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Petitioners' Statistical Report

Differences in Salary between Men and Woman
on the Faculty and Academic Staff
at the University of Minnesota

prepared by

Charlotte Striebel, Ph.D., J.D.

INTRODUCTION

In June 1983, a group of faculty and academic staff women filed petitions pursuant to the Rajender Consent Decree alleging discrimination in pay between men and women faculty members. These petitions alleged claims on behalf of all University class members and specifically referenced women in female dominated departments, women in academic professional and administrative positions and women at the Waseca and Duluth campuses. Between 1983 and 1987, proceedings focused on securing the necessary data to conduct statistical analysis. In January 1988, after the construction and development of the data base was completed, counsel for the University and the petitioners exchanged, for settlement purposes only, their respective statistical analyses. Petitioners' statistical analysis follows.

DATABASE

Source of Data: Current rank, tenure status, percent time and salary data are taken from the EEO-6 report, dated October 15, 1986, provided by the University Office of Equal Opportunity and Affirmative Action. Data on academic degrees, rank and tenure history are taken from a file prepared in conjunction with this litigation by Professors David Lane and William Sudderth ("Sudderth/Lane" database).

Sample - The sample analyzed is all full time faculty or academic staff (class codes 93xx, 94xx, 96xx, or 97xx) that appear on the October 15, 1986 EEO-6 report and are not employed in the Medical School. This includes those employed on the Twin Cities Campus, the Duluth Campus and all coordinate campuses. It is necessary to exclude the Medical School because some of these staff members receive pay from the practice of medicine which is not available in any data base. It is not possible to tell which members receive this extra pay and which do not.

VARIABLES

Academic Degrees. To determine the highest academic degree and time from the highest academic degree, degrees are first classified as bachelors, masters or higher than masters. The higher than masters group includes all doctorates and professional degrees such as JD, MD, DDS, etc.

The time from the highest academic degree is used as a measure of professional experience. It is measured from the earliest degree held in the group of highest level.

Length of University Employment. This is measured from the earliest entry date into either academic rank or administration rank.

Academic Rank. The first rank group is all professors and regents professors (class codes 9401 or 9410). This group includes all persons with these ranks without regard to tenure status. Temporary (T) are included as well as tenured (P). The second group is associate professor (class code 9402). The third group is assistant professor (class code 9403). The fourth group is instructor and below (class codes 9404, 9405, 9406 and 9407).

The academic staff members (P/A) are divided up as follows: The first group is administration with tenure (class code 93xx and academic tenure status P). The second group is administration without tenure (93xx and no academic tenure statute P). Agriculture extension is all class codes 94xx. Professional is all class codes 97xx.

Market Factors Correlated with Sex. First, all employees were grouped by discipline. These discipline groups are identical to academic departments of the larger departments (larger than 10). The smaller departments were grouped together to obtain discipline groups that have size of ten or more. The percent of women in the discipline was computed for each discipline. This percent value was then assigned to every member of the discipline as their value for this market variable.

This is a market factor variable in that it takes into account differences in the monetary value of different disciplines. It is generally recognized that universities do in fact assign different monetary values to different disciplines. The mechanism by which this is accomplished is not at all understood but is generally referred to by the term "market factors".

The market factor variable (MV) used in this study makes no attempt to model or to measure the total relative values of disciplines. This is an extremely difficult task and is far beyond the scope of this study. The market value variable (MV) used here is designed to measure only that portion of the overall market value of disciplines that is correlated with sex for this particular sample. This is the portion of the market value factor that affects the comparative salaries of men and women at the University. This variable is used in the regression analysis (Table 15) in order to measure the effect on salary of female dominated departments.

STATISTICAL ANALYSIS

All salaries are nine month equivalents. The sample analyzed in Tables 1-12 and 15 are all members of the faculty and academic staff for which there is data on both the October 15, 1986 EEO-6 file and the history file collected as the Sudderth/Lane database. The samples in Tables 13 and 14 are all those for which the needed data is available on the history file.

Throughout, the notation

- * indicates "statistically significant at the 5% level" and
- ** indicates "statistically significant at the 1% level".

The selection ratio computed in Tables 5, 9 12 and 13 is the quotient of the two rates (low rank, untenured, unpromoted, etc.) immediately above. The tests of significance in these tables are standard 2 x 2 contingency table tests using the normal approximation. The tests in Tables 1, 2, 3, 6, 7, 10 and 14 are standard t-tests. The tests in Table 15 are the standard tests of regression coefficients produced by the SPSS regression analysis package. (For a discussion of the interpretation of significance level and selection ratio, see Appendix.)

DISCUSSION OF TABLES

A. Salary, Rank, Highest Academic Degree and U of M Experience (Tables 1-12)

Tables 1 through 12 present background statistical comparisons. These tables do not reflect multiple regression analysis. Tables 15A-15D contain petitioners' multiple regression analysis.

Table 1 - The first line of Table 1 provides the average(s) of actual salaries for all men and for all women in the sample. The third column provides the difference between these averages. All differences are the amount that women are paid less than men. The fourth column provides the percent (34.6%) that women's average salaries must be increased to bring them up to the average of men. The notation ** on the difference indicates that this difference is statistically significant at the 1% level.

The remainder of Table 1 and the series of tables, Table 2 through Table 12, examine the contribution of academic degree and academic rank to this difference in average salary between men and women. The effect of academic rank on salary is twofold. First, in every academic rank men are paid on the average higher than are women. This effect is examined in Table 1 (overall), Table 7 (doctoral degree only) and Table 10 (master's degree only). Second, women hold appointments in the higher paid ranks in numbers that are disproportionately small compared to men. This effect is examined in Table 4 and Table 5 (overall), Table 8 and Table 9 (doctoral degree only) and in Table 11 and Table 12 (master's degree only).

Table 1 breaks the sample into groups based on their academic rank. In each group women are paid less on the average than men are. The differences are statistically significant at the 1% level for all of the groups except for professional.

Table 2 - This table analyzes the same sample as in Table 1 except for those members for which the necessary information on academic degree is not available. The groups of faculty are the same as in Table 1. Table 2 gives the average number of years from the highest academic degree held by the faculty or P/A member.

In most of the rank groups the average time from highest degree is greater for men than for women. The question of whether or not the differences in average salaries in Table 1 can reasonably be explained by the difference in average time from highest degree is explored by the use of the regression models reported in Table 15.

Table 3 - The sample and the groups analyzed in this table are the same as in Table 1. The variable treated here is the length of University employment. Only employment at the University of Minnesota is included. The earliest entry date into a faculty (94xx) of a P/A (93xx, 96xx or 97xx) job classification is taken as the beginning of University employment.

In the majority of the groups, the average time in University employment is less for women than it is for men. The effect of these differences in average time of University employment on average salary is explored in the regression models reported on Table 15.

Table 4 - The sample and the groups analyzed in this table is the same as for Table 1.

The first column gives the average salary (both men and women) for the rank group. It is given so that the relative monetary value of an appointment in each group can be seen. For example, the faculty groups are paid progressively less from professor to instructor and below. In the P/A groups the best paid is administration with tenure and next is administration without tenure. The last two groups are about the same and considerably less than the two administration groups.

Under the column heading "men" and "women" are the numbers of men and women in the group. For each group the "% women" is the number of women in the group divided by the total (men and women) in the group.

In the faculty groups, the highest paid group (professor) has the fewest women (7.6%). The percent women increases from the highest paid group to the lowest paid group.

In the P/A groups the best paid group (administration with tenure) has the lowest percent of women (14.6%). The other three groups are paid considerably less and have a higher percentage of women.

Table 5 - This table takes the counts in Table 4 and combines them into two 2 x 2 contingency tables for statistical analysis.

The first 2 x 2 table compares the number of men and women in highest faculty groups with the lowest faculty groups. The % low for each sex is the percent for that sex that is in the low group. That is, for men

$$\frac{428}{428 + 1435} = 23.0\%$$

From the table, the percent of women in the low group (52.6%) is higher than the percent of men in the low group (23.0%). The statistical analysis performed is designed to assist in the interpretation of the comparison of these two percentages. (See Appendix on significance level and selection ratio.)

Since the selection ratio here (43.7%) is considerably below the 80% standard, the difference in the rates at which men and women hold low ranking academic appointments is evidence of discrimination against women. Since the significance level is less than 1%, the difference in these percents cannot reasonably be attributed to chance.

The second 2 x 2 contingency table on Table 5 compares the numbers of men and women in faculty appointments with those in non-tenured P/A appointments. The tenured administrators are deleted because they hold faculty appointments to which they can return when their administrative appointments are completed and hence are a hybrid of faculty and administration.

The percent of men in untenured P/A appointments is 14.6% while the percent of women in untenured P/A appointments is 37.1%. The selection ratio is 39.3%. Thus, women are in untenured P/A positions at a rate almost three times the rate for men. Since the selection ratio is considerably less than the 80% standard, this is evidence that men and women are not treated the same with respect to assignment to untenured P/A positions as compared to faculty positions. The significance level is less than 1% so this difference cannot reasonably be attributed to chance.

Table 6 - The sample for this table is the same as for Table 1 except that only those with an identified highest degree are included. The sample is broken into groups based on the highest academic degree that is held. All salaries were converted to a nine month equivalent salary.

The first group is all those whose highest degree is a bachelor's degree. The average salary for the men in this group is \$28,410 for a nine month academic year. The average salary for women in this group is \$22,070. The difference between men and women in this group is \$6,340. This difference is statistically significant at the 1% level. The average for men is 22.3% higher than the average for women.

For all the degree groups the average for women is much lower than the average for men. The difference is statistically significant at the 1% level for all groups except for the medical degree. For the medical degree the difference is not statistically significant. The reason for this is that this group is rather small since it includes only those who hold a medical degree as their highest degree but are not in the Medical School. (The Medical School is excluded because salary data is not available.)

Table 7 - This table takes the groups from Table 6 who hold a doctoral degree as their highest degree and further divides this group into subgroups following the grouping scheme used in Table 1. Two groups ("instructor and below" and "agricultural extension") were eliminated because the numbers were too small.

In all of the groups women are paid on the average less than men. These differences are statistically significant at the 1% level for the groups associate professor, assistant professor and administration with tenure. The groups professor and administration without tenure are statistically significant at the 5% level. It should be noticed that the only group in which the average pay for women is somewhat comparable to the average pay for men, the professional academic group, is the lowest paid group.

Table 8 - This table analyzes the same sample and uses the same groups as Table 7. The average salary for the group is given so that the relative monetary value of each group can be seen. For both the faculty groups and the P/A groups the percent of women in the highest paid group is the lowest. As the monetary value of the groups decrease, the percent of women in the group increases.

Table 9 - This table takes the counts from Table 8 and combines them into two 2 x 2 contingency tables for statistical analysis. This classification for the 2 x 2 contingency tables are the same as for Table 5.

The percent of all men (with doctoral degrees) that are in the low academic rank (assistant professor) is 17.7%. The percent of all women that are in the low rank is 43.1%. The selection ratio of 41.0% is considerably below the 80% standard so that this difference in the selection rates for the low academic rank is evidence of discrimination. The difference between the

rates for men and women is statistically significant at the 1% level so that it cannot reasonably be attributed to chance.

In the second comparison on this table, the percent of all men (with doctoral degrees) that are in the non-tenured P/A positions is 6.0% while the percent of all women in these positions is 13.6%. The select ratio of 44.2% is considerably below the 80% standard so this difference is the rate at which men and women hold positions in untenured P/A ranks, is evidence of discrimination. The difference between these rates is statistically significant at the 1% level so it cannot reasonably be attributed to chance.

Table 10 - This table takes the group from Table 6 who hold a master's degree as their highest degree and further divides the group into subgroups following the grouping scheme used in Table 1.

The average salary for men is higher than the average salary for women in all groups except the professional group. These differences are statistically significant at the 1% level for the assistant professor group and for the administration without tenure group. The difference is statistically significant at the 5% level for the agricultural extension group. For the groups professor, associate professor, instructor and below, and administration with tenure the differences are not statistically significant. The numbers in these groups is quite small (see Table 11).

For the professional group the numbers are moderate but the difference is not statistically significant. This is the only group in which it is reasonable to conclude that the average pay for men and women are comparable. Again this occurs in the group that is the lowest paid overall.

Table 11 - This table uses the same sample and the same groups as Table 10. The average salary for each group is given so that the relative monetary value of each group can be seen.

The highest paid faculty group (professor) has the fewest women (11.7%), the next highest paid faculty group (associate professor) has the next fewest women (37.8%). The lowest paid faculty groups have the highest percent of women.

In the P/A groups, the highest paid group (administration with tenure) has the fewest women (21.2%). The lowest three groups have average pay that is somewhat comparable and have the highest percentages of women.

Table 12 - This table takes the counts from Table 11 and combines them into two 2 x 2 contingency tables for statistical analysis. The classifications for the 2 x 2 contingency tables is the same as for Table 5 and Table 9.

The percent of all men (with master's as their highest degree) that are in the low academic ranks is 49.2%, while the percent of women in these ranks is 68.8%. The selection ratio of 71.5% is less than the 80% standard so this provides evidence of discrimination. This difference in percentages is statistically significant at the 1% level so it cannot reasonably be attributed to chance.

The percent of all men (with master's as their highest degree) who are in non-tenured P/A positions is 35.8% while the percent for women is 48.5%. The selection ratio of 73.8% is less than the 80% standard so that this provides evidence of discrimination with respect to assignment to non-tenured P/A positions. The difference between these percents is statistically significant at the 1% level so that it cannot reasonably be attributed to chance.

B. Promotion (Tables 13 and 14)

Table 13 - This table provides three 2 x 2 contingency tables all related to the issue of promotion: promotion from associate professor to professor, promotion from assistant professor to associate professor and promotion from tenure track status (N) to tenure status (P).

The sample for the first 2 x 2 table consists of all those who were promoted from associate professor to professor (with at least one year intervening) together with those who entered the rank of associate professor at the University at least 9 years earlier and have not yet been promoted to professor. The 9 year time span was selected by examining all promotions from associate professor to full professor and selecting the time by which 90% of these promotions had occurred. This sample includes promotions that occurred any time during the faculty member's career at the University.

The percent of men unpromoted after at least 9 years is 20.1% while the women unpromoted after at least 9 years is 36.2%. The selection ratio of 55.5% is considerably less than the 80% standard so that this provides evidence of discrimination in the decision to promote or not promote from the rank of associate professor to professor. The significance level for this difference between men and women is less than 1% so that this difference cannot reasonably be attributed to chance.

The sample in the second 2 x 2 table is all persons who have been promoted from assistant professor to associate professor together with those who entered the rank of assistant professor at the University at least 8 years earlier and have not yet been promoted to associate professor. The 8 year time span was determined in the same way as for the first 2 x 2 table except that promotion time from assistant professor to associate professor was used.

The percent of men unpromoted after at least 8 years is 14.2% as compared with the percent of 32.7% for women. The selection ratio of 43.4% is considerably below the 80% standard so that this provides evidence of discrimination against women in the decision to promote or not promote from the rank of assistant professor to associate professor. The significance level for this comparison is less than 1% so that this difference in percents unpromoted cannot reasonably be attributed to chance.

The sample for the third 2 x 2 table is all persons who entered the tenure track (but were not tenured the same year) at any time during their University career. The first row counts those who were later tenured. The second row counts those who have never been tenured and who entered the tenure track at least 7 years ago. The 7 year time span was selected because the Tenure Regulations require that the final tenure decision be made before the end of the sixth year after entering the tenure track.

The percent of men untenured after at least 7 years is 4.4% while the comparable percent for women is 9.1%. The selection ratio of 48.4% is considerably below the 80% standard so that this provides evidence of discrimination against women with respect to the tenure decision. The significance level for this comparison is less than 1% so that this difference between men and women in percents untenured cannot reasonably be attributed to chance.

In this analysis of promotion it is not necessary to make corrections for the variables of degree, tenure status, and experience. Highest academic degree and experience are important in determining the level at which a person enters academic employment. Once they have been employed at a particular rank, it may be assumed that they have the appropriate degree for that rank. Experience is explicitly controlled for in this table through the time lag. For example, no one is treated as unpromoted until at least nine years have elapsed from the time they entered the associate professor rank. This is more than enough time to become eligible for promotion to professor.

Most of the people included in all portions of this table have regular appointments. It would be a violation of the regulations governing temporary (T) appointments for a person to remain on a T appointment for the eight or nine years required in this table.

Table 14 - The sample analyzed in the first line is all those persons who were promoted from assistant professor to associate professor. The second line includes all who were promoted from Assistant Professor to Professor. Cases were eliminated if entry into the two ranks occurred during the same year.

The average number of years to promotion was computed for men and for women for each type of promotion. In each case the average number of years to promotion is longer for women than for

men. For the promotion from associate professor to professor this difference is statistically significant at the 5% level. For the promotion from assistant professor to associate professor the difference is statistically significant at the 1% level.

C. Regression Analysis of Salary (Tables 15, 15A-15D)

Table 15 - This table reports the results of four different linear regression models.

Some of the tables (Table 1, Table 6, Table 7, and Table 10) discussed above, take into account the effect on salary of the variables academic rank and highest academic degree. This was accomplished by breaking the sample into groups and then computing the average salary for men and the average salary for women within each group. Table 1 divides the sample by academic rank only. Table 6 divides the sample by highest degree only. In Table 7 and Table 10 the sample is divided by both rank and highest degree. When this is done the sample size in many of the groups becomes small. It may still be possible to detect trends but statistical significance is often lost. Regression analysis is a method for overcoming this problem by averaging over all groups to obtain one much more accurate difference in overall average salary between men and women rather than the many (often inaccurate) differences computed separately for each group as in Table 1, Table 6, Table 7 and Table 10.

Regression analysis also has the advantage that it can correct for variables that take on continuous values (such as time from highest degree and length of University employment) as well as categorical variables such as academic rank and highest degree that only take on a discrete number of values. (8 for academic rank and 6 for highest degree).

In the regression analysis method, a model which includes a set of independent variables is fit to the data. Then, using this model, the salary of each person (men and women) is corrected to an adjusted salary that the person would have received if the values for the independent variables in the model were at some predetermined and fixed base values. The purpose of computing these adjusted salaries is to make members of the sample comparable. For example, it is not appropriate to compare the salary of a person with a Ph.D. to the salary of a person with a master's degree. However, it is appropriate to compare the adjusted salaries of these to two people because they have both been adjusted to the same base values for academic degrees.

The definition of the independent variables, the selection of the particular variables and the base values assigned to these variables are all part of the model. The coefficients for each variable are determined by the data using a computer regression package. The coefficients for the four models reported on Table 15 are given in Table 15A, Table 15B, Table 15C and Table 15D. It should be noted that all of the coefficients in all of the

models are statistically significant at the 1% level and hence may be considered reliable.

The first model (model A) on Table 15 corrects for the independent variables highest academic degree, time from highest academic degree, the length of University employment. The base value for academic degree is the bachelor's degree. For the other two independent variables it is their average value in the whole sample. (An example of the computation of an adjusted salary for this model is given in the Appendix.)

In the regression model these adjusted salaries are computed for every member of the sample. The average of these adjusted salaries is then computed for men and the average is computed for women. The difference of these averages is reported on Table 15.

In Model A, correcting for differences in the variables highest degree, time from highest degree and the length of University employment - the difference in average salary for men and women is \$3,680. This difference is statistically significant at the 1% level. This difference is 10.3% of the average salary for the sample (\$35,770).

Model B includes all of the independent variables from Model A and in addition a variable that takes into account market factors that vary by discipline and are proportional to the percent of women employed in the discipline.

From Table 15B the coefficient for this market factor variable is -\$56/per percentage point. This means that on the average an employee (male or female) in a discipline that employs a high percent of women is penalized in salary at a rate of \$56 in annual salary for every percentage point of female employment. For example, an employee in an all male discipline (MV = 0%) compared with an employee in an all female discipline (MV = 100%) is paid on the average \$5,600 more assuming that they are the same on the other independent variables.

From Table 15, the difference in average salary between men and women corrected for the independent variables of Model B (highest academic degree, time from highest academic degree, length of University employment and market factors that correlate with sex) is \$2,780. This difference is statistically significant at the 1% level. This difference is 7.8% of the average salary for the sample.

Comparing Model A and Model B, the difference \$900 is the average penalty to women because salaries are lower in female dominated departments.

Model C includes all the independent variables in Model A and in addition the variables academic rank and time in current academic rank. Coefficients for these variables are given in Table 15C. After making corrections for the independent

variables in Model C, the difference in the average salary for men and women is \$2,080. This difference is statistically significant at the 1% level and represents 5.8% of the average salary for the sample.

A comparison between Model A and Model C shows that women are on the average penalized \$1,600 because on the average they are in lower paid ranks than men with the same degree, time from highest degree and length of University employment.

Model D adds the variable, market factors that correlate with sex, to the independent variables in Model C. Corrected for all of these variables women are still paid on the average \$1,450 less than men. This difference is statistically significant at the 1% level and represents 4.1% of the average salary for the sample.

Comparing Model A with Model D, women pay an average combined penalty of \$2,230 because they are in lower paying ranks and because the disciplines in which they work are lower paid than men with the same highest degree, time from highest degree and length of University employment.

APPENDIX

Significance Level

The significance level and selection ratio will be discussed in the context of Table 5. From this table, the percent of women in low rank group (52.6%) is higher than the percent of men in the low group (23.0%). The statistical analysis provided by the significance level and the selection ratio is designed to assist in the interpretation of the comparison of these two percentages.

The issue addressed by the significance level method is "Could the difference in these two percentages reasonably be explained by chance?" The significance level is a measure of the probability of getting the observed result by the action of chance alone if indeed men and women are treated the same with regard to the high and low rank groups. The lower the significance level, the less likely it is that the event occurred by chance. If the significance level is low enough, the hypothesis that the result occurred by chance must be rejected and the conclusion then is that men and women were not treated the same by the selection procedures which resulted in their appointment to the high and low rank groups. The question of "how low is low enough" is answered in an arbitrary manner. In evaluating an experiment in a scientific field in which the experiment is considered in total isolation from any other available information on the subject, statisticians traditionally describe a significance level between 1% and 5% as "significant" (z-score between 1.646 and 2.326) and a level of less than 1% as "highly significant" (z-score less than 2.326). In the courtroom situation the significance level is taken as a measure of the evidentiary value of a particular statistic if that statistic were taken alone.

Selection Ratio (four-fifths rule)

The selection ratio is also an aid to interpretation in comparing the % low for men with the % low for women. The selection ratio measures the practical importance of this difference. The significance level is effected by the size of the difference in the two percentages to some extent, but it chiefly depends on the sample size. For small sample sizes, significance levels will not be low enough to make any firm conclusions no matter how great the differences in the percentages. In the scientific setting this is cured by requiring that more experiments be performed. In the courtroom setting this is not a possibility. Thus it is often necessary to make decisions when significance levels are relatively high. The selection ratio is useful for that purpose.

The selection ratio is the ratio of selection rate for women to the selection rate for men. The selection ratio for the Table 5 example

$$\frac{23.0\%}{52.6\%} = 43.7\%$$

means that women hold the lower ranks at a rate more than twice that of men.

The smaller the selection ratio, the greater is the disparity of treatment between men and women. Again, the question of "how small is small enough" is answered by an arbitrary standard of four-fifths or 80%, Guidelines on Technical Standards for the EEOC, 29 C.F.R. Section 1607.4, D. Under this rule, if the selection ratio is less than 80%, federal enforcement agencies will generally view this as evidence of discrimination while a ratio greater than 80% will generally not be viewed as evidence of discrimination.

Computation of adjusted salary at base values for a hypothetical faculty member

Suppose a faculty member received a Ph.D. degree 10 years ago, has been employed at the University for 5 years and receives a salary of \$34,000 on a nine month contract. The salary is first adjusted to the average for a bachelor's degree by subtracting of the average bonus paid the holder of a Ph.D. over a bachelor's degree. This value is the coefficient given for this model in Table 15A.

$$\begin{aligned} &\text{adjustment to bachelor's degree} \\ &= \$34,000 - \$14,340 = \$19,660 \end{aligned}$$

Adjustments for the other variables are made in a similar way. The average value for time from highest degree is 16.5 years. Our hypothetical person has only 10 years for this variable. Adjustments to the average value uses the coefficient from Table 15A for the variable, time from highest degree. For each year of time from highest degree an additional \$702 is added to annual salary.

Our hypothetical person must be given credit for an additional 6.5 years (16.5 - 10) in order to obtain an adjusted salary at the base value for this variable.

$$\begin{aligned} &\text{adjustment to average time from highest degree} \\ &= \$19,660 + \$702 \times 6.5 = \$24,223 \end{aligned}$$

The average value for the variable, length of University employment, is 13.6 years. Our hypothetical employee has only 5 years, so he must be given credit for 8.6 more years to get an adjusted salary at the average value for this variable. From Table 15A the coefficient for this variable is -\$130/year. Since this coefficient has a negative value, it means that an employee is paid \$130 less for each year of employment at the University.

Thus, our hypothetical employee's salary must be reduced to get an adjusted value for the average on this variable.

adjust to average length of University employment
= \$24,233 - \$103 x 8.6 = \$23,347

Thus the adjusted salary for our hypothetical faculty member at base values for all the independent variables in Model A is \$23,347.

TABLE 1
Average Salary by Rank

	Men	Women	difference	%	
					difference
TOTAL	\$38,440	\$ 28,560	\$9,884	34.6%	**
<u>FACULTY</u>					
Professor	\$47,090	\$43,740	\$3,350	7.7%	**
Assoc. Prof.	35,130	32,920	2,210	6.7%	**
Assistant Prof.	30,120	27,580	2,540	9.2%	**
Instructor and below	25,224	22,600	2,620	11.6%	**
<u>P/A</u>					
Administration with tenure	\$50,830	\$42,230	\$8,600	20.4	**
Administration without tenure	35,230	26,260	8,970	34.2%	**
Agriculture Ext.	25,580	21,190	4,390	20.7%	**
Professional	24,370	23,241	1,130	4.8%	

** Denotes statistically significant at the 1% level.

TABLE 2

Average Time From Highest Degree

	Men	Women	difference	
TOTAL	17.8 yrs	13.0	4.8	**
<u>FACULTY</u>				
Professor	24.2	21.6	2.6	**
Assoc. Prof.	16.0	15.0	1.0	
Assistant Prof.	9.3	11.3	-2.0	**
Instructor and below	11.6	9.9	1.7	
<u>P/A</u>				
Administration with tenure	21.4	19.7	1.7	
Administration without tenure	15.4	12.9	2.5	**
Agriculture Ext.	15.0	10.3	4.7	**
Professional	9.8	10.5	-.7	

TABLE 3

Average Time In University of Minnesota Employment

	Men	Women	difference	
TOTAL	14.6 yrs	10.0	4.6	**
<u>FACULTY</u>				
Professor	21.2	18.4	2.8	**
Assoc. Prof.	13.7	14.5	-.8	
Assistant Prof.	7.2	9.7	-2.5	**
Instructor and below	8.0	7.2	.8	
<u>P/A</u>				
Administration with tenure	17.6	15.6	2.0	
Administration without tenure	8.6	6.0	2.6	**
Agriculture Ext.	12.2	9.6	2.6	*
Professional	4.8	5.45	-.6	

TABLE 4

Distribution by Rank

	<u>average salary for the rank</u>	<u># of Men in Rank</u>	<u># of Women in Rank</u>	<u>% of Women in each rank</u>
TOTAL		2,444	906	27.0%
<u>FACULTY</u>				
Professor	\$46,840	912	75	7.6%
Assoc. Prof.	34,610	523	160	23.4%
Assistance Prof.	29,150	367	225	38.0%
Instructor and below	24,250	61	36	37.1%
<u>P/A</u>				
Administration with tenure	\$49,570	158	27	14.6%
Administration without tenure	30,670	145	150	50.8%
Agriculture Ext.	23,540	105	91	46.4%
Professional	23,860	173	142	45.1%

TABLE 5

Comparison Between High and Low Academic Ranks

	<u>Men</u>	<u>Women</u>
Professor and Associate Professor	1,435	235
Assistant Professor and below	<u>428</u>	<u>261</u>
% low	23.0%	52.6%
Selection ratio		43.7%
z-score		12.9**

Comparison Between Faculty and Non-Tenured P/A

	<u>Men</u>	<u>Women</u>
Faculty (94xx)	1,863	496
Non-Tenured P/A	<u>318</u>	<u>292</u>
% Non-Tenured P/A	14.6%	37.1%
Section ratio		39.3%
z-score		13.4**

TABLE 6

Average Salary by Highest Degree

<u>Highest Degree</u>	<u>Men</u>	<u>Women</u>	<u>difference</u>		<u>% difference</u>
Bachelors	\$28,410	\$22,070	\$6,340	**	22.3%
Masters	29,630	25,680	3,960	**	15.4%
Dentistry and Veterinary Medicine	41,000	31,190	9,810	**	31.5%
Doctorate	40,860	33,080	7,780	**	23.5%
Medical	53,310	46,730	6,480		13.9%
Law	53,840	37,960	15,870	**	41.8%

TABLE 7

Average Salary by Rank
(Doctoral Degree)

	Men	Women	difference		% difference
TOTAL	\$40,860	\$33,080	\$7,780	**	23.5%
<u>FACULTY</u>					
Professor	\$46,800	\$43,640	\$3,160	*	7.2%
Assoc. Prof.	35,130	33,140	2,010	**	6.1%
Assistant Prof.	30,560	28,270	2,290	**	8.1%
<u>P/A</u>					
Administration with tenure	\$51,890	\$44,590	\$7,300	**	16.4%
Administration without tenure	38,180	32,320	5,860	*	18.1%
Professional	24,790	22,860	1,940		8.5%

TABLE 9
(Doctoral Degree)

	<u>Men</u>	<u>Women</u>
Professor and Associate Professor	1,172	170
Assistant Professor	<u>252</u>	<u>129</u>
% Assistant Professor	17.7%	43.1%
Selection ratio	41.0%	
z-score	9.6 **	
	<u>Men</u>	<u>Women</u>
Faculty (94xx)	1,424	299
Non-Tenured P/A	<u>91</u>	<u>47</u>
% Non-Tenured P/A	6.0%	13.6%
Selection ratio	44.2%	
z-score	4.8 **	

TABLE 8

Distribution by Rank
(Doctoral Degree)

	average salary for the rank	Men	Women	% Women
TOTAL		1,656	370	18.3%
<u>FACULTY</u>				
Professor	\$46,560	778	64	7.6%
Assoc. Prof.	34,720	394	106	21.2%
Assistant Prof.	29,780	252	129	33.9%
<u>P/A</u>				
Administration with tenure	\$50,460	121	20	14.2%
Administration without tenure	36,260	45	22	32.8%
Professional	24,110	46	25	35.2%

TABLE 10

Average Salary by Rank
(Master's Degree)

	Men	Women	difference	% difference
TOTAL	\$29,630	\$25,680	\$3,960**	15.4%
<u>FACULTY</u>				
Professor	\$39,580	\$37,194	\$2,390	6.4%
Assoc. Prof.	32,000	31,160	840	2.7%
Assistant Prof.	28,130	26,220	1,910**	7.3%
Instructor and below	24,440	22,590	1,850	8.2%
<u>P/A</u>				
Administration with tenure	\$40,460	\$35,480	\$4,980	14.0%
Administration without tenure	31,220	25,500	5,730**	22.5%
Agriculture Ext.	26,680	24,220	2,470*	10.2%
Professional	21,460	22,150	-690	-3.1%

TABLE 11

Distribution by Rank
(Master's Degree)

	average salary for the rank	Men	Women	% Women
TOTAL		444	350	44.1%
<u>FACULTY</u>				
Professor	\$39,300	53	7	11.7%
Assoc. Prof.	31,680	69	42	37.8%
Assistant Prof.	27,180	81	79	49.4%
Instructor and below	23,640	37	29	43.9%
<u>P/A</u>				
Administration with tenure	\$39,400	26	7	21.2%
Administration without tenure	28,030	58	73	55.7%
Agriculture Ext.	25,540	44	38	46.3%
Professional	21,800	76	75	49.7%

TABLE 12
 (Master's Degree)

	<u>Men</u>	<u>Women</u>
Professor and Associate Professor	122	49
Assistant Professor and below	<u>118</u>	<u>108</u>
% low	49.2%	68.8%
Selection ratio		71.5%
z-score		3.9 **

	<u>Men</u>	<u>Women</u>
Faculty (94xx)	240	157
Non-Tenured P/A (93xx and 97xx)	<u>134</u>	<u>148</u>
% Non-Tenured P/A	35.8%	48.5%
Selection ratio		73.8%
z-score		3.34 **

TABLE 13
Promotion Rates

		<u>Men</u>	<u>Women</u>
From Associate Professor To Professor	Promoted	1468	146
	Unpromoted (after 9 years)	370	83
	Rate unpromoted	20.1%	36.2%
	Selection ratio	55.5%	
	z-score	5.56 **	
		<u>Men</u>	<u>Women</u>
From Assistant Professor To Associate Professor	Promoted	1912	330
	Unpromoted (after 8 years)	317	160
	Rate unpromoted	14.2%	32.7%
	Selection ratio	43.4%	
	z-score	9.71 **	
		<u>Men</u>	<u>Women</u>
From Tenure Track To Tenured	Tenured	1789	408
	Not tenured (after 7 years)	79	41
	Rate untenured	4.4%	9.1%
	Selection ratio	48.4%	
	z-score	4.2 **	

TABLE 14

Average Time to Promotion

	Men	Women	difference
average time to promotion from Associate Professor to Professor	5.8 yrs	6.5 yrs	.65 yrs *
average time to promotion from Assistant Professor to Associate Professor	4.7 yrs	5.6 yrs	.93 yrs **

TABLE 15

Differences in Average Salary
Corrected for
Differences in Highest Degree,
Difference in Rank and
Market Factors that Correlate with Sex

Model	Difference in Average Salary Between Men and Women	% of Average Salary	Variables Corrected for
A	\$3,680 **	10.3%	highest academic degree time from highest academic degree length of Univ. employ- ment
B	\$2,780 **	7.8%	highest academic degree time from highest academic degree length of Univ. employ- ment market factors that correlate with sex
C	\$2,080 **	5.8%	highest academic degree time from highest academic degree length of Univ. employ- ment academic rank time in current academic rank
D	\$1,450 **	4.1%	highest academic degree time from highest academic degree length of Univ. employ- ment academic rank time in current academic rank market factors that correlate with sex

TABLE 15A

Coefficients for the Variables in
Regression Model A Reported on Table 15

<u>Variable</u>	<u>Coefficient</u>	<u>Significance Level</u>
Indicator for female (0=male, 1=female)	- \$ 3,680	0%
		0
Time from highest degree	\$ 702/year	0
Time in University employment	- \$ 130/year	0
Indicators for degree (the base degree is bachelors)		
Masters	\$ 4,290	0
Dentistry and Vet. Med.	\$11,120	0
Doctorate	\$14,340	0
Medical	\$21,830	0
Law	\$24,110	0

TABLE 15B

Coefficients for the Variables in
Regression Model B Reported on Table 15

<u>Variable</u>	<u>Coefficient</u>	<u>Significance Level</u>
Indicator for female (0=male, 1=female)	- \$ 3,780	0%
Time from highest degree	\$ 694/year	0
Time in University employment	- \$ 119/year	0
Indicators for degree (the base degree is bachelors)		
Masters	\$ 4,120	0
Dentistry and Vet. Med.	\$ 9,660	0
Doctorate	\$13,480	0
Medical	\$21,710	0
Law	\$24,030	0
Percent women in the discipline (MV)	-\$56./percentage point	0

TABLE 15C

Coefficients for the Variables in
Regression Model C Reported on Table 15

<u>Variable</u>	<u>Coefficient</u>	<u>Significance Level</u>
Indicator for female (0=male, 1=female)	- \$ 2,080	0%
Time from highest degree	\$ 280/year	0
Time in University employment	- \$ 480/year	0
Indicators for degree (the base degree is bachelors)		
Masters	\$ 2,240	0
Dentistry and Vet. Med.	\$ 6,325	0
Doctorate	\$ 6,330	0
Medical	\$21,735	0
Law	\$18,060	0
Time in current rank	\$ 513/year	0
Indicator for rank (base rank is professor)		
Associate Professor	- \$ 9,990	0
Assistant Professor	- \$15,570	0
Instructor and below	- \$18,965	0
Administration with tenure	\$ 1,920	0
Administration without tenure	- \$13,460	0
Agriculture Extension	- \$18,420	0
Professional	- \$20,130	0

TABLE 15D

Coefficients for the Variables in
Regression Model D Reported on Table 15

<u>Variable</u>	<u>Coefficient</u>	<u>Significance Level</u>
Indicator for female (0=male, 1=female)	- \$ 1,450	0%
Time from highest degree	\$ 278/year	0
Time in University employment	- \$ 476/year	0
Indicators for degree (the base degree is bachelors)		
Masters	\$ 2,220	0
Dentistry and Vet. Med.	\$ 5,500	0
Doctorate	\$ 5,940	0
Medical	\$21,745	0
Law	\$18,190	0
Time in current rank	\$ 515/year	0
Indicator for rank (base rank is professor)		
Associate Professor	- \$ 9,840	0
Assistant Professor	- \$15,285	0
Instructor and below	- \$18,710	0
Administration with tenure	\$ 2,190	0
Administration without tenure	- \$13,150	0
Agriculture Extension	- \$17,940	0
Professional	- \$19,815	0
Percent women in the discipline (MV)	\$41/percentage point	0