | 0 | 0 | 0 | 0 |
| | Hispanic | 78 | 30 | 22 | 26 |
| | White | 435 | 171 | 153 | 111 |
| | Other Non-White | 96 | 9 | 12 | 75 |
| **Faculty Type** | Regular | 772 | 257 | 234 | 281 |
| | Library | 58 | 12 | 27 | 19 |
| **Tenure status** | Tenure Track | 305 | 1 | 4 | 300 |
| | Indefinite Tenure | 525 | 268 | 257 | 0 |
| **First rank Hired In** | Associate or full professor | 145 | 94 | 51 | 0 |
| | Assistant Professor | 685 | 175 | 210 | 300 |
| **Highest Degree** | Not doctoral level | 100 | 29 | 36 | 35 |
| | Doctoral level | 730 | 240 | 225 | 265 |
| **Years since degree** | Mean | 16.3 | 26.2 | 16.9 | 6.9 |
| | High | 50.7 | 50.7 | 38.7 | 27.7 |
| **Age** | Mean | 47.6 | 56.8 | 48.5 | 38.7 |
| | High | 80.2 | 80.2 | 73.8 | 56.9 |
| | Low | 27.9 | 39.4 | 33.1 | 27.9 |
| **Years at UIUC** | Mean | 10.6 | 18.4 | 11.0 | 3.2 |
| | High | 47.3 | 47.3 | 36.2 | 11.0 |
| **Mean Years from hire** | To Associate professor | 5.1 | 4.9 | 5.2 | - |
| | To Full professor | 9.9 | 9.9 | - | - |

## Appendix B -- Demographic Profile of Faculty Selected

**B3. Men only**

| | | All Faculty | Full Professors | Associate Professors | Assistant Professors |
|---|---|---|---|---|---|
| Number | | 1217 | 606 | 298 | 313 |
| Percent with an administrative appointment | | 19.6% | 31.0% | 16.4% | 0.3% |
| **Race/Ethnic Group** | AIAN | 2 | 0 | 1 | 1 |
| | Asian | 248 | 129 | 72 | 47 |
| | African-American | 45 | 19 | 12 | 14 |
| | NHPI | 0 | 0 | 0 | 0 |
| | Hispanic | 96 | 43 | 21 | 32 |
| | White | 689 | 392 | 177 | 120 |
| | Other Non-White | 137 | 23 | 15 | 99 |
| **Faculty Type** | Regular | 1198 | 602 | 287 | 309 |
| | Library | 19 | 4 | 11 | 4 |
| **Tenure status** | Tenure Track | 313 | 0 | 0 | 313 |
| | Indefinite Tenure | 904 | 606 | 298 | 0 |
| **First rank Hired In** | Associate or full professor | 264 | 223 | 41 | 0 |
| | Assistant Professor | 953 | 383 | 257 | 313 |
| **Highest Degree** | Not doctoral level | 79 | 36 | 32 | 11 |
| | Doctoral level | 1138 | 570 | 266 | 302 |
| **Years since degree** | Mean | 20.2 | 28.6 | 17.1 | 7.0 |
| | High | 60.7 | 60.7 | 54.0 | 18.7 |
| **Age** | Mean | 50.7 | 58.3 | 48.3 | 38.1 |
| | High | 86.5 | 86.5 | 80.3 | 54.1 |
| | Low | 26.7 | 38.3 | 34.2 | 26.7 |
| **Years at UIUC** | Mean | 13.9 | 20.3 | 11.8 | 3.3 |
| | High | 51.2 | 51.2 | 50.4 | 9.4 |
| **Mean Years from hire** | To Associate professor | 4.9 | 4.6 | 5.4 | - |
| | To Full professor | 8.8 | 8.8 | - | - |

# Appendix C. Methodology

**General approach**
This model assumes that the salary paid to a faculty member (the "dependent variable") is a linear function of a set of "independent variables", $x_1$ to $x_n$:

$$predicted\ salary = b_0 + b_1x_1 + b_2x_2 + \ldots + b_nx_n$$

The symbols $x_1 \ldots x_n$ are the values of the independent variables, e.g. age. The symbols $b_0 \ldots b_n$ are constant coefficients; the regression model attempts to estimate these coefficients and determine which, if any, are significantly different from 0. If reliable estimates of the regression coefficients can be obtained, we may predict what the salary should be for any faculty member for whom we have the values of the independent variables. The actual salary of a faculty member may differ from the predicted salary because of:

- Error in the specification of the model. The terms may not be linear, for example.
- Critical factors may have been omitted which cause changes in salary. Certainly, the quality of a faculty member's work is one independent variable which is difficult to quantify and include.
- Error in measurement of one of the variables. For example, the dependent variable salary can be calculated in several equally valid ways.

Faculty members were identified and relevant data for each faculty member were pulled from the administrative computer databases. The data were entered into the computer databases for statistical analysis. A total of 2047faculty members were identified; demographic characteristics are in Appendix B.

**Initial selection of faculty***:* Faculty were defined as any person who holds a currently active tenured or tenure-track job on the Urbana campus, which includes campus and central administration employees located on this campus, whose employment status was "active" on October 15 and at least one appointment extending past May 15. We eliminated all faculty with a "T" contract (terminated) and faculty who were retiring during the year.

**Dependent variable: 9 month, 100% Time Salary**
Calculation of a meaningful salary for each faculty member was a challenge because of the many ways employees are coded on the payroll. For the purpose of this study, we included all appointments which appeared to be continuing past the academic year, including zero percent administrative stipends. Short-term or insignificant appointments (under 60 days and under $350) or lump sum payments were excluded. Appointments active on October 15 were used unless an individual's appointments changed during the year; in these cases, the Mid-year salary (March 15) or the salary at the end of the academic appointment year (August 15) was used.

All salaries were adjusted to represent payment for a nine-month period at 100% time.

**Independent variables**
Data for the following independent variables were collected. Derivation of each item is described below.

Current faculty rank
Highest degree earned
Years since the highest degree was awarded
Rank into which faculty member was first hired as tenure-system faculty
Years from first hire as tenure-system faculty to reach associate professor
Years from first hire as tenure-system faculty to reach full professor
Number of departments in which a continuing appointment is held
Starting rank at first hiring
Whether the faculty member holds any administrative appointments
Sex
Race and Ethnicity (Hispanic or Not Hispanic): as reported to IPEDS (Integrated Postsecondary Education Data System)
Percent faculty appointment
Type of faculty appointment (regular or library)

*Data pulled from Enterprise Data Warehouse (EDW) database*

For each faculty member, the following demographic data was pulled from the EDW:

- Name
- UIN (University Identification Number)
- Date of first employment as tenure-system faculty at UIUC
- Race/ethnicity code
- Sex
- Tenure appointment college and department code
- Leave codes (to identify those on sabbatical leave, disability leave, leave without pay, etc.)
- Highest degree, degree level, and degree date, when available

Each faculty member may have many different jobs. All jobs not paid on an hourly basis for these faculty members were selected and the following appointment information was downloaded:

- Job department
- Job E-class (to determine if the annual salary was paid out 9/12, 10/12 or 12/12)
- Start and end dates
- Percent time
- Annual salary
- Monthly salary
- Position class code

*Data pulled from faculty vitas on the web, from department records, and from the Grey Book (supplement to the Board of Trustees (BOT) minutes with all academic salaries and ranks)*

- Highest degree, degree level (whether it was a doctoral, terminal, master's, or bachelor's degree) and degree date (When in doubt, departments were called to verify the degree level. Juris Doctor (JD) degrees were classed as doctoral level, Master of Fine Arts (MFA) and Master of Architecture (MArch) degrees were classed as terminal)
- Date highest degree was awarded (in some cases, we had to call departments for this information when the degree was noted as "expected" on the application form). For faculty members with no degree at all, we used year from age 25 to estimate the years the person had been in the workforce.
- Rank into which faculty member was first hired
- Date of promotion to associate professor (if any)
- Date of promotion to full professor (if any)

*Derived data elements*

From the downloaded and manually collected data, the following were calculated:

- Highest faculty rank: all administrative and academic professional ranks were ignored.
  Faculty holding library or extension faculty appointments in addition to appointments with regular faculty rank were classed as regular faculty, regardless of which appointment had a greater percent.
- Highest tenure code:
  If any tenured appointment was found, code is A
  If no tenured appointment is found, this code is 1-7 or Q.
- Years since degree to January 1 in the academic year under study.
- Number of different departments in which a continuing appointment is held
  Includes any department where the faculty member held a zero percent appointment or more that was active on Oct. 15.
- Years from first hire at UIUC to January 1 in the academic year under study.
- Years from first hire to promotion to associate professor & to full professor
  These data elements will be 0 for those hired in at the associate or full professor level. For faculty who left campus at one rank and returned at a higher rank, an estimate of reasonable promotion dates was made.
- Tenure department
  This was needed to set a dummy variable for the department. When a faculty member had tenured appointments in multiple departments, the department with the highest percentage appointment was used. If all tenured appointments had identical percentages, the department same as their home department was used.

Administrator flag

Administrators were defined as:

All top executives

All department heads/chairs that could be identified from appointments

Faculty whose administrative appointment percentage was larger than their faculty percent

"Administrative" appointments were defined as academic appointments with tenure code=N and a rank/class code not in the faculty range.

Faculty members with a 0% administrative appointment with pay at least 5% or more of total salary.

Executive flag

The president, vice president for academic affairs, chancellor, vice chancellors, Provost, Vice Provosts, and deans were marked as top executives and excluded from the analyses. Former holders of any of these offices may also be flagged and excluded.

Percent time

Total percentage on all appointments active October 15 (or March for those with mid-year changes) was calculated.

9-month, 100% equivalent of salary on all continuing appointments

All faculty whose appointments changed after Oct. 15 (change in percent, change in salary, or new appointments beginning after that date.) were identified. For employees with no such midyear changes, only appointments active on Oct. 15 were totaled. For employees with a midyear change, appointments active on August 15 at the end of the appointment year were totaled.

Temporary appointments were eliminated. All other ongoing appointments were included.

All salaries were adjusted to be 9-month, 100% equivalents. If the job had an employee class code indicating the period of service was 10 months, the annual salary was multiplied by 9/10. If the appointment was for 11 months service, the annual salary was multiplied by 9/11. For all other appointments, the annual salary was used without adjustment. This yields the salary rate for a 9-month period of service. The nine-month equivalent salary and the percent (unadjusted) for all appointments active on Oct. 15 (or Mar 15 if a mid-year change took place) were totaled for an individual to derive the person's actual current 9-month salary rate. If an individual's total percent time was less than 100%, the calculated salary was adjusted to a 100% equivalent by multiplying it times 100/(total percent time).

Dummy variables for each department

A dummy variable (1/0) was created for each department but one. The coefficient for this variable represents the disciplinary difference in salaries between a department and the department left out (in this case, Agricultural & Consumer Economics).

Dummy variables for race/ethnicity

1/0 for Native American, Asian, African American, Hispanic, Other.

**Refining the model**

As in the previous study, we eliminated "top executives" (dean level and higher) from the regression analyses. Once the set of independent variables was created and verified, multivariate linear least-squares regression models were built using SAS. Regressions with all faculty members combined and separate regressions by rank were run and the results tabulated. Several other specialized regressions were run as described in the Appendix E.

**Determining if an independent variable is a significant factor in determining salary levels**

If the coefficient for an independent variable is significantly different from zero, then that variable appears to have a significant effect on salary. To determine if a coefficient was significantly different from zero, we used a Student's t-test to estimate the probability that the regression coefficient for that factor was zero. If the probability was 5% or less, we assumed the factor was a significant contributor to salaries. It is important to note that this 5% level is somewhat arbitrary; a similar study performed at the University of Wisconsin (Madison) used a 10% level for significance.

By looking at the estimate of the coefficient for each of the independent variables, we can see the magnitude and direction of the effect each has on salary. If the coefficient for the dummy variable for males is $1000, for example, and if that coefficient is significantly different from 0, we would conclude that being male generally is associated with a salary increase of $1000, all other factors being equal.

## Appendix D. Regression Statistics

**Overall Statistics for Each Model**

| Who was included in the model | Coefficient of determination (R-squared)* | Model degrees of freedom | F-value statistic for model | Probability that model is significant |
|---|---|---|---|---|
| All Faculty | 0.8447 | 93 | 114.22 | <0.0001 |
| Full Professors | 0.7351 | 89 | 24.48 | <0.0001 |
| Associate Professors | 0.9137 | 91 | 54.32 | <0.0001 |
| Assistant Professors | 0.9814 | 88 | 314.15 | <0.0001 |
| New Assistant Professors | 0.9889 | 86 | 263.15 | <0.0001 |

*This is the fraction of variance of salary "explained" by the regression model

## Appendix E. Other models examined

Two variants on the regression model were examined.

**Using peer salaries instead of dummy variables for each department**
Through the 1999-2000 study, we had used an average assistant professor salary for each Illinois department and its peers as a proxy for the starting salary in the discipline. Because this factor has always been the most significant factor in each analysis and because in previous models, it was one of the more difficult measures to derive, the Committee on the Status of Women suggested we replace it with a dummy variable for each department. For several years, we continued running this regression in addition to the regressions with dummy variables. Due to time constraints, we have not repeated this analysis since then.

**Replacing the dependent variable (actual salary) with log(actual salary)**
This model is frequently used for salary analyses because raises tend to be granted as percentage increases, not as flat dollar amounts. In fact, in the original study in FY94, we tried using log(salary) instead of salary as the dependent variable. At that time, we elected to use salary as a dependent variable because

(1) while log(salary) shows a small increase in the goodness of fit, the two models did not differ greatly in overall significance; and
(2) using log(salary) as a dependent variable makes the coefficients for the independent variables harder to explain to a general audience.

We tried a log(salary) model again with each subsequent year's processing. As expected, there was a slight increase in the goodness of fit ($R^2$=0.89 as opposed to 0.84 with the linear model). The independent variables that were significant contributors to the salary are similar to those found significant in the linear model; however, no significant difference is found for women using this model.

**Examining the interaction of sex with other independent variables in the regression**
The Committee on the Status of Women suggested that we should also examine the interaction of sex with other variables, such as years from degree or years from first hire to promotion. To test the significance of these interactions, we examined regressions where we added an interaction term to the model:

$$\textit{predicted salary} = b_0 + b_1x_1 + b_2x_2 + \ldots + b_nx + b_{1*2}\,(x_1\,x_2\,)$$

To evaluate the importance of these interactive terms, we look at the significance of the coefficient for the interactive term ($b_{1*2}$ above), the significance of the improvement in the overall predictive accuracy of the model, and the proportion of the variance of the model due to the interactive term ("eta squared"). A summary of results is shown in the table below.

**Summary of Results Testing Interactive Terms**

| Interactive term | Interactive Term Coefficient is significant (5% level)? | | Overall model improvement | |
|---|---|---|---|---|
| | All Faculty | Full Professors | All Faculty | Full Professors |
| Sex x Associate professor flag | No | - | 0.00% (n/s) | - |
| Sex x Full professor flag | No | - | 0.01% (n/s) | - |
| Sex x Years from degree | No | No | 0.00% (n/s) | 0.06% (n/s) |
| Sex x Has administrative appointments | No | No | 0.03% (n/s) | 0.00% (n/s) |
| Sex x Number of departments | Yes | No | 0.05% | 0.00% (n/s) |
| Sex x First Rank=assistant professor | No | No | 0.00% (n/s) | 0.00% (n/s) |
| Sex x Years to reach full professor | - | No | - | 0.00% (n/s) |

**All faculty regression:**
Interactive terms of sex with associate professorship, full professorship, years from degree, having administrative appointments, and first hired as assistant professor were not significant; but interactive terms of sex with number of departments was significant at the 5% level. The proportion of the variance of the model from each of the interactive terms was very small -- the contribution to the overall variance is no more than 0.05% for each of the interactive terms. We conclude that the interaction of sex with each of these variables is small even in the case with significant interactive term.

**Full professor regression:**
None of the interactive terms of sex with years from degree, having administrative appointments, number of departments, first hired as assistant professor, and years to reach full professor were significant at the 5% level. The proportion of the variance of the model from each of the interactive terms was very small -- the contribution to the overall variance is no more than 0.06%.