

STATISTICAL ANALYSIS OF SALARIES FOR TENURED AND TENURE TRACK
FACULTY AT THE TWIN CITIES AND DULUTH CAMPUSES
OF THE UNIVERSITY OF MINNESOTA

For Settlement Purposes Only
Summary and Discussion of the University's Salary Study

Rebecca Goodman, Stephen Hoenack, and Marcy Rasmussen
Management Information Division
Office of Management Planning and Information Services

March 13, 1989

This report presents statistical analyses of salaries for faculty at the Twin Cities and Duluth campuses of the University of Minnesota. Section one describes the data. Section two discusses the model and presents results of multiple regressions on faculty salaries. Section three contains tables of descriptive statistics about University faculty.

1. Description of the Data Base

This study covers tenured and tenure track faculty¹ at the Twin Cities and Duluth campuses. Excluded are: academic professional and academic administrative (P/A) employees at all campuses, agricultural extension service employees, non-regular faculty² at all campuses, and tenured or tenure track faculty at the coordinate campuses of Crookston, Morris, and Waseca. The performance criteria for these groups are not comparable to the tenured and tenure-track faculty at the Twin Cities or Duluth campuses. In addition, critical market data for these groups were not available. Current administrators are excluded (n=253) because their salaries are based on different performance criteria.³ Medical school professors in clinical departments are omitted (n=359) because they receive private practice income which is not always reflected in University records and is not set by the University. Because of the private practice income, the University base salaries of clinical professors are not comparable to other base salaries.

The academic data base containing employment histories originated from several sources. The primary source was the personnel files in the Academic Personnel System Office (APSO). Professor David Lane and Professor William Sudderth of the Department of Theoretical Statistics collected information

from APSO files going back to the first date of employment on all academic staff employed on May 31, 1984. APSO employees collected the same information for all academic staff who were employed any time thereafter up to June 30, 1987. These files also contain salary information for the years 1981-82 through 1986-87. The salary information was cross-checked with salary information from the Payroll Data Base to ensure accuracy. Supplementary information was added to the employee history file from sources other than APSO. This information includes variables representing retention and market salary.

The tenured and tenure track faculty data base for the Twin Cities Campus in 1987 includes histories on 1,767 individuals. The Duluth tenured and tenure track faculty data base includes histories on 215 individuals.

2. Multiple Regression Analysis of Academic Salary

Determination

In certain circumstances multiple regression analysis can be used to make inferences about causal relationships when it is not possible to conduct controlled experiments. First, one obtains data on variables which are believed to have causal effects on the variable to be explained, in this case individual faculty salaries. Second, the data are employed in regression formulas to calculate estimates of the magnitude of each hypothesized causal influence on the explained variable. For example, a faculty member's salary may be affected by his/her merit, years of experience, department/field, and level of education. By using multiple regression, we can try to evaluate the effect of one variable (i.e., years of experience) on salary while controlling for the influence of all the

other variables (i.e., merit, department/field, and level of education). The results of multiple regression thus depend on the choice of variables, the theoretical framework used to explain relationships among the variables represented by the data, and the proper application of regression analysis within this framework.

a. The Model Applying Multiple Regression Analysis to Academic Salaries and the Explanatory Variables Used

The level of each faculty member's salary is expressed as a function of a set of variables reflecting measurable characteristics that can affect the institution's demand for his or her services, the staff member's willingness to supply these services, or both.⁴ Ideally, variables which directly capture the faculty member's merit, such as the quantity and quality of research, teaching, and public service would be included in the model. Such variables are not included, however, because of measurement problems.

The model's variables are considered in four categories - acquired characteristics, personal characteristics, experience and rank, and department and field variables. A brief discussion of each variable appears below. A complete list of variables and data sources appears in Tables 1 and 2.

Acquired Characteristics

Retention. A faculty member may be granted retention funds when he or she receives, or is likely to receive, an offer from another employer. Retention represents a direct

increase in salary and is a proxy for merit, since employers are competing for the faculty member.

Possession of Ph.D., Ed.D., or Professional Degree.

These degrees are preferred or required for most academic positions at the University. Because most recent hirees hold the appropriate terminal degree, the variability of this attribute is diminished. If there were sufficient variation, this variable would be expected to have a positive effect on salary.

Personal Characteristics

Gender. This variable takes the value one for males and zero for females.⁵ An estimated positive effect could reflect inadequate control for other variables which should be in the equation, a misspecification of the equation, or the criteria for significance. Alternatively, an estimated positive effect could reflect a true influence of gender on salary. Because it is impossible to include all important causal influences on salaries, a positive and significant coefficient on the gender variable can only be interpreted as suggesting an effect is possibly present. This, in turn, suggests the need for further individualized analysis of employee files to better determine the reasons for the statistical disparity.

Experience and Rank

All Experience Variables. As previously noted, the equation that explains faculty salaries inevitably omits some of the important variables that would control fully for variation in the productivity of individual faculty. For example, there are no variables measuring the quality and quantity of publications. To the extent that these omitted variables are correlated with experience, the latter variable is expected to have a positive effect on salaries. In addition, because salary increases are annual and cumulative, we would expect years of experience to have a positive effect on salary.

Previous Experience. This variable represents an individual's days of experience prior to acquiring an academic (non-student) position at the University of Minnesota. We expect it to have a positive effect on salaries.

Past Administrative Experience. This variable is expected to have an additional positive effect on salaries to the extent that the extra pay accorded to administrators remains in their subsequent base salaries.

Non Professional Leave. These leaves are taken for personal reasons such as parental and medical purposes and may represent career interruptions. This variable measures days of such leave thus, we expect the coefficient to be negative.

Component Experience. Because these variables separately measure faculty members' time in each rank at the University of Minnesota, they control for quality of performance in addition to experience as described above. Academic personnel whose work is deemed to be of higher quality may be promoted more quickly. For example, full professors who spend less time in the associate professor rank may be more highly paid than their colleagues who spend a longer time in the associate rank. (See Appendix I for a complete discussion of the construction of these variables.)

Rank Status. Because the component experience variables are entered separately according to the faculty member's current rank, they would control for current rank as well as experience and quality as described above. In order to separate the effects of experience and rank, rank is included (also indicated according to one's entry rank) as a separate variable.

Department and Field Variables

Appointment Term. This variable indicates whether the faculty member holds a nine (1) or twelve month (0) appointment. It allows for the possibility that personnel on the two types of appointment receive different monthly earnings.

Field Market Salary. This salary is included in the model since the University must deal with a national labor market

when hiring and retaining faculty in each discipline. Due to differing conditions of demand, salaries vary substantially by field, and these must be controlled for when comparing faculty from diverse fields. For the Twin Cities Campus, the value used is the average (weighted by FTE) for the faculty member's field, rank, and term in the AAUDE comparison institutions.⁶ For the Duluth campus, the value used is the average for the faculty member's field, rank, and term in the Northern Michigan University Salary Study.⁷ (See Table 2 for the institutions included in the AAUDE and Northern Michigan Survey.)

Dummy Indicator for Faculty Member's Home Department. This indicator is included for two reasons. First, it helps control for the department's place within the range of field market salaries. This place is rarely the average value used, and, in extreme cases, it can be at the bottom or the top of the range. Second, departmental practices may be somewhat idiosyncratic. For statistical reasons one department must be excluded; that department is Physiology since its mean salary was closest to the mean salary across all departments.

b. Results of the Multiple Regression Analysis

The implied sample model is as follows:

$$\ln \hat{\text{Salary}} = Xb$$

where X is a matrix containing observations on the independent variables indicated along the left hand columns of Tables 3 and 4. The results are presented separately for the Twin Cities and Duluth Campuses. For each equation, two numbers are shown. The first is the variable's estimated coefficient (the b). This value can be interpreted as the change in the predicted dependent variable, logged monthly salary, corresponding to a unit change in the independent variable.

The second number is the t-statistic for the estimated coefficient. It represents a test of the hypothesis that the variable has zero influence. This hypothesis is rejected when the t-statistic exceeds a certain value. The values of the t-statistic for a two-tailed test are:

<u>Value of t</u>	<u>Significance Level</u>
1.960	.05
2.576	.01

When an estimated coefficient's t-ratio exceeds the indicated values, the hypothesis of zero influence can be rejected with the indicated level of significance. The probability shown indicates the chance that the value of t could occur if the variable has no influence.⁸

The functional form of the reported equations is semilogarithmic. The natural log of the faculty member's salary is expressed as a function of linear independent variables. Most published econometric studies of the salaries of university

faculty, as well as studies of earnings in other occupations, are carried out with the semilogarithmic specification.

Twin Cities Campus

Under various assumptions about the salary determination process at the University of Minnesota, over 100 alternative regressions were specified and estimated. These ranged from limited models (where only experience, degrees, and market designators were included as covariates) to models in which attempts were made to capture the salary effects of productivity. Table 3 contains regression estimates for two of the more complete specifications considered during the negotiation process between the plaintiffs and University lawyers. In the discussion of Model 1, the results for all variables are briefly described. The discussion of Model 2 is limited to the results specific to gender.

Model 1 in Table 3 contains all of the variables described in Section 2a. The most important acquired characteristics variable is RETENTN, which controls for whether the faculty member has received retention funds. The degree variables are not as important, presumably because most faculty members at the University possess the appropriate terminal degrees for their departments.

In terms of gender, the only personal characteristic included, the equation indicates that males receive approximately 2% more on average per month than females. For illustrative

purposes, a dollar value can be obtained by multiplying the approximate semilog coefficient (.02) by the mean female monthly salary (\$3,969) for the women included in the model.⁹ The result indicates males receive \$79.38 more per month than females. The t-statistic on GENDER is equal to 1.5.

A number of experience and rank status variables are important in explaining the log of monthly salary. Experience previous to the University of Minnesota, PREVEXP, and non-professional leave, NPLEAVE, have significant negative impacts on salary. Past administrative experience, PASTADMX, is positive and significant. There are two possible explanations for the unexpected negative sign on PREVEXP. First, it is possible that PREVEXP includes work experience which is not directly related to professional work at the University. Second, the variable as constructed does not control for faculty entering the University at different ranks.¹⁰ For example, a full professor hired at the full rank will have a high number of days of previous experience since he/she could have been an assistant and associate professor elsewhere. In contrast, PREVEXP will be low for a full professor whose entire work history has been at this University.

The component experience variables measure the time faculty members spend in each rank. These measures are indicated separately according to the faculty member's entry rank at the University. For example, the variable indicated by FAsstFul represents for current full professors (F), who entered as assistant professors (Asst), the time they have spent as full

professors (Ful). For full professors who came in as full or associates, their time as full professor is statistically insignificant. For full professors who came to the University as assistant professors, there is a positive and statistically significant relationship between length of time at the University as full professors and salary. However, for those full professors who entered as assistant or associate professors, the time at each of these previous ranks is negative and statistically significant.¹¹ As expected, this negative coefficient shows that the shorter the time in previous rank, the higher one's salary. The variables controlling for current rank status are all positive and statistically significant.

Of the departmental and field variables, the faculty member's appointment term, NINE12, has a positive and significant influence on the log of monthly salary. The positive, significant coefficient on field market salary, MKT87, implies that the University's salary policies are influenced by the external faculty labor market. The results for the departmental dummy indicators are shown in a separate table in Appendix II.

In Model 2 we substitute potential experience, POTENEXP, for previous and component experience. This substitution eliminates ten variables from the equation and provides a simpler structure. Two disadvantages arise with the use of this variable. First, for men and women who take non-professional leave or have other career interruptions, POTENEXP will overstate actual experience. Second, POTENEXP cannot control for quality

of performance as was possible with the ten component experience (time in rank) variables. Despite these drawbacks, the coefficient on gender is similar to Model 1.

Duluth Campus

The results of two regressions analyzing faculty salaries at the Duluth Campus are presented in Table 4. The complete results from Model 1 are outlined briefly below; the latter model is discussed only in terms of the coefficient on gender.

Significant acquired characteristics in Model 1 include retention and possession of a baccalaureate or master's degree. The latter variable has a negative effect on the log of monthly salary. Gender is not statistically significant. Four variables are significant in the experience and rank status category. The variable controlling for time spent on non professional leave (NPLEAVE) is negative. Time as a full professor (FullEXP), time as an assistant professor (AsstEXP), and associate professor rank (ASSOPROF) are positive. The variables controlling for market salary (MKTSAL) and term of appointment (NINE12) are statistically significant. Both variables positively influence the log of monthly salary.

The remaining regression shows the results omitting variables controlling for department, previous experience, and component experience. The coefficient on the variable controlling for gender remains statistically insignificant.

3. Descriptive Statistics About University Faculty on the Twin Cities and Duluth Campuses

This sub-section consists of descriptive statistics for faculty at both campuses. Tables 5 through 15 refer to the Twin Cities Campus faculty; Tables 16 through 25 show similar descriptive statistics for the Duluth faculty.

Notes

- 1 The appointment types are either P, N, or C. The types P and N refer to tenured and tenure track appointments. A type C refers to a special probationary contract calling for a decision concerning tenure.
- 2 The appointment types are F, T, A, U, V, or R.
- 3 Current administrators are individuals on 93XX appointments whose end date on that appointment is between January 1, 1987 and June 30, 1987. The class numbers are 9404, 9403, 9402, 9401, and 9410.
- 4 There have been many studies of the determinants of academic salaries in universities. Examples of published studies include Marianne A. Ferber and Carole A. Green, "Traditional or Reverse Sex Discrimination? A Case Study of a Large Public University," Industrial and Labor Relations Review, Vol. 35, No. 4, (July 1982), pp. 550-564; Nancy M. Gordon, Thomas E. Morton, and Ina C. Braden, "Faculty Salaries: Is There Discrimination by Sex, Race, and Discipline?" American Economic Review, Vol. 64, No. 3, (June 1974), pp. 419-427; Barry T. Hirsch and Karen Leppel, "Sex Discrimination in Faculty Salaries: Evidence from a Historically Women's University," American Economic Review, Vol. 72, No. 4, (September 1982), pp. 829-835; Emily P. Hoffman, "Faculty

Salaries: Is There Discrimination by Sex, Race, and Discipline? Additional Evidence," American Economic Review, Vol. 66, No. 1, (March 1976), pp. 196-198; George E. Johnson and Frank P. Stafford, "The Earnings and Promotion of Women Faculty," American Economic Review, Vol. 64, No. 6, (December 1974), pp. 888-903; and Howard P. Tuckman, Publication, Teaching, and the Academic Reward Structure, (Massachusetts: Lexington Books, 1976). Most of these studies employ explanatory variables in the same four categories as described above in the text, and their equations are specified with the semilog functional form.

- 5 Some econometricians think it is desirable to estimate salary determination equations for male faculty, to use this equation to predict the salary of female faculty based on their characteristics, and to perform statistical tests on these predicted values. We believe this approach may have some technical merit and intend to explore it further.
- 6 Four fields are not included in the AAUDE salary survey. Those fields are Family Social Science, Center for Youth Development and Research, Dental Auxiliaries, and General College. To control for market salary in Family Social Science and the Center for Youth Development and Research, we used the Association of Administrators of Home Economics' (AAHE) 1986-87 salary survey. Twelve peer institutions are included in the survey and salaries are based on rank and

term. For faculty in Dental Auxiliaries, market salary represents a weighted average of salaries by rank and term from four institutions (University of Iowa, Ohio State University, University of Pittsburgh, and University of Washington). For faculty in General College market salary is the mean salary of this group by rank and term.

- 7 None of the 24 peer institutions in the Northern Michigan Salary Study has a medical school. Market salary for the Duluth medical school thus represents the mean salary of this unit by rank and term.
- 8 This discussion is based on the assumption that the theoretical specification of the model is correct.
- 9 For an exact interpretation see Robert Halvorsen and Raymond Palonquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," American Economic Review, Vol 70, No. 3, (June 1980), pp. 474-475.
- 10 We are thankful to William E. Becker, Jr., for calling this to our attention.
- 11 Due to possible intercorrelation within the set of time in rank variables, the standard errors of individual coefficients may be suspect.

TABLE 1

VARIABLE DEFINITIONS

Acquired Characteristics

- RETENTN - Dummy variable if retention was ever received (1) or not (0)
- BAMADEG - Bachelor's or Master's Degree is last degree (1) or not (0)
- DOCTDEG - PhD or DED is last degree (1) or not (0)
- PROFDEG - MD, JD, DDS, DVM, or DPharm is last degree (1) or not (0)
- OTHRDEG - Foreign, unknown, or degree in progress is last degree (1) or not (0); excluded category

Personal Characteristics

- GENDER - Male (1) female (0)

Experience and Rank

- PREVEXP - Previous to U of M academic experience in days (may include TA or RA positions at U of M)
- PASTADMX - Past administrative experience at U of M (1) or not (0) (The end date on an administrative appointment is before January 1, 1987)
- NPLEAVE - Non-professional leaves in days

Component Experience

- FFullFul - For Full Professors who came in as Fulls, this variable shows the time spent (in days) as a Full Professor.
- FAssoFul - For Full Professors who came in as Associates, this variable shows the time spent (in days) as a Full Professor
- FAsstFul - For Full Professors who came in as Assistants, this variable shows the time spent (in days) as a Full Professor

- FAssoAss - For Full Professors who came in as Associates, this variable shows the time spent (in days) as an Associate Professor
- FAsstAss - For Full Professors who came in as Assistants, this variable shows the time spent (in days) as an Associate Professor
- FAsstAst - For Full Professors who came in as Assistants, this variable shows the time spent (in days) as an Assistant Professor
- AAssoAss - For Associate Professors who came in as Associates, this variable shows the time spent (in days) as an Associate Professor.
- AAsstAss - For Associate Professors who came in as Assistants, the variable shows the time spent (in days) as an Associate Professor.
- AAsstAst - For Associate Professors who came in as Assistants, this variable shows the time spent (in days) as an Assistant Professor
- AsstTime - For Assistant Professors this variable shows the time spent (in days) as an Assistant Professor
- POTENEXP - For current tenured or tenure track faculty, this variable shows the time (in days) from year of last degree to current year (1987).
- FullEXP - For the Duluth Campus: for faculty whose current rank is Full Professor, this variable shows the time spent (in days) at the University
- AssoEXP - For the Duluth Campus: for faculty whose current rank is Associate Professor, this variable shows the time spent (in days) at the University
- AsstEXP - For the Duluth Campus: for faculty whose current rank is Assistant Professor, this variable shows the time spent (in days) as an Assistant Professor

Compromise Experience

- FullAssx - For faculty whose current rank is Full or Associate Professor, this variable shows the time spent (in days) at the University.
- AsstTime - For faculty whose current rank is Assistant Professor, this variable shows the time spent (in days) as an Assistant Professor

Rank Status

- FULLFULL - Dummy variable (1) came to the U of M as a Full Professor or not (0)
- FULLASSO - Dummy variable (1) currently Full Professor and came in as Associate - was never assistant here or not (0)
- FULLASST - Dummy variable (1) currently Full Professor and also was Associate and Assistant at U of M or not (0)
- ASSOASSO - Dummy variable (1) came to U of M as an Associate Professor and is currently Associate Professor
- ASSOASST - Dummy variable (1) currently Associate Professor who came to the U of M as an Assistant Professor or not (0)
- ASSISTNT - Dummy variable (1) currently Assistant Professor or not (0); excluded category
- FULLPROF - For the Duluth Campus: Dummy variable (1) currently Full Professor or not (0)
- ASSOPROF - For the Duluth Campus: Dummy variable (1) currently Associate Professor or not (0)
- ASSTPROF - For the Duluth Campus: Dummy variable (1) currently Assistant Professor or not (0); excluded category

Compromise Rank

- RANK - Dummy variable (1) currently Full or Associate Professor or (0) currently Assistant Professor

Department and Field Variables

- MKT87 - For the Twin Cities Campus: 1986-87 mean AAUDE salary according to department, rank, and appointment term, (excluding U of M salaries and weighted by FTE)¹
- MKTSAL - For the Duluth Campus: 1986-87 mean salary of twenty-four peer institutions (Northern Michigan University salary study) according to department, rank, and term
- NINE12 - Nine month appt (1) or twelve month (0)

DEPT. - Dummy variable representing individuals' home department (1) or not (0); DDI thru DD110 (DD75 excluded dept)

Compromise Field Variable

NEWMKT - For Full and Associate professors: 1986-87 mean AAUDE salary for full and associate professors according to department and appointment term (excluding U of M salaries and weighted by FTE)

- For Assistant Professors: mean AAUDE salary for assistant professors according to department and appointment term (excluding U of M salaries and weighted by FTE)

Dependent Variable to be Explained

LOGMONTH - 1987 logged monthly salary (includes augmentations) assuming faculty member was 100% time.

¹The weighted mean salaries represent data reported by 27 institutions.

TABLE 2
VARIABLE SOURCES

Acquired Characteristics

- RETENTN - Academic Personnel History File; Academic Affairs Retention Files
- BAMADEG - Lane, Sudderth data (L-S data), Education block, Type 02 card (BA, BS, MA, or MS)
- DOCTDEG - L-S data, Education block, Type 02 card (PhD or DED)
- PROFDEG - L-S data, Education block, Type 02 card (MD, LLB, JD, JSD, DDS, DVM, or DPharm)
- OTHRDEG - L-S data, Education block, Type 02 card (XMA, XMS, XPhD, XDED, XMD, XJSD, Foreign degrees)

Personal Characteristics

- GENDER - L-S data, Personal Information Block, Type 01 card

Experience and Rank

- PREVEXP - L-S data, Experience block, Type 03 card
- PASTADMX - L-S data, Administrative experience block, Type 07 card
- NPLEAVE - L-S data, Leaves block, Type 05 card

Component Experience

- FFullFu1 -
FAssoFu1 -
FAsstFu1 - L-S data, Non-administrative positions block,
FAssoAss - Type 06 card
FAsstAss -
FAsstAst -
AAssoAss -
AAsstAss -
AAsstAst -
AsstTime -

- POTENEXP - L-S data, Education block, Type 02 card

- Fu11EXP -
AssoEXP - L-S data, non-administrative positions block, Type
AsstEXP - 06 card

Compromise Experience

- Fu11Assx - L-S data, non-administrative positions block, Type
AsstTime - 06 card

Rank Status

- FULLFULL -
- FULLASSO -
- FULLASST -
- ASSOASSO - L-S data, Non-administrative positions block,
- ASSOASST - Type 06 card
- ASSISTNT -

- FULLPROF -
- ASSOPROF - L-S data, Non-administrative positions block, Type
- ASSTPROF - 06 card

Compromise Rank

- Rank - L-S data, non-administrative positions block, Type
06 card

Department and Field Variables

- MKT87 - Association of American Universities Data Exchange (AAUDE) computer tape containing information on FTE faculty and average salaries paid by rank, term, and field of institutions participating in the Exchange¹
- MKTSAL - Northern Michigan University Faculty Salary Study, Diskette containing salary, rank, and department data on faculty from 24 institutions²
- NINE12 - L-S data, Non-administrative positions block, Type 06 card (term A, A1, CA = 12; B, B1, CB, E, L, L1, M, M1 = 9)
- DEPT. - L-S, Personal Information Block, Type 01 card

Compromise Field

- NEWMKT - Association of American Universities Data Exchange (AAUDE) computer tape containing information on FTE faculty and average salaries paid by rank, term, and field of institutions participating in the Exchange¹

Dependent Variable to be Explained

- LOGMONTH - Academic Personnel Data Base System, Type 08 card
-

¹The institutions include the University of Arizona, University of California - Berkeley, Carnegie-Mellon University, University of Colorado, University of Florida, University of Illinois, Indiana University, Iowa State University, University of Iowa, University of Kansas, University of Maryland, University of Michigan, Michigan State University, University of Missouri, University of Nebraska, University of North Carolina - Chapel

Hill, Ohio State University, University of Oregon, Pennsylvania State University, University of Pittsburgh, Purdue University, University of Southern California, University of Texas - Austin, Tulane University, University of Virginia, University of Washington, and University of Wisconsin.

²The institutions include Arkansas State University, Central Washington University, Eastern Washington University, Edinboro University, Georgia Southern College, Grand Valley State College, Millersville University, Moorhead State University, Murray State University, Northeast Missouri State University, Northeastern Illinois University, Northern Michigan University, Radford University, Shippensburg University, Slippery Rock University, Southeastern Louisiana University, SUNY College at Brockport, SUNY College at Cortland, SUNY College at Genesco, SUNY College at Oneonta, SUNY College at Plattsburgh, University of Tennessee-Chattanooga, University of Wisconsin-Platteville, and Western Carolina University.

TABLE 3
 UNIVERSITY OF MINNESOTA - TWIN CITIES REGULAR FACULTY
 COEFFICIENTS AND T-STATISTICS (in parentheses)
 DEPENDENT VARIABLE IS LOGGED MONTHLY SALARY

INDEPENDENT VARIABLES	Model 1		Model 2 Potential Experience	
	N=1595 R-SQUARED=.76		N=1580 R-SQUARED=.73	
Acquired Characteristics	COEF	T	COEF	T
RETENTN	.14	(10.5)	.13	(9.6)
BAMADEG	-.03	(1.5)	-.04	(1.8)
DOCTDEG	-.02	(1.3)	-.01	(.7)
PROFDEG	.02	(.7)	.02	(.6)
Personal Characteristics				
GENDER	.02	(1.5)	.02	(1.6)
	\$79.38		\$79.38	
Experience and Rank Status Variables				
PREVEXP	-5.5e-6	(2.7)	na	
PASTADMX	.06	(5.9)	.07	(7.1)
NPLEAVE	-1.1e-4	(6.2)	-1.1e-4	(5.8)
FFullFull	-3.6e-6	(.8)	na	
FAssoFull	2.8e-6	(.6)	na	
FAsstFull	1.7e-5	(7.0)	na	
FAssoAss	-6.2e-5	(6.1)	na	
FAsstAss	-2.4e-5	(3.6)	na	
FAsstAst	-2.4e-5	(2.5)	na	
AAssoAss	-1.9e-5	(3.1)	na	
AAsstAss	-8.5e-6	(2.3)	na	
AAsstAst	-3.2e-5	(3.8)	na	
AsstTime	-2.5e-6	(.4)	na	
POTENEXP	na		2.4e-6	(1.6)
FullAssx	na		na	
AssTTime	na		na	
FULLFULL	.46	(12.6)	.37	(11.6)
FULLASSO	.37	(8.4)	.21	(6.8)
FULLASST	.26	(7.0)	.20	(7.1)
ASSOASSO	.22	(8.1)	.15	(7.2)
ASSOASST	.17	(6.4)	.07	(4.8)
RANK	na		na	

TABLE 3 (Continued)

Departmental and Field Variables

MKT87	4.8e-6 (4.1)	6.5e-6 (5.1)
NEWMKT	na	na
NINE12	.09 (4.6)	.11 (5.6)
DEPARTMENT	Appendix II	Appendix II

ANNUAL DOLLAR AMOUNTS

9-month employees	\$714.42	\$714.42
12-month employees	\$873.18	\$873.18

For illustrative purposes, the dollar values associated with gender were obtained by multiplying the approximate semilog regression coefficient, in each model, by the mean female monthly salary in 1986-87 for the women included in the model and then multiplying by 9 and 11 months, respectively.

TABLE 4
 UNIVERSITY OF MINNESOTA - DULUTH FACULTY ONLY
 COEFFICIENTS AND T-STATISTICS (in parentheses)
 DEPENDENT VARIABLE IS LOGGED MONTHLY SALARY

	Model 1	Model 2
	N=208 R-SQUARED=.83	POTENEXP-NO COMPONENT EXP, DEPT. N=201 R-SQUARED=.78
	COEF T	COEF T
Acquired Characteristics		
RETENTN	.06 (2.8)	.07 (3.0)
BAMADEG	-.08 (2.4)	-.13 (3.0)
DOCTDEG	-.03 (1.0)	-.01 (.3)
Personal Characteristics		
GENDER	.01 (.5)	.01 (.5)
	\$33.40	\$33.40
Experience and Rank Status Variables		
PREVEXP	3.3e-6 (.8)	na
PASTADMX	.01 (.6)	.03 (1.7)
NPLEAVE	-4.4e-4 (9.4)	-4.7e-4 (9.6)
POTENEXP	na	9.7e-6 (2.8)
FullEXP	1.1e-5 (1.9)	na
AssoEXP	5.0e-6 (.9)	na
AsstEXP	1.8e-5 (3.3)	na
FULLPROF	.05 (.7)	-.05 (.9)
ASSOPROF	.10 (2.4)	-.01 (.4)
Departmental and Field Variables		
MKTSAL	2.3e-5 (5.6)	2.8e-5 (8.0)
NINE12	.32 (4.3)	.31 (8.8)
Departmental Dummies	See Appendix III	na
ANNUAL DOLLAR AMOUNTS		
Nine-month employees	\$300.60	\$300.60
Twelve-month employees	\$367.40	\$367.40

For illustrative purposes, the dollar values associated with gender were obtained by multiplying the approximate semi-log regression coefficient, in each model, by the mean female monthly salary in 1986-87 for the women included in the model and then multiplying by 9 or 11 months, respectively.

TABLE 5
 1987 FACULTY BY GENDER
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

	<u>Number</u>	<u>Percent</u>
Females	344	19.5
Males	1417	80.2
Missing cases	<u>6</u>	<u>.3</u>
Total	1767	100.0

TABLE 6
 1987 FACULTY: COMPOSITION BY RANKS AND GENDER*
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

	<u>Total Faculty</u>	<u>Male Faculty</u>	<u>Female Faculty</u>
Percent Full Professors	51.8 (n=912)	91.6	8.4
Percent Associate Professors	30.0 (n=529)	75.4	24.6
Percent Assistant Professors	<u>18.1 (n=318)</u>	56.9	43.1
	100.0 (n=1759)		

* Two individuals who are instructors are excluded.

TABLE 7

1987 MALE AND FEMALE FACULTY BY RANK*
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

	<u>Male Faculty</u>	<u>Female Faculty</u>
Percent Full Professors	59.0 (n=835)	22.4 (n=77)
Percent Associate Professors	28.2 (n=399)	37.8 (n=130)
Percent Assistant Professors	<u>12.8 (n=181)</u>	<u>39.8 (n=137)</u>
	100.0 (n=1415)	100.0 (n=344)

* Two individuals who are instructors are excluded.

TABLE 8

1987 FACULTY BY CURRENT RANK, ENTRY RANK, AND GENDER*
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

<u>Current Rank</u>	<u>Entry Rank</u>	<u>Number of Males</u>	<u>Percent of Males</u>	<u>Number of Females</u>	<u>Percent of Females</u>
Full	- Full	113	8.0	11	3.2
Full	- Asso	169	11.9	18	5.3
Full	- Asst	553	39.1	46	13.4
Asso	- Asso	80	5.6	22	6.4
Asso	- Asst	319	22.6	108	31.6
Asst	- Asst	<u>181</u>	<u>12.8</u>	<u>137</u>	<u>40.1</u>
		1415	100.0	342	100.0

* Four individuals are not included. Two of these four are instructors. The remaining two are full professors but due to missing data we were unable to determine their entry rank.

TABLE 9

1987 FACULTY: MEAN UNIVERSITY OF MINNESOTA EXPERIENCE¹
 BY CURRENT RANK, ENTRY RANK, AND GENDER²
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

Current Rank	Entry Rank	Mean Years for Males	Mean Years for Females
Full	Full	11.9 (n=113)	6.2 (n=11)
Full	Associate	17.9 (n=169)	14.4 (n=18)
Full	Assistant	21.5 (n=553)	18.7 (n=46)
Associate	Associate	8.3 (n=80)	5.5 (n=22)
Associate	Assistant	13.2 (n=319)	12.4 (n=108)
Assistant	Assistant	7.6 (n=181)	9.7 (n=137)
		(n=1415)	(n=342)

¹ Mean experience includes time spent on 'T' appointments by faculty who are now tenured or tenure track

² Four individuals are not included. Two of these four are instructors. The remaining two are full professors but due to missing data we were unable to determine their entry rank.

TABLE 10

1987 FACULTY: MEAN TOTAL SALARY¹ BY CURRENT RANK,
 ENTRY RANK, AND GENDER²
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

Current Rank	Entry Rank	Mean for Males	Mean for Females
Full	Full	\$58,135 (n=113)	\$54,073 (n=11)
Full	Associate	48,984 (n=169)	42,394 (n=18)
Full	Assistant	46,015 (n=553)	43,133 (n=46)
Associate	Associate	40,612 (n=80)	38,437 (n=22)
Associate	Assistant	35,719 (n=319)	33,447 (n=108)
Assistant	Assistant	31,787 (n=181)	29,268 (n=137)
		(n=1415)	(n=342)

¹ Faculty on twelve month appointments are converted to nine month appointments. Mean total salary includes augmentations and assumes all faculty are 100% time.

² Four individuals are not included. Two of these four are instructors. The remaining two are full professors but due to missing data we were unable to determine their entry rank.

TABLE 11

1987 FACULTY BY TYPE OF HIGHEST DEGREE AND GENDER¹
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

	Number of <u>Males</u>	Percent of Males	Number of <u>Females</u>	Percent of <u>Females</u>
Bachelor's Degree	16	1.1	6	1.7
Master's Degree	114	8.1	75	21.8
MD or Law Degree	28	2.0	8	2.3
DVM, DDS, or PharmD	19	1.3	2	.6
Professional Doctorate ²	31	2.2	3	.9
Research Doctorate-PhD	1076	76.0	218	63.4
Unknown Degrees	13	1.0	5	1.5
Degrees in Progress	19	1.3	6	1.7
Foreign	99	7.0	21	6.1
Missing	2	.1	--	--
	<u>1415</u>	<u>100.0</u>	<u>344</u>	<u>100.0</u>

¹ Two individuals who are instructors are excluded.

² This category includes DBA, DED, DENGSC, DFA, DLS, DM, DMA, DME, DRPH, DSW, and EDD.

TABLE 12

1987 FACULTY BY APPOINTMENT TERM AND GENDER*
 (Excluding current administrators and clinical medical faculty)
 University of Minnesota - Twin Cities Campus

	Number of <u>Males</u>	Percent of Males	Number of <u>Females</u>	Percent of <u>Females</u>
Nine	866	61.2	212	61.8
Twelve	550	38.8	131	38.2
	<u>1416</u>	<u>100.0</u>	<u>343</u>	<u>100.0</u>

* Two individuals are excluded due to missing data.

TABLE 13

1987 FACULTY WHO WERE PAST ADMINISTRATORS*, BY GENDER
(Excluding current administrators and clinical medical faculty)
University of Minnesota - Twin Cities Campus

	Number of Males	Percent of Males	Number of Females	Percent of Females
Past Administrators	309	21.8	47	13.7
Not Past Administrators	1108	78.2	297	86.3
	1417	100.0	344	100.0

*Past Administrators are individuals whose end date on an administrative appointment is before January 1, 1987.

TABLE 14

1987 FACULTY WHO HAVE RECEIVED RETENTION FUNDS,
BY GENDER, 1983-84 THROUGH 1986-87
(Excluding current administrators and clinical medical faculty)
University of Minnesota - Twin Cities Campus

	Number of Males	Percent of Males	Number of Females	Percent of Females
Received Retention Funds	128	9.0	27	7.8
Did not Receive Retention Funds	1289	91.0	317	92.2
	1417	100.0	344	100.0

TABLE 15

1987 FACULTY: MEAN DAYS OF NON-PROFESSIONAL LEAVE BY GENDER
(Excluding current administrators and clinical medical faculty)
University of Minnesota - Twin Cities Campus

	Mean for Males	Mean for Females
Days of Non-Professional Leave	30.6 (n=1417)	79.3 (n=344)

TABLE 16

1987 DULUTH FACULTY BY GENDER
(Excluding Current Administrators)

	Number	Percent
Females	54	25.1
Males	161	74.9
Total	215	100.0

TABLE 17

1987 DULUTH FACULTY: COMPOSITION BY RANK AND GENDER
(Excluding current administrators)

	Total Faculty	Male Faculty	Female Faculty
Percent Full Professor	21.8 (n=47)	97.9	2.1
Percent Associate Professor	41.4 (n=89)	76.4	23.6
Percent Assistant Professor	34.0 (n=73)	57.5	42.5
Percent Instructors/Lecturers	2.8 (n=6)	83.3	16.7
Total	100.0 (N=215)		

TABLE 18

1987 MALE AND FEMALE DULUTH FACULTY BY RANK
(Excluding current administrators)

	Male Faculty	Female Faculty
Percent Full Professors	28.6 (n=46)	1.8 (n=1)
Percent Associate Professors	42.2 (n=68)	39.0 (n=21)
Percent Assistant Professors	26.1 (n=42)	57.4 (n=31)
Percent Instructors/Lecturers	3.1 (n=5)	1.8 (n=1)
TOTAL	100.0 (n=161)	100.0 (n=54)

TABLE 19

1987 DULUTH FACULTY: MEAN UMD EXPERIENCE
BY RANK AND GENDER
(Excluding current administrators)

Rank	Mean Years For Males	Mean Years For Females
Full Professors	19.6 (n=46)	18.2 (n=1)
Associate Professors	11.8 (n=68)	12.7 (n=21)
Assistant Professors	6.5 (n=42)	8.6 (n=31)
Instructors/Lecturers	4.3 (n=5)	14.0 (n=1)

TABLE 20

1987 UNIVERSITY OF MINNESOTA-DULUTH FACULTY
MEAN SALARY BY RANK AND GENDER

	Mean for Males	Mean for Females
Full Professors	\$44131 (N=46)	\$42905 (N=1)
Associate Professors	35143 (N=68)	32481 (N=21)
Assistant Professors	28873 (N=42)	28078 (N=31)
Lecturers/Instructors	26788 (N=5)	28205 (N=1)

TABLE 21

1987 DULUTH FACULTY BY TYPE OF HIGHEST DEGREE AND GENDER
(Excluding current administrators)

	Number of Males	Percent of Males	Number of Females	Percent of Females
Bachelor's Degree	1	.6	1	1.9
Master's Degree	19	11.8	17	31.5
DVM, DDS, or PharmD	1	.6		
Professional Doctorate*	8	5.0	6	7.4
Research Doctorate-PhD	119	73.9	28	51.9
Unknown	1	.6	1	1.9
Degrees in Progress	5	3.1	2	3.7
Foreign Degrees	7	4.3	1	1.9
	161		54	

* This category includes DBA, DED, DENGSC, DFA, DLS, DM, DMA, DME, DRPH, DSW, and EDD. There were no faculty whose highest degree was in law or medicine.

TABLE 22
 1987 DULUTH FACULTY BY APPOINTMENT TERM AND GENDER
 (Excluding current administrators)

	Number of Males	Percent of Males	Number of Females	Percent of Females
Nine Month	139	86.3	48	88.9
Twelve Month	22	13.7	6	11.1
	161	100.0	54	100.0

TABLE 23
 1987 DULUTH FACULTY WHO WERE PAST ADMINISTRATORS*, BY GENDER
 (Excluding current administrators)

	Number of Males	Percent of Males	Number of Females	Percent of Females
Past Administrators	48	29.8	10	18.5
Not Past Administrators	113	70.2	44	81.5
	161	100.0	54	100.0

* Past administrators are individuals whose end date on an administrative appointment is before January 1, 1987

TABLE 24
 1987 DULUTH FACULTY WHO HAVE RECEIVED RETENTION FUNDS
 (Excluding current administrators)

	Number of Males	Percent of Males	Number of Females	Percent of Females
Received Retention Funds	29	18.0	9	16.7
Did Not Receive Retention Funds	132	82.0	45	83.3
	161	100.0	54	100.0

TABLE 25

1987 UNIVERSITY OF MINNESOTA-DULUTH FACULTY
 MEAN DAYS OF NON-PROFESSIONAL LEAVE BY GENDER

	<u>Mean for Males</u>	<u>Mean for Females</u>
Days of Non-Professional Leave	33.71 (N=161)	7.43 (N=54)

APPENDIX I

NOTES ON THE CONSTRUCTION OF THE COMPONENT EXPERIENCE VARIABLES

In order to construct an individual faculty member's time at the University of Minnesota, it was necessary to break down the separate conditions under which people come to work here. We were interested in seeing the difference between the relationship of experience to salary for those who came to Minnesota with tenure and for those who came seeking tenure. Obviously, a faculty member starting at the University of Minnesota as a full professor has a low number of days of experience but a high salary, whereas, an incoming assistant professor who attains full professor rank has a much higher number of days of experience and may have a lower salary than the former faculty member discussed. There are six separate situations which encompass the possibilities of faculty status at the university as listed in Figure A below. Of these six, a faculty member is in one category or is not (dummy coded) and since knowing five of these situations automatically answers the sixth, the sixth category is considered a redundant amount of information and is therefore excluded (the rank of assistant professor).

FIGURE A
Creation of Rank Status

CURRENT RANK	Asst	ENTRY RANK Asso	Full
Asst	excluded	*****	*****
Asso	ASSOASST	ASSOASSO	*****
Full	FULLASST	FULLASSO	FULLFULL

FIGURE B
Creation of Component Experience Variables

Current Rank	Entry Rank	Time AT U of MN in Particular Rank
FULL	FULL	* TIME AS FULL PROFESSOR = (FFullFull)
FULL	ASSO	* TIME AS FULL PROFESSOR = (FAssoFull)
FULL	ASST	* TIME AS FULL PROFESSOR = (FAsstFull)
FULL	ASSO	* TIME AS ASSO PROFESSOR = (FAssoAss)
FULL	ASST	* TIME AS ASSO PROFESSOR = (FAsstAss)
FULL	ASST	* TIME AS ASST PROFESSOR = (FAsstAst)
ASSO	ASSO	* TIME AS ASSO PROFESSOR = (AAssoAss)
ASSO	ASST	* TIME AS ASSO PROFESSOR = (AAsstAss)
ASSO	ASST	* TIME AS ASST PROFESSOR = (AAsstAst)
ASST	ASST	* TIME AS ASST PROFESSOR = (AsstTime)

APPENDIX II
 1987 TWIN CITIES FACULTY
 (Excluding current administrators and clinical medical faculty)
 REGRESSION RESULTS WITH DEPARTMENTAL DUMMY VARIABLES

Departmental Dummy	MODEL 1	MODEL 2
COLLEGE OF LIBERAL ARTS		
Anthropology	- .10 (2.1)	-.07 (1.5)
Art History	- .08 (1.5)	-.08 (1.4)
East Asian Studies	- .11 (1.7)	-.06 (.9)
Classical Studies	- .15 (2.3)	-.13 (2.0)
Economics	.26 (6.0)	.27 (5.9)
Speech-Communication	- .05 (.8)	-.02 (.3)
Geography	- .10 (1.3)	-.08 (1.1)
French-Italian	- .15 (3.1)	-.12 (2.4)
Studio Arts	- .13 (2.3)	-.11 (1.9)
German	- .03 (.5)	-.01 (.1)
Comp Lit, English, Composition	- .09 (2.4)	-.09 (2.3)
History	- .05 (1.3)	-.03 (.9)
Journalism, KUOM	.02 (.4)	.05 (1.0)
Linguistics	- .01 (1.1)	-.05 (.9)
Music	- .10 (2.3)	-.07 (1.6)
Afro-American Studies	- .03 (.4)	-.00 (.0)
Philosophy	- .02 (.5)	-.04 (.7)
Psychology	.09 (2.1)	.13 (3.2)
Area Studies*	- .11 (2.9)	-.10 (2.5)
Sociology	- .02 (.4)	.00 (.1)
Spanish-Portuguese	- .00 (.0)	.01 (.2)
Humanities	- .04 (.7)	-.05 (.9)
Communication Disorders	.08 (1.3)	.13 (1.9)
Statistics	.09 (2.0)	.11 (2.2)
Political Science	.07 (1.8)	.10 (2.2)
INSTITUTE OF TECHNOLOGY		
Architecture	- .02 (.4)	.01 (.2)
Civil and Mineral Engineering- Mineral Res Ctr	.06 (1.4)	.03 (.6)
Computer Science	.22 (4.3)	.22 (4.0)
Electrical Engineering	.19 (5.1)	.17 (4.2)
Mathematics	.03 (.9)	.04 (1.3)
Mechanical Engineering	.15 (3.6)	.17 (3.8)
Aerospace Engineering & Mechanics	.14 (2.9)	.11 (2.2)
Chemistry	.03 (.8)	.05 (1.4)

Chemical Engineering & Material Science	.11 (2.6)	.13 (2.7)
Earth Science & Geo Physics	.04 (.9)	.04 (1.0)
Physics & Astronomy- Hist. of Sci & Tech	.05 (1.6)	.06 (1.7)

AGRICULTURE-FORESTRY-HOME ECONOMICS

Agriculture & Applied Economics	.11 (3.0)	.14 (3.7)
Agricultural Engineering	.10 (2.3)	.14 (3.1)
Agronomy and Plant Genetics	.08 (1.9)	.10 (2.2)
Animal Science	.04 (1.0)	.09 (2.2)
Entomology	.04 (.9)	.07 (1.4)
Food Science & Nutrition-AG	.06 (1.3)	.08 (1.5)
Horticultural Science & Landscape Arch	.01 (.3)	.03 (.7)
Plant Pathology	.02 (.4)	.03 (.6)
Rhetoric	.10 (2.2)	.08 (1.7)
Soil Science	.08 (1.9)	.12 (2.6)
Fish & Wildlife	.04 (.8)	.08 (1.2)
Forestry (Resources & Products)	.00 (.1)	.01 (.3)
Family Social Science	.01 (.1)	.02 (.4)
Design, Housing, & Apparel	.03 (.6)	.03 (.7)
Food Science & Nutrition-HE	.10 (2.2)	.14 (2.7)
Social Work	.03 (.6)	.04 (.8)

DENTISTRY DEPARTMENTS

.11 (3.2) .13 (3.4)

MEDICAL DEPARTMENTS

Cell Biology, Neuroanatomy, Mortuary Science	.13 (3.0)	.15 (3.3)
Biochemistry - Med	.12 (2.5)	.12 (2.3)
Microbiology	.10 (2.3)	.10 (2.1)
Pharmacology	.22 (3.9)	.22 (3.7)

EXCLUDED CATEGORY EXCLUDED CATEGORY EXCLUDED

PUBLIC HEALTH

.17 (4.8) .17 (4.5)

PHARMACY

.02 (.5) .05 (1.1)

NURSING

.02 (.5) .04 (1.0)

COLLEGE OF BIOLOGICAL SCIENCE

Biochemistry-CBS	.03 (.5)	.00 (.0)
Ecology & Behavioral Biology		

Botany	- .03 (.6)	-.00 (.0)	
Genetics & Cell Biology	.01 (.2)	.01 (.3)	
COLLEGE OF VETERINARY MEDICINE			
Veterinary Biology	.11 (2.2)	.13 (2.6)	
Large Animal Clinical Science	.10 (2.3)	.11 (2.5)	
Veterinary Pathobiology	.14 (3.2)	.13 (2.8)	
Small Animal Clinical Science	.15 (3.2)	.20 (3.9)	
Veterinary Diagnostics Investigation	.10 (1.9)	.13 (2.2)	
LAW SCHOOL	.28 (5.8)	.30 (5.9)	
HHH PUBLIC AFFAIRS	.09 (1.7)	.11 (2.0)	
EDUCATION			
Educational Policy & Admin	.07 (1.5)	.09 (1.9)	
Music Ed & Curriculum and Inst	.07 (1.9)	.08 (2.0)	
Vocational Technical Ed	.11 (2.4)	.13 (2.7)	
Physical Ed and Recreation	.06 (1.2)	.04 (.7)	
Educational Psychology	.11 (2.7)	.14 (3.5)	
Child Development	.19 (3.8)	.23 (4.4)	
SCHOOL OF MANAGEMENT			
Accounting	.25 (4.6)	.27 (4.7)	
Industrial Relations Center	.09 (1.7)	.11 (1.9)	
Management Science	.15 (3.2)	.16 (3.3)	
Marketing and Business Law	.17 (2.6)	.20 (2.9)	
Finance and Insurance	.11 (1.9)	.12 (2.1)	
Strategic Mgmt & Organization	.13 (2.9)	.15 (3.2)	
GENERAL COLLEGE	- .06 (1.7)	-.04 (1.1)	-
LIBRARIES	- .06 (1.4)	-.02 (.5)	-
VARIOUS COLLEGE ADMIN DEPTS	.14 (1.0)	.16 (1.0)	-

* Area studies includes Scandinavian, South and Southwest Asian Studies, American Indian Studies, American Studies, Ancient-Near East-Jewish Studies, Chicano Studies, Russian and East European Studies, and Women's Studies.

APPENDIX III
1987 DULUTH FACULTY

(excluding current administrators)

REGRESSION RESULTS WITH DEPARTMENTAL DUMMY VARIABLES

Departmental Dummy	Model 1
School of Medicine	.07(.9)
Instructional Science, Child and Family Development, and Industrial and Technical Studies	-.09(2.2)
Health and Physical Education and Recreation	-.00(.0)
Physical and Mental Health, Social Work, Allied Clinical Health	-.03(.8)
Biology, Chemistry, Physics, and Geology	.02(.7)
Math and Statistics, Computer Science	.09(2.2)
Industrial Engineering, Materials Process Engineering, Computer Engineering	.09(1.5)
American Indian Studies, Foreign Language and Literature, Humanities, and History	.00(.1)
Communication, English	excluded category
Political Science, Sociology, Anthropology, Geography	.08(1.9)
Art, Music, Theatre	-.05(1.4)
Accounting, Management Studies, Finance and Management Information Science, Economics	.14(3.6)