APPENDIX A

Using Multiple Regression to Study Gender and Race Equity in Salaries[1]

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This appendix provides an introduction to the interpretation of regression statistics for salary equity studies. Recognizing that it will be read by an audience with a wide range of mathematical knowledge, we have attempted to make it understandable to those who are not familiar with statistical techniques.

To begin with a very simple example, assume that we are interested in finding out how some variables relate to body weight. These variables are shoe size, hours of exercise per week, eye color, fast-food meals, height, and make of automobile. If we used multiple regression to relate these characteristics to body weight data, we would expect some to be more strongly associated with body weight than others. We would probably find that make of automobile and eye color had no relationship to body weight. The amount of exercise per week might be negatively related to body weight"as exercise goes up, body weight goes down. Height, shoe size and fast-food meals, might be positively related to body weight"as they go up, body weight goes up. Among these positively related variables we would probably find that height is more strongly related than shoe size and fast food meals.

The particular strength of multiple regression is that it can isolate the effect of one of these variables while controlling for all of the others. In other words, it can control statistically for height, shoe size and fast-food meals while examining the impact of hours of exercise per week. Conceptually, we can compare a group of people of exactly the same

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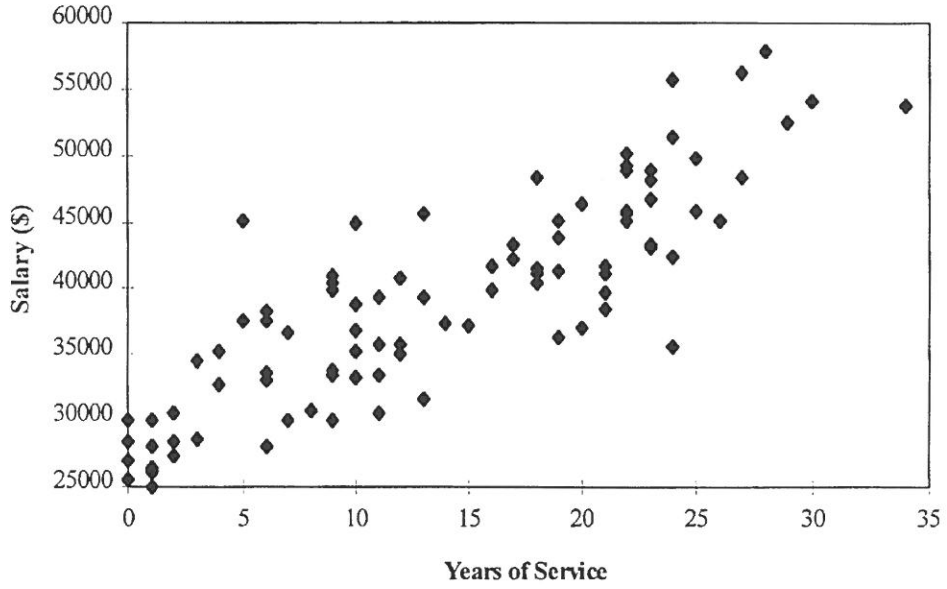
[1] This Appendix is borrowed from *Pay Checks:A Guide to Achieving Salary Equity in Higher Education.*

height, wearing the same size shoes and eating the same number of fast-food meals per week and differing only in their amount of exercise.

Instead of body weight, we are interested in explaining variations in higher education faculty salaries. In particular we want to estimate the effect of variables like gender and race while controlling for other important salary related variables, like years of service and discipline. To explain how multiple regression works, we begin by considering how just one variable, say years of service, explains differences in salaries. If we plot the years of service against salaries, we would probably see a scatter plot similar to Figure A.1. Even a casual glance at Figure A.1 indicates that salary increases as years of service increase. Note, however, that the relationship is not perfect; every increase in years of service does not result in an equal increase in salary. If the relationship were perfect, all points would fall on a straight line.

FIGURE A.1

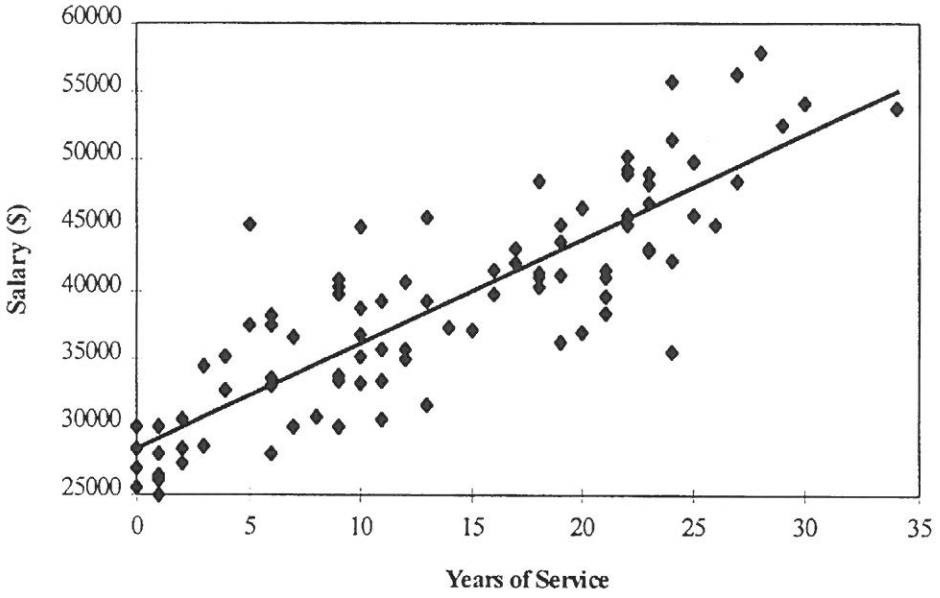
SALARY BY YEARS OF SERVICE



To describe this relationship statistically, we could provide an equation that would estimate how large a difference in salary we would expect, on average, for individuals who differ by one year in their years of service. This is done by fitting these points with the line of "best fit' (Figure A.2).

FIGURE A.2

SALARY BY YEARS OF SERVICE



"Best fit' is a statistical criterion, indicating that the line minimizes the distances between the line and the points scattered around it.[1] In other words, the line is as close to all points as a straight line can be. The slope or steepness of this line indicates the predicted change in salary for a unit change (one year) in years of service. For instance, if we draw a straight line up from five years of service on the horizontal axis of Figure A.2 until we reach the line of best fit and then draw a line over to the vertical axis we will find the average *predicted* salary for faculty members with five years of service.

We do not have to have a graph or line of best fit in front of us to be able to predict the salary of those with five years of service. Regression analysis provides us with a formula representing the straight line on Figure A.2. This line can be described by just two pieces of information:

- the intercept, that is, the place the line starts on the vertical axis; and
- the slope of the line (called the regression coefficient), which is the average increase in salary for a one unit (year) increase in years of service.

This formula is:

Predicted Salary = intercept point + slope of the line ý years of service

This is the same as the formula we learned for a straight line in basic algebra.

$$Y = a + bX$$

Where **Y** is the predicted Salary, **a** is the intercept value,[2] **b** is the slope of the line value, and **X** is the amount of the predictor variable years of service. Thus, for any number of years of service we can easily arrive at the predicted salary. Assume, for example, that the regression formula tells us that the starting point of the regression line (the intercept or **a**) is $29,000 and the slope of the regression line is $800. We can figure out that a faculty member with five years of service is predicted to have a salary of:

Y = $29,000 + ($800 ý 5 years of service) = $33,000

The example above is a simple two variable linear regression. Salary is the dependent variable and years of service as a predictor or independent variable. Since we want to know about the effects of many variables on salary, we use *multiple* regression. Fortunately, the equation for multiple regression is a straightforward extension of the two variable equation. Suppose we are looking at just two predictor variables, years of service and years in rank. The multiple regression procedure might tell us, for example, that with the introduction of this new variable our intercept has changed to $31,000 and the unstandardized regression coefficient (equivalent of the slope of the line) for years of service has changed to $700 and the unstandardized regression coefficient for years in rank is $800. For a faculty member with five years of service, two of which have been in his or her current rank, the predicted salary (Y) would be:

Y = $31,000 + ($700 ý 5 years of service) + ($800 ý 2 years in rank)

= $36,100.

But what happens when we try to include some of the other variables we want to use to explain salary? How can we multiply an unstandardized regression coefficient times discipline or rank?

Including "Dummy' Variables

The two independent or predictor variables we have thus far used in the example, years in rank and years of service, are continuous variables. That is, they take on a series of values, equal distances apart; each additional year of service or year in rank is equivalent to any other year of service or

year in rank. Such variables can be entered into regression analyses in their current form. But, many of the independent variables commonly used in studies of salary equity do not have equal intervals; that is, they do not have numeric value. Special steps must be taken to include them in the multiple regression analysis.

Discipline, gender, race and rank are variables that either cannot be ordered (discipline, gender and race, for example) or, if they have an order, the differences between levels are not necessarily equal. For instance, we do not know if the value difference between the ranks of instructor and assistant professor is the same as the value difference between the ranks of associate professor and full professor or whether the rank of full professor is worth twice as much as assistant professor and four times as much as instructor. Similarly, we have no basis for deciding that being in the business/management discipline is worth twice as much as being in the education discipline, but only half as much as being in the computer and information sciences discipline. Regression analysis can actually tell us these relationships if we transform these variables by making them into what are called dummy variables.

Dummy coding is a way of quantifying variables that are basically qualitative or categorical in nature. For group membership variables (race, sex, rank, etc.) you need to convert each category within the variable into a separate variable. Each of these new dummy variables has only two values: 0 or 1. For instance, for the variable female, all women are coded 1, and all others are coded 0; for the variable assistant professor we assign the value of 1 to those who are assistant professors and the value of 0 to all others. The transformation to dummy variables, therefore, involves an increase in the number of variables. Where there was originally one categorical variable called current rank there are now five dummy variables, one for each rank category. Where there was originally one variable gender, there are now two"one for male, coded 1 and 0; and one for female, coded 1 and 0.

When entering a group membership variable into the regression analysis, one of the dummy categories is omitted. This is because you convey all of the information contained in the codes of the original variable with one less than the number of categories. For instance, if there are five categories of rank, anyone who is coded as zero in four categories, must be in the fifth. The selection of the particular category to be omitted from the regression analysis does not affect the analysis but you may want to pick a logical comparator. Since the omitted or default category serves as the reference, it makes more sense, for example, to choose white males as the reference group then it would minority males. Similarly, it may pay to

choose a well understood rank category like full professor than it would to choose lecturer, which is a rank that varies in use across institutions.

The estimate for the omitted category is represented by the intercept. For example, if the category male is omitted for gender and the category associate professor is omitted for rank and the category social sciences is omitted for discipline, the salary at the intercept will be the estimate for the average salary of male associate professors in social sciences with zero years of service and zero years in rank. To calculate the average salary for any other group, the regression coefficient for that group is added to the intercept value. (In the case of a negative regression coefficient, the sum will be less than the intercept, because adding a negative amount to a number results in subtraction, thereby reducing it.)

Returning to the equation examples, suppose we include the dummy variables for Gender and Discipline in the regression analyses.[3] We leave out the categories male and social science. The resulting multiple regression equation might indicate, for example, that the intercept is 33,000 and the regression coefficients are:

Years of service = $700
Years in rank = $900
Fine arts = -$400
Business = $2,500
Female = -$900

To estimate the salary of a male with three years of service and three years in rank in the discipline of business we would use the following equation:

Intercept Yrs. of Service Yrs. in Rank Business Male Pred. Salary

$33,000 + (3 ý $700) + (3 ý $900) + $2,500 + 0 = $40,300

Assuming faculty members in different disciplines who all have three years of service and three years in rank, we would predict their salaries as follows:

Female in business:

Intercept Yrs. of Service Yrs. in Rank Business Female Pred. Salary

$33,000 + (3 ý $700) + (3 ý $900) + $2,500 + -$900 = $39,400

Female in social science:

Intercept	Yrs. of Service	Yrs. in Rank	Soc. Sci.	Female	Pred. Salary
$33,000	+ (3 ý $700)	+ (3 ý $900)	+ 0	+ -$900	= $36,900

Male in fine arts:

Intercept	Yrs. of Service	Yrs. in Rank	Fine Arts	Male	Pred. Salary
$33,000	+ (3 ý $700)	+ (3 ý $900)	+ -$400	+ 0	= $37,400

Remember that categories of social science and male are the defaults and thus, the intercept represents the salary for faculty members in the categories. This is why nothing is added or subtracted for these categories in the formula. You can see by these examples that the parameter estimate (or unstandardized coefficient) for the dummy variable female is a measure of how much on average it costs a faculty person to be a woman, assuming that all the other variables in the equation are held constant. Similarly, dummy variables for race, such as African American and Latino, can indicate the average effect of each race category.

How Good Is the Regression Equation?

It is important to know how to judge the validity of different regression equations. Returning to the body weight example, we could run a regression equation with a lot of variables like eye color and make of automobile which do not strongly relate to the dependent variable. The result would be a fancy equation that would not tell us much. Multiple regression provides an estimate of how well the set of independent or predictor variables (eye color or shoe size) account for the variation in the dependent variable (individual body weight). This measure is called the adjusted R-square (adj. R^2). An adjusted R^2 of 0.75 indicates that 75 percent of the variation in salary is accounted for by the predictor variables in the equation, an adjusted R^2 of 0.55 indicates that 55 percent of the variation is accounted for by the variables.

Another way of conceptualizing this is in terms of the scatter of points around the "best fit' line in Figure A.2. The smaller the scatter of observed points around the line represented by the regression equation, the better the prediction and the closer the adjusted R^2 is to 1. If there is no association between the predictor variables and the dependent variable (i.e., the scatter is random and does not tend to form a line), the adjusted $R^2 = 0$. In the social sciences, adjusted R^2s below 0.3 are generally thought to indicate little or no association. Those in the range of 0.4 to 0.6 are considered to indicate moderate associations. Those above 0.7 are

considered strong associations, indicating that most of the variations in the dependent variable have been accounted for by the independent or predictor variables.

Interpreting the Regression Results

At the end of this appendix we have included an illustration (Figure A.3) of typical computer output from a multiple regression analysis of faculty salaries for an institution we call Proxy College. At the top of that illustration the adjusted R^2 results are reported. In this case, it is 0.8211. This means that 82.11 percent of the variation in salary is accounted for by the variables in the equation. The remaining 17.89 percent could be due to random factors, measurement error, or variables left out of the equation. An adjusted R^2 of this magnitude is an indication that the variables in the equation are explaining most of the variation in salaries.

To illustrate the common appearance of multiple regression computer output, we have included in Figure A.3 the last three columns even though (you will be happy to note) Standard Error, T for HO, and the Prob > T can be ignored by most faculty salary analyses. They are important for inferential statistics, which make inferences about a population based on a sample. Faculty salary studies are typically not based on samples. Most include the entire population of faculty at a given institution, so interpretation of inferential statistics is not needed or meaningful. (See the discussion on Significance of Significance in Chapter 6.)

The left hand column in Figure A.3 identifies the independent (predictor) variables. The next column, DF, indicates the degrees of freedom. Each variable has one degree of freedom associated with it. The next column, Sum, is the sum of that variable for all cases in the equation.[4] For dummy variables, the sum tells the number of cases in that category. We see that there are 81 assistant professors and 134 full professors included in the equation.

The next column is headed Parameter Estimate. The specific type of parameter estimate shown in this column is the unstandardized regression coefficient that we have been describing. A single unit change in the variable results in a change in predicted salary that is shown by the parameter estimate. As previously indicated, when dummy variables are used in a regression equation, one category for each group membership variable must be omitted from the equation. In Figure A.3, the omitted variables are listed at the top as Dummy Variable Defaults. In this case, they consist of male for gender, social science for discipline, Ph.D. for educational attainment, and associate professor for current rank. With these omitted categories, the intercept, which is listed in the first row,

would represent the salary for a male associate professor in a social science discipline whose highest degree is a Ph.D. This also explains why these variables are not found in the variable list of the first column.

We can look down this column to the regression coefficient (labeled Parameter Estimate in Figure A.3) for Yr_rank, and see that it is 544.348571. Therefore, if the individual's years in rank were greater than zero, we would multiply his or her years in rank by 544.348571, and add that amount to the intercept to get a more accurate estimate of his or her salary. If she/he is not an associate professor, but is an assistant, we would add -5,447 (the unstandardized regression coefficient for assistant professor) to his or her salary to improve our estimate. (As indicated earlier the addition of a negative number actually amounts to subtraction.) The unstandardized regression coefficient for the variable female shows us that, even when controlling for all other factors in the equation, women at Proxy College are paid an average of $1,017 *less* than men. Again, this is indicated by the unstandardized regression coefficient being a negative number.

To see if you understand this output, calculate the predicted salary for a full professor with a Ph.D., three years in rank and ten years in service, in the discipline of business. You should get a predicted salary of $46,895 if this faculty person is a male and $45,878 if this faculty person is a female (rounding to the nearest whole number).

FIGURE A.3

Proxy College
Regression Analysis of Faculty Salaries

Dependent Variable: SALARY Dummy Variable Defaults: MALE, SOC SCI, Ph.D, ASSOC

R-squar 0.8325 Adj R-sq 0.8211

Variable	DF	Sum	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	335	29495	994.62906029	29.654	0.0001
YR_RANK	1	2927	544.348571	42.44607444	12.824	0.0001
YR_SERV	1	4988	336.390498	48.57062401	6.926	0.0001
ASST	1	81	-5447.273440	634.67422069	-8.583	0.0001
FULL	1	134	5951.380714	455.91364220	13.054	0.0001
MASTERS	1	101	-539.921096	808.87423663	4.005	0.0001
BACHLORS	1	4	-1076.643425	1641.2392210	-0.656	0.5123
AGIRESRC	1	11	5032.979425	1053.0875729	4.779	0.0001
ARCHENVR	1	9	3988.706165	1135.4294293	3.513	0.0005
BUSINESS	1	9	6457.295117	1170.5822575	5.516	0.0001
BIOLOGY	1	14	4456.221675	967.48669527	4.606	0.0001
AREASTDI	1	13	4976.437719	1004.8530098	4.952	0.0001
COMUNCTN	1	8	441.642358	1159.3391086	0.381	0.7035
COMPUINF	1	10	2922.576103	1067.8918658	2.737	0.0066
EDUCATIN	1	8	1422.662763	1155.0865960	1.232	0.2191
ENGNERIN	1	15	2393.906709	936.39183011	2.557	0.0111
FINEARTS	1	6	2380.802276	1340.5263086	1.776	0.0768
FORGNLAN	1	3	3548.019256	1724.3069450	2.058	0.0405
HEALTPRF	1	5	1738.377402	1395.4345988	1.246	0.2138
HOMECNMY	1	5	1588.998793	1376.3579156	1.154	0.2492
LAW	1	5	1356.105647	1378.8903794	0.983	0.3262
LETTERS	1	5	4060.422238	1467.0322010	2.768	0.0060
LIBRARY	1	8	791.285924	1178.9245073	0.671	0.5026
MATH	1	14	473.654141	947.47812117	0.500	0.6175
PHYSICS	1	6	568.258532	1281.6642459	0.443	0.6578
PSYCLOGY	1	8	1243.279501	1146.2883723	1.085	0.2790
PUBSERVC	1	9	1476.943558	1106.7881700	1.334	0.1831
THEOLOGY	1	17	466.892901	908.79433574	0.514	0.6078
FEMALE	1	117	-1016.832795	389.18698941	-2.613	0.0694

Appendix B

Analyses of the impact of the relative level of State funding for higher education in the latest year of promotion. was received.

Note – For these analyses the NCSU population of faculty was necessarily restricted to those receiving a promotion subsequent to 1981.

Like most public sector institutions, NCSU has substantial dependence on the state legislature's annual budget allocations to higher education. The level of legislative salary increases in the year a faculty person receives a promotion is hypothesized to impact the amount of increase that faculty member receives with the promotion. A faculty person promoted in a year when the State has been generous may receive a greater increase because more money is available. A faculty person promoted in a lean year may receive less than he or she might have if promoted in a year when more money was allocated from the legislature.

Using a history of the annual cost of living adjustments (COLA) and merit increases dating back to 1981-82, we created two continuous variables. The first was the percentage of the cost of living increases awarded each year. These increases go to most, if not all, faculty. The second was the percentage allotted for merit increases that are distributed to selected faculty.

All faculty members who have not received a rank appointment since 1981-82 were, of necessity, excluded from these analyses. The population subset that has received a rank appointment since 1981 has proportionately fewer white males and more women and minority males than the total population. Women decline from 371 to 360, a 3 percent decrease. Minority men decline from 161 to 150, a 7 percent decrease. White males decline from 1049 to 928, a 12 percent decrease. The direction of this change in the gender and race make up of this subset is logical given that the pre-1981 faculty population would be expected to have a higher proportion of white males than subsequent faculty populations.

We entered the COLA and Merit variables into the analyses reported on Figures 16, 17, 18 and 19. The results are reported on the tables below. Here we summarize the results. In all cases the coefficients for Females became less negative, indicating less salary difference between women and white males with the inclusion of the COLA and merit variables. These decreases were less than $200, in most cases. The opposite tended to be true for the amount of bias indicated for minority males. For Figures 16, 17 and 18 the coefficients for minority males became more negative indicating an increasing gap between the salaries of white males and minority males, usually by less than $200. For Figure 19, however, the results for minority males indicate slightly lower bias (less than $100) for the total population and natural log coefficients but higher for the white-male line residuals.

COLA/Merit comparable results for Figure 16 - Regression results with all potentially tainted variables in the analyses

Race/Gender	Number	Total Population Coefficient	Natural Log Coefficient*	White Male Line Residual
Females	360	-472	-223	-806
Minority Males	150	-1453	-1105	-1858

*These are the dollar equivalents of the natural log coefficients.

COLA/Merit comparable results for Figure 17 - Regression results without the rank modifer distinctions

Race/Gender	Number	Total Population Coefficient	Natural Log Coefficient*	White Male Line Residual
Females	360	-709	-510	-1088
Minority Males	150	-1691	-1407	-2213

*These are the dollar equivalents of the natural log coefficients.

COLA/Merit comparable results for Figure 18 - Regression results without rank modifiers and the non-tenure-track distinction

Race/Gender	Number	Total Population Coefficient	Natural Log Coefficient*	White Male Line Residual
Females	360	-921	-755	-1311
Minority Males	150	-1508	-1198	-2086

*These are the dollar equivalents of the natural log coefficients.

COLA/Merit comparable results for Figure 19 - Regression results for NCSU tenure-track faculty with no rank modifiers population

Race/Gender	Number	Total Population Coefficient	Natural Log Coefficient*	White Male Line Residual
Females	230	-783	-771	-992
Minority Males	126	-1967	-1595	-2451

*These are the dollar equivalents of the natural log coefficients.

Appendix C

Results without *all* potentially tainted variables

Regression results <u>without</u> rank, non-tenure track, admistrative title and rank modifier variables

Race/Gender	Number	Total Population Coefficient	Natuaral Log Coefficient*	White Male Line Residual
Females	371	-2360	-2452	-2172
Minority Male	161	-1283	-935	-1329

*These are the dollar equivalents of the natural log coefficients.

Appendix D

Our initial regression analyses broke out seven race/gender categories for comparisons with the white male salaries. American Indians were combined with the Hispanic category. The race/gender group results are indicated below.

Regression results for analsis without rank modifiers for 7 race/gender categories

Race/Gender	Number	Total Population Coefficients	Natuaral Log Coefficient*	White Male Line Residuals
White Female	318	-1003	-881	-1406
Asian Male	103	-1334	-1402	-1885
African Am. Male	41	-767	186	-1001
African Am. Female	29	-1097	-246	-1843
Hispanic & Am. Ind. Male	17	-4367	-2281	-4239
Hispanic & Am. Ind. Female	15	674	104	714
Asian Female	9	1617	4989	2059

*These are the dollar equivalents of the natural log coefficients.

The results provided on the above table can be interpreted as dollar measures indicating how a gender/race group compares with the white-male reference category. For example, the first number in the second column indicates that white females earn $1003 less on average than white males, when all of the variables in the analysis are held constant.

We have listed the seven-race/gender categories in order based on the number of faculty members in each. The smaller the number of individuals in a category the more likely it is that the result could be disproportionately impacted by one or two uncharacteristic faculty members. Besides the positive coefficients for the smallest groups of minority women and the log of salary results for African American males, the remaining coefficients are negative, indicating that, when the variables in the regression analysis are controlled, white-males have higher salaries, on average, than most minority and women categories.

Regression results for analyses without the non-tenure-track distinction for 7 race/gender categories

Race/Gender	Number	Total Population Coefficients	Natuaral Log Coefficient*	White Male Line Residuals
White Female	318	-1230	-1147	-1622
Asian Male	103	-1028	-1047	-1630
African Am. Male	41	-674	298	-953
African Am. Female	29	-768	143	-1523
Hispanic & Am. Ind. Male	17	-4841	-2822	-4733
Hispanic & Am. Ind. Female	15	258	-387	228
Asian Female	9	3	2968	459

*These are the dollar equivalents of the natural log coefficients.

APPENDIX E

NORTH CAROLINA STATE UNIVERSITY REGRESSION
Defaults: White Male, Ph.D., No Rank Modifier, Tenured, Not Admin, Assist, Professor, PAMS
All Potentially Tainted Variables

Independent Variables	Sum	Label Explanation
Intercept	1581	
female	371	all females
min_m	161	minority males
f_prl	63	first professional degree
belowPHD	187	degree below PhD
res	54	rank modifier of research
clin	8	rank modifier of clinical
visit	143	rank modifier of visiting
dist	64	rank modifier of distinguished
not_tt	274	not on tenure track
on_track	270	on tenure-track, but not yet tenured
adm	180	those with an adm. title below department head
prof	641	full professor
assoc	435	associate professor
inst	20	instructor
lect	161	lecturer
s_affair	31	college of student affairs (physical education)
design	33	college of design
ed	61	college of education
engineer	236	college of engineering
nat_reso	72	college of natural resources
hum_ss	317	college of humanities and social sciences
ag_life	408	college of agriculture and life sciences
textiles	41	college of textiles
vet_med	115	college of veterinary medicine
managemt	74	college of management
pe_cent		previous experience(between degree and NCSU hire)centered
pe_cent2		pe_cent squared
yr_pcent		years at NCSU prior to current rank centered
yr_pcen2		yr_pcent squared
yr_ccent		years at NCSU in the current rank centered
yr_ccen2		yr_ccent squared

REGRESSION OF ANNUAL SALARY
Defaults: White Male, PhD, No Rank Modifier, Tenured, Not Admin, Assist Professor, PAMS
Dependent Variable: Annual Salary
All Potentially Tainted Variables

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	31	6.733156E11	21719858869	238.91
Error	1549	1.408253E11	90913663	
Corrected Total	1580	8.141409E11		

Root MSE	9534.86563	R-Square	0.8270
Dependent Mean	67932	Adj R-Sq	0.8236
Coeff Var	14.03587		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	57907	1833.61368	31.58	<.0001
female	1	-677.90442	636.12180	-1.07	0.2867
min_m	1	-1376.62580	839.12512	-1.64	0.1011
f_prl	1	219.11876	1642.08166	0.13	0.8939
belowPHD	1	-1773.23571	1358.04946	-1.31	0.1918
res	1	-9459.13029	1892.17659	-5.00	<.0001
clin	1	-3279.11691	3966.54115	-0.83	0.4085
visit	1	-9932.25481	1406.83000	-7.06	<.0001
dist	1	23243	1319.09317	17.62	<.0001
not_tt	1	-2898.60408	2240.70351	-1.29	0.1960
on_track	1	-1544.58987	1655.90750	-0.93	0.3511
adm	1	1019.96014	807.51503	1.26	0.2067
prof	1	29019	1798.60478	16.13	<.0001
assoc	1	10290	1617.59505	6.36	<.0001
inst	1	-8981.12159	2724.60073	-3.30	0.0010
lect	1	-11182	1847.72952	-6.05	<.0001
s_affair	1	-12104	2147.82384	-5.64	<.0001
design	1	-2338.86903	2159.38329	-1.08	0.2789
ed	1	-5430.57136	1427.59615	-3.80	0.0001
engineer	1	10369	943.16925	10.99	<.0001
nat_reso	1	-6112.33669	1371.70551	-4.46	<.0001
hum_ss	1	-12067	946.59837	-12.75	<.0001
ag_life	1	-8495.87450	879.42368	-9.66	<.0001
textiles	1	1453.78003	1676.55835	0.87	0.3860
vet_med	1	2308.59204	1377.28427	1.68	0.0939
managemt	1	12432	1335.26720	9.31	<.0001
pe_cent	1	-13.73179	64.93955	-0.21	0.8326
pe_cent2	1	18.11357	3.04127	5.96	<.0001
yr_pcent	1	-837.92230	103.18571	-8.12	<.0001
yr_pcen2	1	15.01794	6.97008	2.15	0.0313
yr_ccent	1	252.83481	52.13864	4.85	<.0001
yr_ccen2	1	-1.68835	3.88120	-0.44	0.6636

FACULTY LOG REGRESSION
Defaults: White Male, PhD, No Rank Modifier, Tenured, Not Admin, Assist Professor, PAMS
Dependent Variable: logsal
All Potentially Tainted Variables

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	31	185.51183	5.98425	321.62	<.0001
Error	1549	28.82124	0.01861		
Corrected Total	1580	214.33307			

Root MSE	0.13641	R-Square	0.8655
Dependent Mean	11.06460	Adj R-Sq	0.8628
Coeff Var	1.23281		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	10.92356	0.02623	416.43	<.0001
female	1	-0.00638	0.00910	-0.70	0.4836
min_m	1	-0.01356	0.01200	-1.13	0.2587
f_pr1	1	0.00395	0.02349	0.17	0.8663
belowPHD	1	-0.07741	0.01943	-3.98	<.0001
res	1	-0.27718	0.02707	-10.24	<.0001
clin	1	-0.17965	0.05675	-3.17	0.0016
visit	1	-0.33509	0.02013	-16.65	<.0001
dist	1	0.22803	0.01887	12.08	<.0001
not_tt	1	0.15493	0.03206	4.83	<.0001
on_track	1	0.04457	0.02369	1.88	0.0601
adm	1	0.01046	0.01155	0.91	0.3654
prof	1	0.42567	0.02573	16.54	<.0001
assoc	1	0.19650	0.02314	8.49	<.0001
inst	1	-0.26725	0.03898	-6.86	<.0001
lect	1	-0.36723	0.02643	-13.89	<.0001
s_affair	1	-0.21290	0.03073	-6.93	<.0001
design	1	0.01072	0.03089	0.35	0.7286
ed	1	-0.07495	0.02042	-3.67	0.0003
engineer	1	0.14818	0.01349	10.98	<.0001
nat_reso	1	-0.07435	0.01962	-3.79	0.0002
hum_ss	1	-0.19676	0.01354	-14.53	<.0001
ag_life	1	-0.10025	0.01258	-7.97	<.0001
textiles	1	0.02329	0.02398	0.97	0.3317
vet_med	1	0.04868	0.01970	2.47	0.0136
managemt	1	0.18444	0.01910	9.66	<.0001
pe_cent	1	0.00136	0.00092902	1.47	0.1429
pe_cent2	1	0.00015894	0.00004351	3.65	0.0003
yr_pcent	1	-0.00613	0.00148	-4.15	<.0001
yr_pcen2	1	0.00006946	0.00009971	0.70	0.4861
yr_ccent	1	0.00530	0.00074589	7.11	<.0001
yr_ccen2	1	-0.00010448	0.00005552	-1.88	0.0601

DOLLAR TRANSLATION OF THE RACE/GENDER LOG PARAMETER ESTIMATES

female	-436.49
min_m	-925.07

Appendix E

WHITE-MALE FACULTY REGRESSION
Defaults: PhD, No Rank Modifier, Tenured, Not Admin, Assist, PAMS
Dependent Variable: Annual Salary
All Potentially Tainted Variables

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	29	4.116241E11	14193934367	138.33
Error	1019	1.045612E11	102611537	
Corrected Total	1048	5.161853E11		

Root MSE	10130	R-Square	0.7974
Dependent Mean	72220	Adj R-Sq	0.7917
Coeff Var	14.02629		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	56568	2390.31367	23.67	<.0001
f_pr1	1	1150.14571	2243.44391	0.51	0.6083
belowPHD	1	-1648.03406	2072.79940	-0.80	0.4268
res	1	-13276	2793.55155	-4.75	<.0001
clin	1	-2036.40965	7733.54715	-0.26	0.7924
visit	1	-10469	2353.56674	-4.45	<.0001
dist	1	22403	1515.29774	14.78	<.0001
not_tt	1	-1456.14639	3120.94132	-0.47	0.6409
on_track	1	-1412.11762	2171.48450	-0.65	0.5156
adm	1	992.91401	973.88380	1.02	0.3082
prof	1	31161	2349.15578	13.26	<.0001
assoc	1	11301	2118.37497	5.33	<.0001
inst	1	-4401.44531	4886.89685	-0.90	0.3680
lect	1	-13098	2800.75734	-4.68	<.0001
s_affair	1	-13866	2993.87046	-4.63	<.0001
design	1	-1336.90211	3113.87809	-0.43	0.6678
ed	1	-5246.64235	2066.97873	-2.54	0.0113
engineer	1	9928.57989	1202.27935	8.26	<.0001
nat_reso	1	-6490.62378	1748.13452	-3.71	0.0002
hum_ss	1	-12615	1256.99026	-10.04	<.0001
ag_life	1	-9614.41223	1086.99578	-8.84	<.0001
textiles	1	1506.82189	2265.89072	0.67	0.5062
vet_med	1	1687.36547	1804.10433	0.94	0.3499
managemt	1	10176	1681.80868	6.05	<.0001
pe_cent	1	-84.89256	84.75932	-1.00	0.3168
pe_cent2	1	19.35330	3.67520	5.27	<.0001
yr_pcent	1	-997.60072	127.82738	-7.80	<.0001
yr_pcen2	1	18.45635	8.80230	2.10	0.0363
yr_ccent	1	155.60845	63.25405	2.46	0.0141
yr_ccen2	1	3.21332	4.76275	0.67	0.5000

WHITE MALE LINE SALARY RESIDUALS

---------- females ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	371	Sum Weights	371
Mean	-987.24076	Sum Observations	-366266.32
Std Deviation	8361.16694	Variance	69909112.5
Skewness	0.80736213	Kurtosis	4.15234341
Uncorrected SS	2.6228E10	Corrected SS	2.58664E10
Coeff Variation	-846.92279	Std Error Mean	434.090158

---------- minority males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	161	Sum Weights	161
Mean	-1671.2466	Sum Observations	-269070.71
Std Deviation	9068.89764	Variance	82244904.4
Skewness	0.36447585	Kurtosis	0.85820579
Uncorrected SS	1.36089E10	Corrected SS	1.31592E10
Coeff Variation	-542.64269	Std Error Mean	714.72926

---------- white males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	1049	Sum Weights	1049
Mean	0	Sum Observations	0
Std Deviation	9988.59828	Variance	99772095.6
Skewness	0.64723273	Kurtosis	3.1089986
Uncorrected SS	1.04561E11	Corrected SS	1.04561E11
Coeff Variation	.	Std Error Mean	308.401728

APPENDIX F

NORTH CAROLINA STATE UNIVERSITY REGRESSION
Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS
Rank modifiers not included

Independent Variables	Sum	Label Explanation
Intercept	1581	population
female	371	all females
min_m	161	minority males
f_prl	63	first professional degree
belowPHD	187	degree below PhD
not_tt	274	not on tenure track
on_track	270	on tenure-track, but not yet tenured
adm	180	those with an adm. title below department head
prof	641	full professor
assoc	435	associate professor
inst	20	instructor
lect	161	lecturer
s_affair	31	college of student affairs (physical education)
design	33	college of design
ed_psy	61	college of education
engineer	236	college of engineering
nat_reso	72	college of natural resources
hum_ss	317	college of humanities and social sciences
ag_life	408	college of agriculture and life sciences
textiles	41	college of textiles
vet_med	115	college of veterinary medicine
managemt	74	college of management
pe_cent		previous experience(between degree & NCSU hire)centered
pe_cent2		pe_cent squared
yr_pcent		years at NCSU prior to current rank centered
yr_pcen2		yr_pcent squared
yr_ccent		years at NCSU in the current rank centered
yr_ccen2		yr_ccent squared

REGRESSION OF ANNUAL SALARY
Defaults: White Male, PhD, Tenured, Not Admin, Assist Professor, PAMS
Rank modifiers not included
Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	27	6.397017E11	23692655975	210.93
Error	1553	1.744392E11	112324003	
Corrected Total	1580	8.141409E11		

Root MSE	10598	R-Square	0.7857
Dependent Mean	67932	Adj R-Sq	0.7820
Coeff Var	15.60131		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	58982	2029.71151	29.06	<.0001
female	1	-882.33664	705.98636	-1.25	0.2116
min_m	1	-1511.75912	928.75222	-1.63	0.1038
f_prl	1	1087.62747	1803.32702	0.60	0.5465
belowPHD	1	-2124.05577	1500.26445	-1.42	0.1570
not_tt	1	-15622	1898.74623	-8.23	<.0001
on_track	1	-4965.46567	1825.34528	-2.72	0.0066
adm	1	880.65635	897.19349	0.98	0.3265
prof	1	29461	1984.59605	14.84	<.0001
assoc	1	8361.60758	1786.74151	4.68	<.0001
inst	1	-4014.38269	2818.33661	-1.42	0.1545
lect	1	-6946.32820	1798.44778	-3.86	0.0001
s_affair	1	-8088.27159	2348.26623	-3.44	0.0006
design	1	-1885.78811	2396.52658	-0.79	0.4315
ed_psy	1	-4429.81085	1585.50713	-2.79	0.0053
engineer	1	11616	1044.14351	11.13	<.0001
nat_reso	1	-5173.84620	1489.01252	-3.47	0.0005
hum_ss	1	-12594	1043.72672	-12.07	<.0001
ag_life	1	-6895.08289	971.65468	-7.10	<.0001
textiles	1	4549.74474	1854.83962	2.45	0.0143
vet_med	1	2384.11254	1514.77240	1.57	0.1157
managemt	1	13728	1476.91100	9.29	<.0001
pe_cent	1	-48.54528	71.91537	-0.68	0.4998
pe_cent2	1	23.43877	3.34105	7.02	<.0001
yr_pcent	1	-1121.72101	112.41577	-9.98	<.0001
yr_pcen2	1	23.05793	7.71653	2.99	0.0029
yr_ccent	1	307.68932	57.55370	5.35	<.0001
yr_ccen2	1	-0.57773	4.31039	-0.13	0.8934

FACULTY LOG REGRESSION
Defaults: White Male, PhD, Tenured, Not Admin, Assist Professor, PAMS
Rank modifiers not included
Dependent Variable: logsal

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	27	177.32204	6.56748	275.57
Error	1553	37.01102	0.02383	
Corrected Total	1580	214.33307		

Root MSE	0.15438	R-Square	0.8273
Dependent Mean	11.06460	Adj R-Sq	0.8243
Coeff Var	1.39522		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	10.95324	0.02956	370.48	<.0001
female	1	-0.01011	0.01028	-0.98	0.3257
min_m	1	-0.01593	0.01353	-1.18	0.2392
f_prl	1	0.01343	0.02627	0.51	0.6093
belowPHD	1	-0.09281	0.02185	-4.25	<.0001
not_tt	1	-0.17914	0.02766	-6.48	<.0001
on_track	1	0.00350	0.02659	0.13	0.8952
adm	1	0.00927	0.01307	0.71	0.4783
prof	1	0.40418	0.02891	13.98	<.0001
assoc	1	0.15778	0.02603	6.06	<.0001
inst	1	-0.12085	0.04105	-2.94	0.0033
lect	1	-0.24353	0.02620	-9.30	<.0001
s_affair	1	-0.11280	0.03421	-3.30	0.0010
design	1	0.02566	0.03491	0.74	0.4624
ed_psy	1	-0.05821	0.02309	-2.52	0.0118
engineer	1	0.16744	0.01521	11.01	<.0001
nat_reso	1	-0.06830	0.02169	-3.15	0.0017
hum_ss	1	-0.22175	0.01520	-14.59	<.0001
ag_life	1	-0.07944	0.01415	-5.61	<.0001
textiles	1	0.06688	0.02702	2.48	0.0134
vet_med	1	0.05094	0.02206	2.31	0.0211
managemt	1	0.21874	0.02151	10.17	<.0001
pe_cent	1	0.00159	0.00105	1.51	0.1303
pe_cent2	1	0.00018345	0.00004867	3.77	0.0002
yr_pcent	1	-0.00767	0.00164	-4.69	<.0001
yr_pcen2	1	0.00010501	0.00011240	0.93	0.3503
yr_ccent	1	0.00684	0.00083833	8.16	<.0001
yr_ccen2	1	-0.00010731	0.00006279	-1.71	0.0876

DOLLAR TRANSLATION OF THE RACE/GENDER LOG PARAMETER ESTIMATES

female	-690.67
min_m	-1085.02

Appendix F

WHITE-MALE FACULTY REGRESSION
Defaults: PhD, Tenured, Not Admin, Assist, PAMS
Rank modifiers not included
Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	25	3.860227E11	15440906700	121.36	<.0001
Error	1023	1.301626E11	127236154		
Corrected Total	1048	5.161853E11			

Root MSE	11280	R-Square	0.7478
Dependent Mean	72220	Adj R-Sq	0.7417
Coeff Var	15.61888		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	57807	2645.19695	21.85	<.0001
f_prl	1	2591.04924	2492.41436	1.04	0.2988
belowPHD	1	-2553.16998	2289.00534	-1.12	0.2649
not_tt	1	-17397	2340.29783	-7.43	<.0001
on_track	1	-5902.78462	2390.58464	-2.47	0.0137
adm	1	529.65998	1083.60727	0.49	0.6251
prof	1	31705	2594.53847	12.22	<.0001
assoc	1	8987.42203	2339.93241	3.84	0.0001
inst	1	4782.05965	5097.69053	0.94	0.3484
lect	1	-5971.95579	2704.26337	-2.21	0.0274
s_affair	1	-9357.84516	3235.05084	-2.89	0.0039
design	1	-1180.54645	3459.56868	-0.34	0.7330
ed_psy	1	-4117.76431	2298.15326	-1.79	0.0735
engineer	1	10441	1332.84404	7.83	<.0001
nat_reso	1	-6608.74115	1905.45168	-3.47	0.0005
hum_ss	1	-13537	1379.23039	-9.81	<.0001
ag_life	1	-8186.52388	1204.48480	-6.80	<.0001
textiles	1	3906.92836	2517.18544	1.55	0.1209
vet_med	1	939.95346	1993.33678	0.47	0.6374
managemt	1	10791	1866.36680	5.78	<.0001
pe_cent	1	-159.60063	94.20624	-1.69	0.0905
pe_cent2	1	26.61458	4.04872	6.57	<.0001
yr_pcent	1	-1344.53360	139.33580	-9.65	<.0001
yr_pcen2	1	30.07241	9.75033	3.08	0.0021
yr_ccent	1	160.78206	70.18678	2.29	0.0222
yr_ccen2	1	6.67286	5.29601	1.26	0.2080

WHITE MALE LINE SALARY RESIDUALS

---------- females ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	371	Sum Weights	371
Mean	-1270.4517	Sum Observations	-471337.59
Std Deviation	9125.08848	Variance	83267239.7
Skewness	0.50296628	Kurtosis	2.83672036
Uncorrected SS	3.14077E10	Corrected SS	3.08089E10
Coeff Variation	-718.25543	Std Error Mean	473.750989

---------- minority males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	161	Sum Weights	161
Mean	-1908.4918	Sum Observations	-307267.18
Std Deviation	10337.793	Variance	106869964
Skewness	0.56928433	Kurtosis	1.59736362
Uncorrected SS	1.76856E10	Corrected SS	1.70992E10
Coeff Variation	-541.67342	Std Error Mean	814.732223

---------- white males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	1049	Sum Weights	1049
Mean	0	Sum Observations	0
Std Deviation	11144.5476	Variance	124200940
Skewness	0.91606322	Kurtosis	4.1374078
Uncorrected SS	1.30163E11	Corrected SS	1.30163E11
Coeff Variation	.	Std Error Mean	344.092097

APPENDIX G

NORTH CAROLINA STATE UNIVERSITY REGRESSION
Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS
No rank modifiers or distinction for non-tenure track

Independent Variable	Sum	Label Explanation
Intercept	1581	population
Female	371	all females
min_m	161	minority males
f_prl	63	first professional degree
belowPHD	187	degree below PhD
ntenured	544	not tenured including ntt and tt not yet tenured
adm	180	those with an adm. title below department head
prof	641	full professor
assoc	435	associate professor
inst	20	instructor
lect	161	lecturer
s_affair	31	college of student affairs (physical education)
design	33	college of design
ed_psy	61	college of education
engineer	236	college of engineering
nat_reso	72	college of natural resources
hum_ss	317	college of humanities and social sciences
ag_life	408	college of agriculture and life sciences
textiles	41	college of textiles
vet_med	115	college of veterinary medicine
managemt	74	college of management
pe_cent		previous experience(between degree and NCSU hire)centered
pe_cent2		pe-cent squared
yr_pcent		years at NCSU prior to current rank centered
yr_pcen2		yr_pcent squared
yr_ccent		years at NCSU in the current rank centered
yr_ccen2		yr_ccent squared

REGRESSION OF ANNUAL SALARY
Defaults: White Male, PhD, Tenured, Not Admin, Assist Professor, PAMS
No rank modifiers or distinction for non-tenure track
Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	26	6.323671E11	24321811451	207.93	
Error	1554	1.817738E11	116971551		
Corrected Total	1580	8.141409E11			

Root MSE	10815	R-Square	0.7767
Dependent Mean	67932	Adj R-Sq	0.7730
Coeff Var	15.92080		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	60823	2058.19231	29.55	<.0001
female	1	-1093.00328	719.95250	-1.52	0.1292
min_m	1	-1349.33539	947.54964	-1.42	0.1546
f_pr1	1	854.79302	1840.02145	0.46	0.6423
belowPHD	1	-2724.19819	1529.11049	-1.78	0.0750
ntenured	1	-9456.10690	1774.30088	-5.33	<.0001
adm	1	1179.93819	914.78620	1.29	0.1973
prof	1	27572	2011.14550	13.71	<.0001
assoc	1	6596.96663	1809.66175	3.65	0.0003
inst	1	-11671	2708.64692	-4.31	<.0001
lect	1	-14802	1544.07709	-9.59	<.0001
s_affair	1	-7568.81816	2395.45704	-3.16	0.0016
design	1	-1181.15177	2443.98431	-0.48	0.6290
ed_psy	1	-3996.53066	1617.05039	-2.47	0.0136
engineer	1	11486	1065.39924	10.78	<.0001
nat_reso	1	-5368.24509	1519.30686	-3.53	0.0004
hum_ss	1	-12110	1063.35087	-11.39	<.0001
ag_life	1	-6726.51932	991.32414	-6.79	<.0001
textiles	1	5483.19881	1889.14960	2.90	0.0038
vet_med	1	2026.38517	1545.13232	1.31	0.1899
managemt	1	14182	1506.06433	9.42	<.0001
pe_cent	1	-60.97482	73.37130	-0.83	0.4061
pe_cent2	1	21.12974	3.39697	6.22	<.0001
yr_pcent	1	-1157.65040	114.62811	-10.10	<.0001
yr_pcen2	1	25.10572	7.87030	3.19	0.0015
yr_ccent	1	313.22970	58.72814	5.33	<.0001
yr_ccen2	1	-1.59830	4.39677	-0.36	0.7163

FACULTY LOG SALARY REGRESSION
Defaults: White Male, PhD, Tenured, Not Admin, Assist Professor, PAMS
No rank modifiers or distinction for non-tenure track
Dependent Variable: Natural Log of Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	26	175.16742	6.73721	267.32	
Error	1554	39.16565	0.02520		
Corrected Total	1580	214.33307			

Root MSE	0.15875	R-Square	0.8173
Dependent Mean	11.06460	Adj R-Sq	0.8142
Coeff Var	1.43480		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	10.98479	0.03021	363.60	<.0001
female	1	-0.01372	0.01057	-1.30	0.1944
min_m	1	-0.01314	0.01391	-0.94	0.3448
f_prl	1	0.00944	0.02701	0.35	0.7268
belowPHD	1	-0.10310	0.02245	-4.59	<.0001
ntenured	1	-0.07346	0.02604	-2.82	0.0049
adm	1	0.01440	0.01343	1.07	0.2838
prof	1	0.37181	0.02952	12.59	<.0001
assoc	1	0.12753	0.02656	4.80	<.0001
inst	1	-0.25208	0.03976	-6.34	<.0001
lect	1	-0.37817	0.02267	-16.69	<.0001
s_affair	1	-0.10390	0.03516	-2.95	0.0032
design	1	0.03774	0.03587	1.05	0.2930
ed_psy	1	-0.05078	0.02374	-2.14	0.0326
engineer	1	0.16521	0.01564	10.56	<.0001
nat_reso	1	-0.07163	0.02230	-3.21	0.0013
hum_ss	1	-0.21347	0.01561	-13.68	<.0001
ag_life	1	-0.07655	0.01455	-5.26	<.0001
textiles	1	0.08288	0.02773	2.99	0.0028
vet_med	1	0.04481	0.02268	1.98	0.0484
managemt	1	0.22653	0.02211	10.25	<.0001
pe_cent	1	0.00137	0.00108	1.27	0.2026
pe_cent2	1	0.00014388	0.00004986	2.89	0.0040
yr_pcent	1	-0.00829	0.00168	-4.93	<.0001
yr_pcen2	1	0.00014011	0.00011553	1.21	0.2254
yr_ccent	1	0.00694	0.00086205	8.05	<.0001
yr_ccen2	1	-0.00012480	0.00006454	-1.93	0.0533

WHITE-MALE FACULTY REGRESSION
Defaults: PhD, Tenured, Not Admin, Assist, PAMS
No rank modifiers or distinction for non-tenure track
Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	24	3.81225E11	15884375844	120.52	
Error	1024	1.349602E11	131797102		
Corrected Total	1048	5.161853E11			

Root MSE	11480	R-Square	0.7385
Dependent Mean	72220	Adj R-Sq	0.7324
Coeff Var	15.89635		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	61010	2639.33094	23.12	<.0001
f_pr1	1	2871.66285	2536.26658	1.13	0.2578
belowPHD	1	-3074.26214	2328.06882	-1.32	0.1870
ntenured	1	-12040	2210.21882	-5.45	<.0001
adm	1	793.77844	1101.98879	0.72	0.4715
prof	1	28294	2579.39436	10.97	<.0001
assoc	1	5682.82705	2317.66207	2.45	0.0144
inst	1	-4038.40745	4978.02077	-0.81	0.4174
lect	1	-14614	2350.21612	-6.22	<.0001
s_affair	1	-8773.56765	3291.09821	-2.67	0.0078
design	1	-528.67322	3519.37107	-0.15	0.8806
ed_psy	1	-3278.53987	2334.84114	-1.40	0.1606
engineer	1	10549	1356.40489	7.78	<.0001
nat_reso	1	-6517.40153	1939.24361	-3.36	0.0008
hum_ss	1	-13128	1402.09225	-9.36	<.0001
ag_life	1	-7878.43077	1224.81888	-6.43	<.0001
textiles	1	4995.38350	2555.54432	1.95	0.0509
vet_med	1	698.80432	2028.35536	0.34	0.7305
managemt	1	11235	1898.09193	5.92	<.0001
pe_cent	1	-174.32047	95.84880	-1.82	0.0692
pe_cent2	1	24.54678	4.10637	5.98	<.0001
yr_pcent	1	-1380.97547	141.68246	-9.75	<.0001
yr_pcen2	1	32.08093	9.91796	3.23	0.0013
yr_ccent	1	156.54659	71.43023	2.19	0.0286
yr_ccen2	1	6.31701	5.38977	1.17	0.2415

WHITE MALE LINE SALARY RESIDUALS
No rank modifiers or distinction for non-tenure track

---------- females ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	371	Sum Weights	371
Mean	-1489.1	Sum Observations	-552456.12
Std Deviation	9269.26409	Variance	85919256.7
Skewness	0.31758013	Kurtosis	2.44359437
Uncorrected SS	3.26128E10	Corrected SS	3.17901E10
Coeff Variation	-622.47423	Std Error Mean	481.236213

---------- minority males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	161	Sum Weights	161
Mean	-1785.4269	Sum Observations	-287453.73
Std Deviation	10851.9328	Variance	117764446
Skewness	0.18436427	Kurtosis	1.66267764
Uncorrected SS	1.93555E10	Corrected SS	1.88423E10
Coeff Variation	-607.80605	Std Error Mean	855.252118

---------- white males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	1049	Sum Weights	1049
Mean	0	Sum Observations	0
Std Deviation	11348.0768	Variance	128778848
Skewness	0.79366671	Kurtosis	4.1409177
Uncorrected SS	1.3496E11	Corrected SS	1.3496E11
Coeff Variation	.	Std Error Mean	350.37614

APPENDIX H

NORTH CAROLINA STATE UNIVERSITY TENURE-TRACK WITH NO RANK MODIFIERS POPULATION REGRESSION

Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS

The population is restricted to those that are on tenure track and have no rank modifiers

Independent Variable	Sum	Label Explanation
Intercept	1230	population
female	237	all females
min_m	134	minority males
f_pr1	43	first professional degree
belowPHD	49	degree below PhD
on_track	265	on tenure-track, but not yet tenured
adm	166	those with an adm. title below department head
prof	561	full professor
assoc	420	associate professor
s_affair	13	college of student affairs (physical education)
design	31	college of design
ed_psy	51	college of education
engineer	188	college of engineering
nat_reso	50	college of natural resources
hum_ss	205	college of humanities and social sciences
ag_life	348	college of agriculture and life sciences
textiles	32	college of textiles
vet_med	92	college of veterinary medicine
managemt	59	college of management
pe_cent		previous experience (between degree and NCSU hire)centered
pe_cent2		pe_cent squared
yr_pcent		years at NCSU prior to current rank centered
yr_pcen2		yr_pcent squared
yr_ccent		years at NCSU in the current rank centered
yr_ccen2		yr_ccent squared

TENURE-TRACK FACULTY ANNUAL SALARY REGRESSION

Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS

The population is restricted to those that are on tenure track and have no rank modifiers

Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square
Model	24	2.652903E11	11053763236
Error	1205	93279545120	77410411
Corrected Total	1229	3.585699E11	

Root MSE	8798.31864	R-Square	0.7399
Dependent Mean	71548	Adj R-Sq	0.7347
Coeff Var	12.29704		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	55880	2200.24109	25.40	<.0001
female	1	-958.30781	686.19053	-1.40	0.1628
min_m	1	-2012.27114	849.07226	-2.37	0.0179
f_prl	1	1275.86469	1821.37361	0.70	0.4838
belowPHD	1	287.68341	2543.71850	0.11	0.9100
on_track	1	-1228.93374	1955.79133	-0.63	0.5299
adm	1	1410.42910	783.34876	1.80	0.0720
prof	1	31096	2205.43781	14.10	<.0001
assoc	1	11485	1970.43466	5.83	<.0001
s_affair	1	-14382	3646.26096	-3.94	<.0001
design	1	-4411.35457	2805.19105	-1.57	0.1161
ed_psy	1	-6603.57249	1442.34212	-4.58	<.0001
engineer	1	10168	961.30315	10.58	<.0001
nat_reso	1	-7902.14496	1465.11175	-5.39	<.0001
hum_ss	1	-13072	963.40630	-13.57	<.0001
ag_life	1	-9666.11464	889.55521	-10.87	<.0001
textiles	1	2906.01847	1739.78318	1.67	0.0951
vet_med	1	1391.43747	1420.45970	0.98	0.3275
managemt	1	13978	1367.88965	10.22	<.0001
pe_cent	1	-146.31752	79.49937	-1.84	0.0659
pe_cent2	1	24.94105	4.13779	6.03	<.0001
yr_pcent	1	-925.17942	107.40051	-8.61	<.0001
yr_pcen2	1	17.96261	7.08437	2.54	0.0114
yr_ccent	1	178.12572	54.20057	3.29	0.0010
yr_ccen2	1	-0.44367	4.11034	-0.11	0.9141

TENURE-TRACK FACULTY LOG REGRESSION

Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS

The population is restricted to those that are on tenure track and have no rank modifiers

Dependent Variable: logsal

Analysis of Variance

Source	DF	Sum of Squares	Mean Square
Model	24	51.12996	2.13042
Error	1205	15.74326	0.01306
Corrected Total	1229	66.87323	

Root MSE	0.11430	R-Square	0.7646
Dependent Mean	11.15075	Adj R-Sq	0.7599
Coeff Var	1.02506		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	10.92033	0.02858	382.04	<.0001
female	1	-0.01370	0.00891	-1.54	0.1247
min_m	1	-0.02336	0.01103	-2.12	0.0344
f_prl	1	0.02139	0.02366	0.90	0.3662
belowPHD	1	0.01870	0.03305	0.57	0.5715
on_track	1	0.00227	0.02541	0.09	0.9289
adm	1	0.01744	0.01018	1.71	0.0869
prof	1	0.44416	0.02865	15.50	<.0001
assoc	1	0.18960	0.02560	7.41	<.0001
s_affair	1	-0.29969	0.04737	-6.33	<.0001
design	1	-0.07603	0.03644	-2.09	0.0372
ed_psy	1	-0.09240	0.01874	-4.93	<.0001
engineer	1	0.13728	0.01249	10.99	<.0001
nat_reso	1	-0.10440	0.01903	-5.49	<.0001
hum_ss	1	-0.20065	0.01252	-16.03	<.0001
ag_life	1	-0.12534	0.01156	-10.85	<.0001
textiles	1	0.04603	0.02260	2.04	0.0419
vet_med	1	0.02878	0.01845	1.56	0.1192
managemt	1	0.18998	0.01777	10.69	<.0001
pe_cent	1	-0.00154	0.00103	-1.49	0.1363
pe_cent2	1	0.00024472	0.00005376	4.55	<.0001
yr_pcent	1	-0.01050	0.00140	-7.53	<.0001
yr_pcen2	1	0.00022791	0.00009204	2.48	0.0134
yr_ccent	1	0.00253	0.00070414	3.59	0.0003
yr_ccen2	1	-0.00004992	0.00005340	-0.93	0.3501

DOLLAR TRANSLATION OF THE RACE/GENDER LOG PARAMETER ESTIMATES

Female	-974.62
min_m	-1654.27

WHITE-MALE TENURE-TRACK FACULTY REGRESSION

Defaults: White Male, Ph.D., Tenured, Not Admin, Assist Professor, PAMS
The population is restricted to those that are on tenure track and have no rank modifiers

Dependent Variable: Annual Salary

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	22	1.877183E11	8532650155	101.10
Error	836	70555524957	84396561	
Corrected Total	858	2.582738E11		

Root MSE	9186.76009	R-Square	0.7268
Dependent Mean	73588	Adj R-Sq	0.7196
Coeff Var	12.48400		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	55571	2983.31368	18.63	<.0001
f_pr1	1	2823.91532	2314.39690	1.22	0.2228
belowPHD	1	-2256.41402	3171.89865	-0.71	0.4770
on_track	1	-1837.64438	2659.95044	-0.69	0.4898
adm	1	1328.24767	928.41566	1.43	0.1529
prof	1	31958	2959.45697	10.80	<.0001
assoc	1	11311	2688.24421	4.21	<.0001
s_affair	1	-12328	4444.49899	-2.77	0.0057
design	1	-967.26497	3663.85453	-0.26	0.7918
ed_psy	1	-6849.53840	2057.08282	-3.33	0.0009
engineer	1	9693.48943	1199.48379	8.08	<.0001
nat_reso	1	-8281.12161	1769.29883	-4.68	<.0001
hum_ss	1	-13072	1241.40199	-10.53	<.0001
ag_life	1	-10437	1081.78591	-9.65	<.0001
textiles	1	3007.20320	2295.69809	1.31	0.1906
vet_med	1	300.15474	1786.67795	0.17	0.8666
managemt	1	11895	1676.75334	7.09	<.0001
pe_cent	1	-143.97802	98.49580	-1.46	0.1442
pe_cent2	1	22.43823	4.80205	4.67	<.0001
yr_pcent	1	-1035.49758	131.05089	-7.90	<.0001
yr_pcen2	1	20.00721	8.78130	2.28	0.0230
yr_ccent	1	100.78641	63.78489	1.58	0.1145
yr_ccen2	1	4.56369	4.89609	0.93	0.3515

WHITE MALE LINE SALARY RESIDUALS FOR TENURE-TRACK FACULTY
The population is restricted to those that are on tenure track and have no rank modifiers

---------- females ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	237	Sum Weights	237
Mean	-1167.3005	Sum Observations	-276650.22
Std Deviation	7772.61256	Variance	60413506
Skewness	1.17197168	Kurtosis	4.50200688
Uncorrected SS	1.45805E10	Corrected SS	1.42576E10
Coeff Variation	-665.86217	Std Error Mean	504.88544

---------- minority males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	134	Sum Weights	134
Mean	-2423.7484	Sum Observations	-324782.28
Std Deviation	8430.2143	Variance	71068513.2
Skewness	0.47976123	Kurtosis	1.20286215
Uncorrected SS	1.02393E10	Corrected SS	9452112254
Coeff Variation	-347.81723	Std Error Mean	728.259596

---------- white males ----------

The UNIVARIATE Procedure
Variable: residual

Moments

N	859	Sum Weights	859
Mean	0	Sum Observations	0
Std Deviation	9068.21628	Variance	82232546.6
Skewness	0.50538796	Kurtosis	3.36763023
Uncorrected SS	7.05555E10	Corrected SS	7.05555E10
Coeff Variation	.	Std Error Mean	309.403547

Appendix I[1]

Notes on Remedy

Perspectives on Bias

Before looking at remedies, it is helpful to come to an understanding of the meaning of the bias findings. Underlying many debates over both how to study and how to correct faculty salary disparities are assumptions about how discrimination comes to be embedded in salaries in the first place. Ferree and McQuillan (1998) have described the two primary conceptualizations of discrimination as the institutional and individual perspectives. The institutional perspective views discrimination as systemic, generally affecting all those in the women and/or minority category in question. The individual perspective sees discrimination as resulting from isolated personal prejudices that cause pockets of salary disparities.

According to the institutional-systemic view, the basic reason for gender bias in salaries is that women and women's work have traditionally been undervalued. There is a pervasive cultural attitude that women are second-class citizens and by extension their work is worth less than that of men. This cultural devaluing of women/minorities and their work permeates all realms of our society —our psychological, political and economic existence. Paying women less than men for equal work was not made illegal until 1963; the acceptability of paying women less remains an implicit social norm. Historic and on going prejudice becomes embedded in institutional processes, and the resulting policies and practices undervalue most, if not all, women workers. The purpose of a faculty salary study is to identify and to propose institutional solutions for systemic biases.

By contrast, the individual view of the potential for gender and race bias in salaries is that the market tends to reward human capital fairly. Thus, a year of education or experience or the attainment of a higher rank will be equally rewarded in the salaries of women, minorities, and white men. Intervention is rarely needed because the market is generally fair. Isolated personal prejudices can exist, however, causing pockets of salary disparities. The purpose of a salary study under the individual perspective is to find the few individuals whose salaries have been affected by personal prejudice and adjust their salaries accordingly. Depending on the findings, a secondary objective may be to remove the prejudiced person(s) from hiring and salary assignment responsibilities.

Note that these are not necessarily competing or mutually exclusive perspectives. Holding the view that historic and systemic gender or race bias is transferred to salaries through societal and institutional processes does not rule out also believing that biased individuals can facilitate bias in salaries in their particular departments or colleges.

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[1] This Appendix consists of excerpts from chapter 7 of the forthcoming edition of *Paychecks: a Guide to Conducting Salary Studies for Higher Education Faculty.*

Remedy Options

The institutional approach assumes that the effect of gender and race on salaries is systemic, affecting all those in a given gender and race category. In other words, the undervaluing of workers based on gender and race affects the "superstars," the "duds," and the average performers. Why should the highly productive females have actual salaries that are lower on average than the highly productive males? Similarly, why should the substandard women be paid less, on average, than the substandard men? Gray (1990, p. 7) states that "discrimination affects the salaries of the best, the poorest, and the average woman faculty member." Any remedy should address the entire class.
In fact, an emphasis on group or class differences, rather than individual differences, is a more appropriate use of multiple regression statistics (Gray and Scott 1980). Multiple regression results, like averages, indicate class, rather than individual, differences. For instance, suppose the regression equation indicates that women faculty members receive $1,200 less per year on average than comparable white-male faculty members after controlling for rank, discipline, years of service, and the other predictor variables. This does not mean that there aren't faculty women who are paid above the average for comparable men. Neither does it mean that there aren't white men paid less than women or minorities. What it means is that it is less likely that white men make less than comparable women and minorities and that it is less likely that women and minorities make more than comparable white men.

Applying the group approach to salary awards means that the distribution of women and minorities' residuals (or the scattergram of their actual and predicted salaries) are more similar to that for white men. The highest paid women and minorities will have salaries more like the highest paid white males, and the lowest paid women and minorities will have salaries more like the lowest paid white males. Figures 1 and 2 show the effects of this approach on a SUNY two-year college.

Figure 1 plots the actual salaries (vertical axis) against the regression predicted salaries (horizontal axis) for each faculty member. Each square represents a male faculty member's predicted and actual salaries, and each circle represents a female or minority faculty member's predicted and actual salaries. The scatter for the women and minorities is lower than that for the men, and separate lines representing the general trend of the scatter (the line of "best fit") have been plotted for each group. Raising the salaries of all those in the women and minorities category by the total amount of their negative coefficient has the effect of moving the female-minority best-fit line up to coincide with the male line (figure 2). The scatter around that line will persist so that relatively equal proportions of the white male scatter and women and minorities' scatter are above and below that line.

FIGURE 1 — BEFORE REMEDY

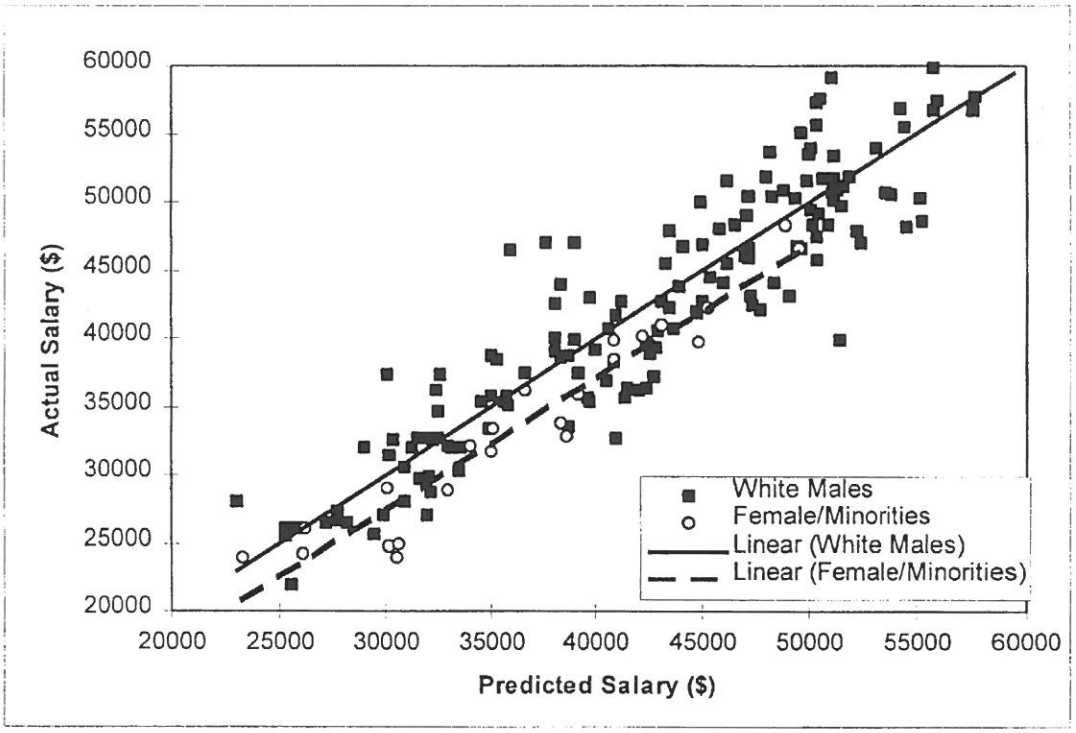
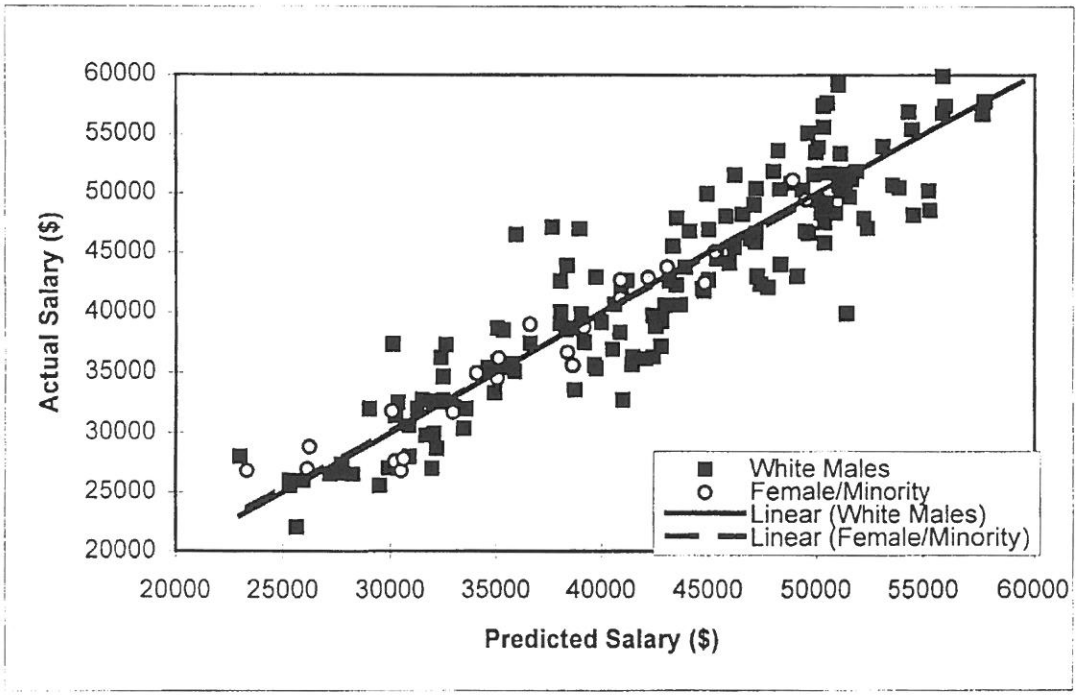


FIGURE 2 — AFTER REMEDY



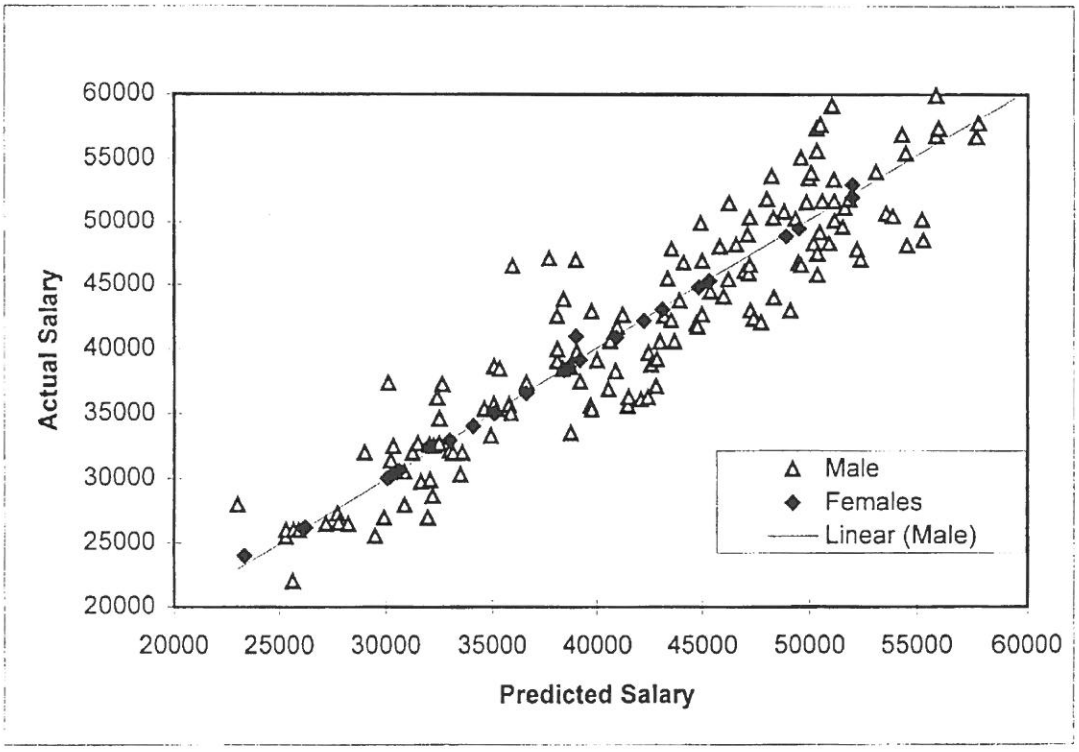
Appendix I

The group approach creates equalization across gender and race groups, but it does not change the distribution of salaries within these groups. Women and minorities do not experience others in their same race-gender category leaping ahead of them in salary.

Any remedy that involves only those who's predicted salaries are below their actual salaries is misguided. When the regression coefficient for any group studied is negative, everyone in that group is, on average, paid less than everyone in the default group. For example, if the default rank is associate professor and the variable for assistant professor has a negative coefficient, this indicates that, on average, all assistant professors are paid less than associate professors. To assume that being an assistant professor affects only those that are paid below the associate professor line misuses this finding.

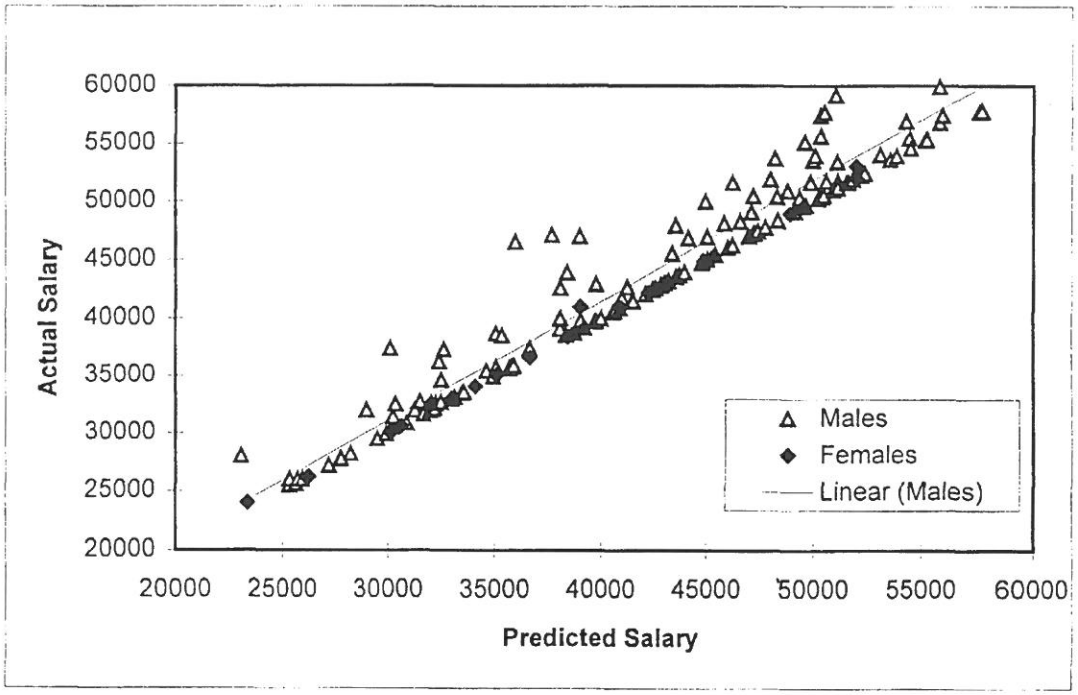
Moreover, there are a number of practical problems with the "predicted below actual" remedy. The most obvious one is that leaving all of the white males below the line while raising the women and minority faculty members' salaries to the line increases the potential for reverse discrimination allegations (see figure 3). This can lead to a second problem. Sometimes the salaries of all those below the line are raised to the line. Such an adjustment aggravates the gender bias in salaries rather than eliminating it (see figure 4). Raising salaries of the large number of white males below the line lifts the regression line itself so that now a substantial majority of the female and minority faculty members are paid below that line.

FIGURE 3 — BELOW THE LINE REMEDY



Appendix I

FIGURE 4 — BELOW THE LINE REMEDY EXTENDED TO ALL



Another variation on this approach is to "allow" all the women and minorities whose actual salaries are below their predicted salaries to apply for individual case reviews. Case reviews can involve pairing an individual woman or minority with a comparable white male or small group of comparable white males to illustrate the need for adjustment (Holmes-Rovner et al. 1994). Case reviews are lengthy processes, necessitating the development of criteria for comparing faculty members and focusing attention on the issue and related controversy for an extended period of time. Such comparisons tend to become accusatory, competitive, and contentious, perhaps leading to recrimination, defensive reaction, and exacerbation of any race or gender animosity.

Case reviews assume that bias is individual, not systemic. Under this assumption, no reason exists to conduct a multiple regression analysis. Statistical methods do not adequately address the individual level. Even if they did, the data available for most salary analyses are not adequate or appropriate for suggesting remedies for individual cases of salary disparity.

Moreover case reviews have the obvious drawback of using the same decision makers and institutional structures that created the discrepancy in the first place, perhaps even requiring self-incrimination. And what happens to monies that are not awarded? Does the administrative unit that does not award them retain them? (See Snyder, Hyer, and McLaughlin 1994.)

Remedy approaches that do not include the women and minorities at the top risk reinforcing the stereotype that women and minorities are low performers. Many highly

successful minorities and women may acquiesce to such an approach because they feel apologetic about having more power, status, and rewards than others have in their gender and race groups. Given that they are already better off, they may be reluctant to insist on the real value of their work and to compare themselves with white men. But fairness is more than just bring up the bottom. When elite women and minorities are paid like white men, they make it easier for all others in their race-gender group to be more fairly treated.

About Longevity

The most senior women and minority faculty members may have suffered more bias simply because of the compounding effect of time. Gray (1990) recommends adjusting for seniority either by an across-the-board adjustment with a seniority bonus or by basing each individual's adjustment on the number of years at the institution. The senior bonus approach could, for instance, give a bias increment to all faculty in an underpaid race-gender category and, in addition, a longevity bonus for those with more then 10 years of service to the institution. Alternatively, the total remedy can be based on years-of-service. For example, if the regression results indicate that, on average, each person in a race-gender category is underpaid by $1,000 and the average time at the institution is 10 years, then each female and/or minority can receive $100 for each year at the institution. Thus, a faculty member who has been at the institution for five years receives $500, and someone who has been there for 15 years receives $1,500.[2]

If you use multiple regression analyses and find indications of gender or race bias in faculty salaries, consider a class-based remedy consistent with that statistical method. Remedies that are distributed equally to all those in the affected group can be applied easily, efficiently, promptly and without prolonged attention to the issue.

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[2] A percentage increase is sometimes suggested as a way of correcting for the compounding effect of bias over time. The presumption is that the highest paid individuals have been at the institution longest and, therefore, should be awarded proportionately higher bias corrections. We do not recommend this approach. As multiple regression studies demonstrate, many factors other than longevity contribute to high pay. A person hired last year as a full professor in a prestigious discipline would receive a higher award than the many women and minorities in disciplines that are low paid (Bellas 1994).

Bibliography

Allen, J. (1984). *Manual for determination of academic salary discrimination against women.* Canadian Association of University Teachers.

Bellas, M. L. (1994). Comparable worth in academia: The effects on faculty salaries of the sex composition and labor market conditions of academic discipline. *American Sociological Review, 59*, 807-831.

Brittingham, B. E., Pezzullo, T. R., Ramsay, G. A., Long, J. V., and Ageloff, R. M. (1979). A multiple regression model for predicting men÷s and women÷s salaries in higher education. In T. R. Pezzullo and B. E. Brittingham (Eds.), *Salary equity: Detecting sex bias in salaries among college and university professors.* Lexington, MA: Lexington Books.

Broder, I. E. (1993). Professional achievements and gender differences among economists. *Economic Inquiry, 31*, 116-127.

Ferree, M., McQuillan, J.(1998) Gender-Based Pay Gaps: Methodological and Policy Issues in University Salary Studies. *Gender and Society, 12 (1), 7-39.*

Fidell, L. (1970). Empirical verification of sex discrimination in hiring practices in psychology. *American Psychologist, 25*, 1096-1097.

Finkler, D., Van Dyke, D., and Klawsky, J.(1989). *How statistics, law, and politics influence the evaluation of gender salary disparity in higher education.* University of Nebraska at Omaha. (Unpublished manuscript).

Geetter, J. (1988). *Report from Salary Inequity Committee*. University of Connecticut. (Unpublished report).

Gray, M. (1990). *Achieving pay equity on campus*. Washington, D.C.: American Association of University Professors.

Gray, M. (1991). Using regression to study faculty salaries. *Thought and Action, 7*, 55-100.

Gray, M. (1993). Can statistics tell us what we do not want to hear? The case of complex salary structures. *Statistical Science, 8*, 144-179.

Gray, M., and Scott, E. (1980). A "statistical' remedy for statistically identified discrimination. *Academe, 66*, 174-181.

Haignere, L., Lin, Y., Eisenberg, B., McCarthy, J. (1996). *Pay Checks: A Guide to Salary Equity in Higher Education*, United University Professions.

Hodson, R. (1985). Some considerations concerning the functional form of earnings. *Social Science Research, 14*, 374-394.

Holmes-Rovner, M., et.al. (1994) Compensation equity between men and women in academic medicine: Methods and implications. *Academic Medicine*,69 (2) 131-137.

Hurley, R., et al. (1981). Female faculty equity study: University of Maryland. *Resources in Education.* ED:211025.

Johnson, C., Riggs, M., and Downey, R. (1987). Fun with numbers: Alternative models for predicting salary levels. *Research in Higher Education, 27*, 349-362.

Johnsrud, L., and Heck, R. (1994). Administrative promotion within a university. *Journal of Higher Education, 65*, 23-44.

Long, J. S., Allison, P. D., and McGinnis, R. (1993). Rank advancement in academic careers: Sex differences and the effects of productivity. *American Sociological Review, 58*, 703-722.

McLaughlin, G., Zirkes, M., and Mahan, B. (1983). Multicollinearity and testing questions of sex equity. *Research in Higher Education, 19*, 277-284.

Muffo, J. A., Braskamp, L., and Langston, I. W., IV (1979). Equal pay for equal qualifications? A model for determining race or sex discrimination in salaries. In T. R. Pezzullo and B. E. Brittingham (Eds.), *Salary equity: Detecting sex bias in salaries among college and university professors.* Lexington, MA: Lexington Books.

Ramsay, G. A. (1979). A generalized regression model for predicting discrimination: A demonstration using constructed data. In T. Pezzullo and B. Brittingham (Eds.), *Salary Equity.* 37-54. Toronto: Lexington.

Schau, C., and Heyward, V. (1987). Salary equity: Similarities and differences in outcomes from two common prediction models. *American Educational Research Journal, 24(2)*, 271-286.

Schrank, W. (1977). Sex discrimination in faculty salaries: A case study. *Canadian Journal of Economics, 10*, 411-433.

Schrank, W. (1985). *Sex discrimination in faculty salaries at Memorial University: A decade later*. Report submitted to the president of Memorial University and the Executive Committee of the Memorial University of Newfoundland Faculty Association.

Schrank, W. (1988). *Multiple regression analysis as a method of ascertaining salary anomalies.* OCUFA workshop on the compensation of female academic staff.

Scott, E. (1977). *Higher education salary evaluation kit.* Washington, D.C.: American Association of University Professors.

Snyder, J., Hyer, P., and McLaughlin, G. (1994). Faculty salary equity: Issues and options. *Research in Higher Education, 35*, 1-19.

Steinpreis, R.E., Anders K.A., Ritzke D. (1999). The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study. *Sex Roles*, 41(7-8) 509-528.

Top, T. (1991). Sex bias in the evaluation of performance in the scientific, artistic, and literary professions: A review. *Sex Roles, 24*, 73-106.

Weiller, W. (1990). Integrating rank differences into a model of male-female faculty salary discrimination. *Quarterly Review of Economics and Business, 30*, 3-15.