Internal Salary Equity Study for the University of Maine

May 2015

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Executive Summary

In this study, we investigated whether there was evidence of gender discrimination in pay for faculty at the University of Maine in the 2011-12 academic year. We applied multivariate statistical techniques to data obtained from the institution to investigate these issues. The dataset used for this study consists of faculty members at the University of Maine from the colleges of Business, Public Policy & Health; Cooperative Extension; Engineering; Education & Human Development; Liberal Arts & Sciences; and Natural Science, Forestry, & Agriculture. The data are for the 2011–12 academic year. To ensure that the set of faculty was relatively homogeneous and that the analysis conducted here was comparable to accepted practices and standards in the field, only faculty members who were employed full-time were included in the study. After these exclusions, there were 549 faculty members in the dataset.

The dependent variable used throughout this study is the logarithm of annual base salary (9-month equivalent), which is often used in salary studies due to its appropriateness in situations where salaries reflect a compounding process. From the personnel database provided by the University of Maine, the following independent variables were used: years employed by the University of Maine, academic rank, highest degree, gender, race/ethnicity, age, time in rank, and department. Another independent variable sometimes used in salary studies is some measure related to productivity (e.g., number of publications); however, such data were not available to the researchers and thus were not included in this analysis, a limitation that should be considered when interpreting results.

The findings revealed that although male faculty on average earned approximately 21% more than female faculty, almost all of the total wage gap could be attributed to differences between men and women in the faculty member's rank, years of experience, departmental affiliation, and time in rank. After taking these factors into account, the remaining (unexplained) wage gap between male and female faculty members at the University of Maine was 1.9% and was not statistically different from zero at p-value = 0.05. When current rank and time in rank were *not* controlled for in the salary model, the unexplained wage gap by gender increased to 5.1% and became significant at p-value = 0.01.

The unexplained wage gap was not substantially affected by whether a single-equation or two-equation approach was used. Using the single-equation method, approximately 90% of the total wage gap between men and women was explained by factors that should legitimately affect salaries. Using the two-equation model, the proportion explained was slightly lower at 87%.

Considered together, the results of these analyses showed that after taking into account personal and work-related characteristics that should affect salary, female faculty on average earned slightly less than their male counterparts. However, there was no clear evidence of a statistically significant unexplained pay gap between male and female faculty at the University of Maine.

Introduction

With the passage of the federal Equal Pay Act in 1964, employers across the nation became very concerned with ensuring that the manner in which their employees were paid was deemed to be fair and equitable. Subsequent legislation in the early 1970s specified that the fair and equitable treatment of employees with regard to compensation also extends to institutions of higher education. As a result, many internal salary equity studies were conducted in the 1970s and 1980s to examine the salary structures in colleges and universities. In more recent years, a number of institutions have continued to monitor their internal salary structures for evidence of inequitable treatment of particular groups of faculty members.

One of the most persistent themes in the faculty compensation literature is the question of whether male and female faculty members on average receive salaries that are comparable to each other after taking into account personal and work-related factors that are thought to have an effect on their pay. Studies conducted at the national level have shown that female faculty members are paid less than male faculty with comparable characteristics such as educational attainment, academic field/discipline, and years of experience. The findings from institution-specific studies, on the other hand, have been more mixed. Although a number of these institution-specific internal salary equity studies revealed that female faculty members were paid less than male faculty members, other studies have not shown evidence of significant pay differences between the genders. A list of selected studies is shown in the Appendix to this report. The results have also been mixed in the institution-specific studies that we have conducted.

In the summer of 2012, we were asked by the University of Maine to conduct a study of the internal salary equity of their faculty. The focus of the internal salary equity study was to determine whether female faculty members, on average, are paid significantly less than comparable male faculty members.

To answer this question, we obtained data on all full-time, tenure-eligible faculty members at the University of Maine in the academic year 2011-12. The dataset included information on each faculty member's base salary, years of experience at the institution, highest degree attained, academic field/discipline, race, gender, and academic rank.

The findings revealed that although male faculty on average earned approximately 21% more than female faculty, almost all of the total wage gap could be attributed to differences between men and women in the faculty member's rank, years of experience, departmental affiliation, and time in rank. After taking these factors into account, the remaining (unexplained) wage gap between male and female faculty members at the University of Maine was 1.9% and was not statistically different from zero at p-value = 0.05. When current rank and time in rank were *not* controlled for, the unexplained wage gap by gender increased to 5.1% and became significant at p-value = 0.01.The unexplained wage gap was not substantially affected by whether a single-equation or two-equation approach was used.

This report begins with an overview of the relative compensation of male and female faculty members at the University of Maine and a description of the statistical procedures used to investigate salary equity by gender. A second section describes the data and variables used in the study.

Measuring Gender Disparities in Salary

Most inquiries into possible salary discrimination begin by observing that there is a difference in the average salaries for male and female faculty. This is referred to here as the "total wage gap". It is common knowledge that in many labor markets, women on average earn less than their male counterparts and that the total wage gap between men and women can be sizable. This phenomenon applies to colleges and universities as well as employers in non-academic labor markets. Dating back to the 1970s, the American Association of University Professors (AAUP) has collected and published statistics on the average earnings of faculty at colleges and universities in the United States. Because the salary data are broken down by gender, they can be used to measure the total wage gaps for male and female faculty within any participating institution. Table 1, for example, shows how the average salaries compare for male and female faculty at the University of Maine and selected peer institutions for the academic year 2012–13. (Note: All salary data in this table are equated to 12-month salaries.)

Table 1. Average Salaries for Ranked Faculty at Selected Institutions by Gender, 2011–12

Institution	Average salary (equated 12-month)		Total wage gap	
	Men	Women	$	%
University of Maine (Orono)	$ 110,244	$ 91,524	$ 18,720	17.0%
Montana State University (Bozeman)	$ 82,296	$ 74,484	$ 7,812	9.5%
North Dakota State University (Main)	$ 104,856	$ 84,180	$ 20,676	19.7%
South Dakota State University	$ 93,048	$ 80,256	$ 12,792	13.7%
University of Idaho	$ 100,728	$ 84,900	$ 15,828	15.7%
University of Rhode Island	$ 119,412	$ 96,912	$ 22,500	18.8%
University of Wyoming	$ 113,184	$ 90,072	$ 23,112	20.4%

Notes: Data obtained from IPEDS. Average salary data include all instructional faculty. Total wage gap (%) = the total wage gap as a percentage of average men's salary. Peer institutions were derived from the custom comparison group chosen by the University of Maine in its 2013 IPEDS Data Feedback Report.

As the above data from the University of Maine and six peer institutions show, female faculty members on average earned considerably less than their male counterparts, although the gap varies between institutions and, within institutions, between ranks. At the University of Maine, the total wage gap between male and female faculty members was $18,720, which translates into 17.0% of the average male professor salary. Among all seven institutions, this places the University of Maine in the middle in terms of the total wage gap between the genders.

Despite the attention that is often given to average salary differences such as these, experts in faculty compensation recognized early on that the difference in average salaries could not be used as evidence of pay discrimination because it did not take into account possible gender differences in important labor-market factors that should legitimately affect salaries. One important reason why the total wage gaps in Table 1 can be misleading is that there is an uneven distribution of men and women across academic ranks. Usually a higher proportion of male faculty to female faculty is found at the Full Professor rank, where salaries tend to be the highest. Thus more insight into the relative pay of male and female faculty can be obtained by considering the differences in average salary by gender within each rank, as shown in Table 2:

Table 2. Average Equated 9-Month Salaries by Gender and Rank for the University of Maine and Selected Peer Institutions, 2011–12

	Professor			Associate Professor			Assistant Professor		
	Men	Women	Gap ($)	Men	Women	Gap ($)	Men	Women	Gap ($)
University of Maine (Orono)	$ 97,500	$ 91,400	$ 6,100	$ 79,900	$ 73,400	$ 6,500	$ 62,000	$ 57,800	$ 4,200
Montana State Univ. (Bozeman)	$ 90,000	$ 89,100	$ 900	$ 69,700	$ 65,000	$ 4,700	$ 62,400	$ 61,500	$ 900
North Dakota State Univ. (Main)	$ 103,500	$ 101,300	$ 2,200	$ 78,600	$ 75,600	$ 3,000	$ 71,100	$ 66,700	$ 4,400
South Dakota State University	$ 83,700	$ 82,000	$ 1,700	$ 71,100	$ 66,900	$ 4,200	$ 63,600	$ 60,500	$ 3,100
University of Idaho	$ 92,700	$ 89,300	$ 3,400	$ 71,000	$ 70,500	$ 500	$ 62,500	$ 58,700	$ 3,800
University of Rhode Island	$ 107,400	$ 99,200	$ 8,200	$ 81,800	$ 76,000	$ 5,800	$ 72,900	$ 64,000	$ 8,900
University of Wyoming	$ 108,600	$ 99,500	$ 9,100	$ 78,200	$ 72,700	$ 5,500	$ 70,500	$ 63,600	$ 6,900

Notes: Data obtained from *Academe*, March/April 2013. Average salary data are equated to 9-month contracts and include faculty at the Full, Associate, and Assistant ranks. Total wage gap ($) = difference in average salaries between male and female faculty at each respective rank. Total wage gap (%) = total wage gap as a percentage of average male salary at each respective rank. Peer institutions were derived from the custom comparison group chosen by the University of Maine in its 2013 IPEDS Data Feedback Report.

The data in Table 2 illustrate that the average salary gaps between men and women were much smaller *within* each rank than when faculty were aggregated *across* ranks as in Table 1. Female faculty members at the University of Maine on average earned $6,100 less than male faculty members at the Full Professor rank, $6,500 less at the Associate Professor rank, and $4,200 less at the Assistant Professor rank. These average pay gaps were substantially smaller than the total wage gap of $18,720 shown in Table 1, thus highlighting the importance of examining salary differences within rank. Note also that the gender pay gaps within rank were not unique to the University of Maine. For every institution in this list, the average salaries for male faculty within rank exceeded the average salaries for female faculty. Finally, note also that the size of the wage gap is not consistent across ranks. The University of Maine had the highest wage gap in the Associate Professor rank but was third in the Professor rank and fourth in the Assistant Professor rank.

In addition to rank, other characteristics of faculty may also affect their salaries. If these factors are unequally distributed between men and women, then they may also affect the total wage gap between the genders. For example, gender differences are often found with regard to employment rates in higher-paying academic disciplines such as business. Male faculty members also typically have more years of experience in academe, on average, than their female counterparts. Given that employees with more experience are usually expected to earn more than employees with less experience, some of the difference in average salaries between males and females may rightly be attributed to their different experience levels rather than to unfair treatment by the institution.

In general terms, this means that the average salary difference (or total wage gap) between men and women in Table 1 can be broken down into two components: the "explained wage gap" and the "unexplained wage gap":

(1) Total wage gap = Explained wage gap + Unexplained wage gap

The explained wage gap is the portion of the total wage gap that is attributed to differences in factors such as experience, educational attainment, and rank that should affect salaries. The unexplained wage gap represents the estimated portion of the total wage gap between men and women that cannot be attributed to known, measurable factors that may legitimately affect salaries. The term "unexplained wage gap" is used to reflect the fact that this remainder could be due to justifiable factors that cannot be measured, justifiable factors that were not included in the analysis, or inequitable treatment of men and women. Therefore, the presence of a significant unexplained wage gap does not, in and of itself, prove that the employer has engaged in unfair treatment of men and women.

The standard procedure by which researchers measure the unexplained wage gap is through multiple regression analysis. The advantage of multiple regression analysis is that it allows the investigator to control for the influences of other factors such as rank, labor market experience, educational attainment, and discipline that may legitimately affect faculty compensation. The analysis begins with the specification of a salary equation of the form:

(2) $$\ln Y_i = \alpha_0 + \sum_{j=1}^{J} \alpha_j X_{ij} + \varepsilon_i$$

where $\ln Y_i$ = salary for the i^{th} faculty member expressed in logarithms, X_1 to X_J = set of J independent variables that were deemed appropriate for differentiating salaries among faculty, α_0 to α_J = set of coefficients to be estimated by multiple regression analysis, and ε_i = random error term. The log of salary is most often used as the dependent variable in salary studies due to its appropriateness in situations where salaries reflect a compounding process (i.e., salary increases are awarded on a percentage basis as opposed to a fixed dollar amount). The resulting coefficients in the salary model show the approximate predicted percentage change in salary due to each of the designated factors X_1 to X_J.

To measure the unexplained wage gap between male and female faculty, either a single-equation method or a multiple-equation method can be used. In the single-equation method, a dummy variable for each faculty member's gender is added to the wage equation shown above:

$$(3) \quad \ln Y_i = \alpha_0 + \sum_{j=1}^{J} \alpha_j X_{ij} + \alpha_{J+1} M_i + \varepsilon_i$$

where the variable $M_i = 1$ if male, and zero otherwise. The coefficient α_{J+1} represents the unexplained wage gap for gender, or the approximate percentage salary difference between male and female faculty after taking into account differences in the levels of the independent variables for males and females.

One limitation of the single-equation approach, however, is that it restricts each of the independent variables in the model to have the same effect on salary for both male and female faculty. For example, if one of the independent variables in the salary model is years of experience, then this restriction means that an additional year in the labor force must have the same average impact on salary for men and women. If these assumptions are inappropriate, then the estimated coefficient for the gender variable—the unexplained wage gap—will also be incorrect. The extent to which the estimated unexplained wage gap is affected by these restrictions will vary from application to application, although in practice the effects tend to be fairly minor.

To address this issue, Oaxaca (1973), Blinder (1973), Reimers (1983), and Cotton (1988) recommend using multiple-equation methods for measuring the unexplained wage gap. Rather than adding a gender dummy variable to the wage equation, the multiple-equation methods suggest estimating the wage equation (2) separately for males:

$$(4) \quad \ln Y_i = \alpha_{m0} + \sum_{j=1}^{J} \alpha_{mj} X_{mij} + \varepsilon_i, \quad \textit{for male faculty only}$$

Equation (4) is referred to as the male wage structure.[1] The unexplained wage gap between the genders can then be found by substituting each female faculty member's characteristics into the male wage structure and comparing the average actual female salary with the average predicted salary as if male:

[1] This approach requires having a sufficient number of observations on each variable by gender. See Toutkoushian and Hoffman (2002) for more discussion of the challenges in implementing the two-equation method in institution studies of internal salary equity.

(5) Unexplained Wage Gap (2-equation) = $\ln \hat{Y}$ (female as male) – $\ln \bar{Y}$ (*female*)

where $\ln \hat{Y}$ (female as male) = average predicted log of salary for females based on the male wage structure, and $\ln \bar{Y}$ (*female*) = average log of salary for female faculty.

A second issue to address when conducting an internal salary equity study is whether or not to control for academic rank in the salary model. Because faculty members often received pay increases when they are promoted, there is a clear connection between salary and rank that argues for the researcher to add variables for rank to the salary model. If it is true that men are more likely than women to be found at higher ranks, then failure to control for rank will lead to an overestimate of the unexplained wage gap. However, some have countered that if female faculty members are discriminated against in terms of rank assignment, then controlling for rank in the salary model will lead to an underestimate of the true unexplained wage gap. The recommended approach to this problem is to estimate the unexplained wage gap both ways, report both sets of findings, and then compare the estimates to see whether the magnitude of the unexplained wage gap changes.

Data Description

The dataset used in this report consists of faculty members at the University of Maine from the colleges of Business, Public Policy & Health; Cooperative Extension; Engineering; Education & Human Development; Liberal Arts & Sciences; and Natural Science, Forestry, & Agriculture. The data are for the 2011–12 academic year. To ensure that the set of faculty was relatively homogeneous and that the analysis conducted here was comparable to accepted practices and standards in the field, only faculty members who were employed full-time were included in the study. After these exclusions, there were 549 faculty members in the dataset.

The dependent variable used throughout this study is the logarithm of annual base salary (9-month equivalent).

From the personnel database provided by the University of Maine, the following independent variables were constructed: years employed by the University of Maine, age, and time in rank (all using a reference date of 9/1/2011). Dichotomous (or "dummy") variables were created for categorical variables including gender, rank, tenure status, race/ethnicity (coded as white or non-white), highest degree (coded as PhD or below a PhD), and department (those departments with fewer than five individuals were combined into one, as shown below in Table 3). Tenure status was coded into tenured/tenure-track, Other (essentially Cooperative Extension Service faculty), and Not Applicable.

Another independent variable sometimes used in salary studies is some measure related to productivity (e.g., number of publications). Unfortunately, such data were not available to the researchers and thus were not included in this analysis. This limitation should be considered when interpreting results.

Table 3. List of Department Variables

Department	Variable name
Animal & Veterinary Sciences	dummy_dept_ANV
Anthropology	dummy_dept_AY
Art	dummy_dept_AT
Chemical & Biological Engineering	dummy_dept_CHE
Chemistry	dummy_dept_CH
Civil & Environmental Engineering	dummy_dept_CE
Communication & Journalism	dummy_dept_CMJM
Communication Sciences & Disorders	dummy_dept_CSD
Cooperative Extension Service	dummy_dept_CES
Earth Sciences	dummy_dept_ERS
Education & Human Development	dummy_dept_EDUC
Electrical & Computer Engineering	dummy_dept_ECE
English	dummy_dept_EH
Food Science & Human Nutrition	dummy_dept_FSN
History	dummy_dept_HY
Maine Business School	dummy_dept_BA
Mathematics & Statistics	dummy_dept_ME
Mechanical Engineering	dummy_dept_MLC
Modern Languages & Classics	dummy_dept_BMMB
Molecular & Biomedical Science	dummy_dept_MC
Music	dummy_dept_NMP
Philosophy	dummy_dept_PL
Physics and Astronomy	dummy_dept_PS
Plant, Soil, & Environmental Sciences	dummy_dept_PSE
Political Science	dummy_dept_POL
Psychology	dummy_dept_PY
School of Biology & Ecology	dummy_dept_SBE
School of Computing and Information Sciences	dummy_dept_SCIS
School of Economics	dummy_dept_SOE
School of Engineering Technology	dummy_dept_SET
School of Forest Resources	dummy_dept_FORM
School of Marine Sciences	dummy_dept_SMS
School of Nursing	dummy_dept_NURS
School of Social Work	dummy_dept_SWK
Sociology	dummy_dept_SY
Wildlife Ecology	dummy_dept_W
Combined *	dummy_dept_Small

* Includes the following departments, each with < 5 faculty: Advanced Structures and Composites Center, Climate Change Institute, Honors College, Intensive English Institute, Public Administration, Theater, and Water Research Institute.

NOTE: Mathematics & Statistics was used as the reference department in all models and thus was not assigned a dummy variable.

Findings—Unexplained Wage Gap by Gender

Table 4 provides descriptive statistics (mean and standard deviation) for the key variables that are used in the faculty salary models.

Table 4. Descriptive Statistics for Selected Variables

Variable	Males only	Females only	Combined
2011-2012 annual salary (9-month equivalent)	$82666 (22012)	$68100 (19214)	$77466 (22167)
Log of 2011-2012 annual salary (9-month equivalent)	11.286 (.275)	11.090 (.278)	11.216 (.292)
Years at University of Maine	17.938 (11.819)	12.750 (8.961)	16.086 (11.158)
Full Professor	.467 (.500)	0.230 (.422)	.383 (.486)
Associate Professor	.317 (.466)	.362 (.482)	.333 (.472)
Assistant Professor	.133 (.340)	.235 (.425)	.169 (.375)
Lecturer	.071 (.257)	.153 (.361)	.100 (.301)
Instructor	.011 (.106)	.020 (.142)	.015 (.120)
Tenured or tenure-track	.822 (.383)	.653 (.477)	.761 (.427)
Cooperative Extension faculty (tenure status = "Other")	.048 (.214)	.112 (.316)	.071 (.257)
Not on tenure track (tenure status = ""Other")	.130 (.337)	.235 (.425)	.168 (.374)
Highest degree is a PhD	.867 (.340)	.750 (.434)	.825 (.380)
Highest degree is below a PhD	.133 (.340)	.250 (.434)	.175 (.380)
Race--white	.915 (.279)	.934 (.249)	.922 (.269)
Race--nonwhite	.093 (.292)	.066 (.249)	.084 (.277)
Time in rank (years)	10.493 (9.149)	7.302 (6.454)	9.354 (8.422)
Age	53.857 (10.444)	51.171 (10.207)	52.898 (10.431)
N	353	196	549

Note: Data include faculty with a total FTE=1. Means are shown in each cell, with standard deviations shown in parentheses below each.

Table 4 shows that the average salary for male faculty exceeded the average salary for female faculty by $14,566, or approximately 19.6% based on the difference in logarithms (11.286 – 11.090 = 0.196). This total wage gap was slightly higher than what was found for the larger set of faculty reported to the AAUP (see Table 1; it should be noted that the AAUP data include only ranked faculty). The descriptive statistics in Table 4 suggest that some portion of this total wage gap was likely attributable to differences in personal and work-related characteristics across genders. On average, male faculty members had more than five more years of experience than do females. They were also more likely than females to be at the Associate and Full Professor levels, as shown in Table 5:

Table 5. Faculty by Rank and Gender

	Females		Males	
	#	%	#	%
Instructor	4	50%	4	50%
Lecturer	30	55%	25	45%
Assistant Professor	46	49%	47	51%
Associate Professor	71	39%	112	61%
Full Professor	45	21%	165	79%
Total	196	36%	353	64%

Note: Data include faculty with a total FTE=1.

In addition, as Table 6 shows, the faculty in the departments and colleges with the highest average salaries—Business, Public Policy, & Health and Engineering—were predominantly male:

Table 6. Average Salaries and Gender Distribution of Faculty

	Gender		
College	**F**	**M**	**Average salary**
College of Business, Public Policy, & Health	8	16	$93,655
College of Engineering	6	60	$93,424
College of Education & Human Development	19	19	$62,716
College of Liberal Arts & Sciences	65	126	$75,485
College of Natural Science, Forestry, & Agriculture	75	112	$79,029
other	23	20	$58,968
Total	196	353	$77,466

Note: Data include faculty with a total FTE = 1. All salaries are 9-month equivalent.

To determine if male faculty members at the University of Maine were paid significantly more than their female counterparts after controlling for differences in salary that were due to factors that are measurable and should legitimately affect pay, we estimated several different multiple regression models. In each model, the dependent variable was the natural log of annual salary (9-month

equivalent). In Model 1 (see Table 7), we controlled for the following factors: gender, the faculty member's departmental affiliation, time at the University of Maine, degree type of the highest degree, race, and age. In Model 2, we added control variables for the faculty member's academic rank and time in rank, to determine whether adding academic rank to the model accounted for more of the total wage gap. The results for all of the variables except departmental affiliation are shown below in Table 7. (Note: Expanded tables including the departmental affiliation variables are included in the appendices to this report.)

Table 7. Multiple Regression Results for Determinants of Faculty Salaries at the University of Maine, 2011-12

Variable	**Model 1: Without rank**	**Model 2: With rank**
(Constant)	10.699 (.065)**	11.049 (.053)**
Female	-.051 (.018)**	-.020 (.013)
Rank—Instructor	--	-.196 (.057)**
Rank—Lecturer	--	-.219 (.035)**
Rank—Assistant Professor	--	-.174 (.020)**
Rank—Professor	--	.210 (.016)**
Tenure status OTH	--	-.094 (.058)
Tenure status NA	--	-0.13 (.027)**
Time at University of Maine	.007 (.001)**	-.001 (.001)
Highest degree is below a PhD	-.227 (.024)**	-.034 (.021)
Race—nonwhite	.002 (.029)	-.007 (.020)
Age	.007 (.001)**	.002 (.001)
Time in rank	--	.000 (.000)**
R-squared	**.659**	**.830**

Notes: Standard errors are shown in parentheses. Coefficients represent the approximate percentage change in salary due to a

one-unit change in each independent variable. Each model also includes dichotomous variables for departmental affiliation (reference category = math/statistics). Reference categories: Male, Associate Professor, Math/Statistics Dept., Highest degree is a PhD, Race=White. Results for the 37 non-reference departmental dummy variables, not shown here, are viewable in the appendices.
* coefficient is statistically significant at p = 0.05, ** coefficient is statistically significant at p = 0.01 (two-tailed tests).

The salary models in Table 7 show that a large proportion (66–83%) of the variations in faculty salaries was explained by factors such as their rank, experience, and academic discipline. These values are consistent with the R-squared values typically observed in internal salary equity studies conducted at specific institutions. Not surprisingly, time at the University of Maine (a proxy for years of experience) was found to have a significant effect on faculty salaries when rank is not included in the model. The effect of experience on salary changed when rank was added to the model because of the high correlation between years of experience and academic rank. The results demonstrate that adding rank to the salary model improved the overall fit of the regression line and verified that salary increased with rank even after controlling for years of experience.

In terms of the effect of gender on salary, it can be seen that although the estimated coefficients for the variable Female were negative in both salary models, they were not statistically different from zero (at the p = 0.05 level) once rank was controlled for in the salary equation. Of note, however, the proportions of women were lower in the Associate and Full Professor ranks.

As a test of the robustness of our single-equation results, we applied the two-equation approach to measuring the unexplained wage gap between male and female faculty. We estimated Model 2 for only the male faculty at the University of Maine, computed the predicted salary for each female faculty member using this model, and then calculated the difference between the average predicted salary as if male and the average actual salary for female faculty. If the difference was found to be dramatically different from what was obtained in the single-equation method, then the restrictions imposed by the single-equation method could be leading to incorrect estimates of the unexplained wage gap. Table 8 provides a comparison of the results from the single- and two-equation approaches:

Table 8. Comparison of Unexplained Wage Gaps at University of Maine by Method

	Total wage gap	Unexplained wage gap	Explained wage gap
Single-equation	0.196	0.020	0.176
Two-equation	0.196	0.026	0.170

Notes: Single-equation method data are from Table 7, Model 2. Both methods controlled for rank, tenure status, departmental affiliation, time at UM, highest degree, race, age, and time in rank.

Table 8 illustrates that the unexplained wage gap was not substantially affected by whether the single-equation or two-equation approach is used. Using the single-equation method, approximately 90% of the total wage gap between men and women (calculated by dividing the Explained Wage Gap by the Total Wage Gap and expressing as a percentage) was explained by factors that should legitimately affect salaries. Using the two-equation model, the proportion explained was slightly lower at 87%. Therefore the conclusions drawn from the single-equation method are appropriate for this study.

Conclusions

In this study, we investigated whether there was any evidence that faculty members, on average, face pay discrimination at the University of Maine based on gender. Considering all results together, we did not observe clear evidence of a significant unexplained wage gap between comparable male and female faculty at the University of Maine.

After controlling for the effects of rank, tenure status, departmental affiliation, experience, highest degree, time in rank, age, and race, the remaining (unexplained) wage gap between male and female faculty members at the University of Maine was approximately 2% and was not statistically different from zero at p-value = 0.05. When current rank and time in rank were not controlled for in the salary model, the unexplained wage gap by gender increased to 5.1% and became significant at p-value = 0.01. The unexplained wage gap was not substantially affected by whether a single-equation or two-equation approach was used.

Appendices

Selected Readings on Faculty Pay Discrimination

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Statement of Qualifications

Dr. Robert Toutkoushian is currently a Professor of Higher Education in the Institute of Higher Education at the University of Georgia. He teaches courses and conducts research on a wide range of issues pertaining to the economics of education and financial issues of postsecondary education. Prior to joining the faculty at the University of Georgia, he served as a Coordinator/Research Associate in the Management Information Division at the University of Minnesota (1990-1996), the Executive Director of the Office of Policy Analysis for the University System of New Hampshire (1996–2003), and Professor of Educational Leadership at Indiana University. He holds a PhD in economics from Indiana University, where he specialized in econometrics and finance.

During the past 20 years, Dr. Toutkoushian has developed a particular expertise in the area of faculty/staff compensation. At the University of Minnesota, he used alternative methods for measuring faculty salary inequities and examined how to measure the impact of faculty productivity on male/female salary differences in gender equity studies. Subsequently, he has conducted statistical studies of faculty gender equity using national data licensed through the National Center for Education Statistics. More recently he has completed gender-equity studies for faculty and/or professional staff for Washburn University, Villanova University, the University of Minnesota, the University of Cincinnati, the University of New Hampshire, and Dartmouth College. His work on faculty compensation and work-related issues has been published in *Research in Higher Education*, *The Review of Higher Education*, *Economics of Education Review*, *The Journal of Higher Education*, and *Quarterly Review of Economics and Finance*. He has served as a consultant and/or expert witness for both the plaintiffs and the defendants in salary-equity cases at the University of Cincinnati, the University of Minnesota, and Northern Arizona University.

Dr. Valerie Martin Conley is a Professor of Higher Education and Student Affairs and chair of the Counseling and Higher Education Department in The Gladys W. and David H. Patton College of Education at Ohio University. Dr. Conley has over 27 years of experience in education spanning private industry, education consulting, institutional research, and teaching at the college level. Her work has appeared in *The Journal of Higher Education*, *Planning for Higher Education*, *The NEA Almanac of Higher Education*, and the higher-education monograph series *New Directions*. Her research has been funded by the National Center for Education Statistics, TIAA-CREF, the Ohio Board of Regents, and the NSF. She has conducted dozens of workshops at professional conferences and has served as faculty for the AIR/NSF/NCES Summer Data Policy Institute and Foundations for the Practice of Institutional Research. Dr. Conley was also a member of the technical review panel for the National Study of Postsecondary Faculty from 1994 to 2004. She currently serves on the ACE/Sloan Faculty Retirement Transition External Advisory Committee, and she is a Research Fellow with the TIAA-CREF Institute. She is co-authoring *The American Faculty Reconsidered: An Update and Epilogue* with Drs. Jack Schuster (Claremont Graduate University) and Martin Finkelstein (Seton Hall University). Dr. Conley holds a PhD in Educational Leadership and Policy Studies from Virginia Tech.

Ms. Laura Risler is director of the Center for Higher Education at Ohio University. She has 22 years of experience in public service ranging from higher education to economic development and state-level administration. She holds a Master of Public Administration degree from the School of Public and Environmental Affairs at Indiana University, and she is currently a doctoral candidate in Higher Education at Ohio University.

Complete Regression Results

Expanded version of Table 7. Multiple Regression Results for Determinants of Salary for Faculty at the University of Maine, 2011-12

Variable	Model 1: Without rank	Model 2: With rank
(Constant)	10.699 (.065)**	11.049 (.052)**
Female	-0.051 (.018)**	-.020 (.013)
Rank--Instructor	--	-.196 (.057)**
Rank--Lecturer	--	-.219 (.035)**
Rank—Assistant Professor	--	-.174 (.020)**
Rank—Professor	--	.210 (.016)**
Tenure status OTH	--	-.094 (.058)
Tenure status NA	--	-.130 (.027)**
Small departments combined †	-.120 (.060)*	-.046 (.043)
Animal & Veterinary Sciences Dept.	-.033 (.072)	.037 (.053)
Art Dept.	.106 (.075)	-.031 (.054)
Anthropology Dept.	-.057 (.069)	-.068 (.049)
Maine Business School	.337 (.056)**	.390 (.040)**
Molecular & Biomedical Science Dept.	.017 (.067)	.020 (.048)
Civil & Environmental Engineering Dept.	.291 (.065)**	.265 (.047)**
Cooperative Extension Service	-.042 (.052)	-.099 (.069)
Chemistry Dept.	.073 (.063)	.079 (.045)

Variable	Model 1: Without rank	Model 2: With rank
Chemical & Biological Engineering Dept.	.359 (.064)**	.312 (.046)**
Communication & Journalism Dept.	-.037 (.069)	-.043 (.049)
Communication Sciences & Disorders	.045 (.083)	.081 (.059)
Electrical & Computer Engineering Dept.	.364 (.065)**	.306 (.047)**
Education & Human Development Dept.	-.077 (.050)	-.019 (.036)
English Dept.	-.095 (.056)	-.076 (.040)
Earth Sciences Dept.	.184 (.060)**	.104 (.043)*
School of Forest Resources	.030 (.056)	.016 (.040)
Food Science & Human Nutrition Dept.	.131 (.075)	.072 (.054)
History Dept.	-.075 (.060)	-.086 (.043)*
Music Dept.	-.045 (.067)	-.092 (.048)
Mechanical Engineering Dept.	.244 (.064)**	.193 (.046)**
Modern Languages & Classics Dept.	-.134 (.072)	-.112 (.052)*
New Media	.212 (.089)*	.146 (.064)*
School of Nursing	-.089 (.060)	-.004 (.043)
Philosophy Dept.	.036 (.089)	.018 (.063)
Political Science Dept.	-.019 (.075)	-.050 (.053)
Physics and Astronomy Dept.	.072 (.060)	.064 (.043)
Plant, Soil, & Environmental Sciences Dept.	.005 (.062)	-.012 (.046)
Psychology Dept.	.004 (.061)	-.032 (.044)

Variable	Model 1: Without rank	Model 2: With rank
School of Biology & Ecology	.084 (.054)	.067 (.039)
School of Computing and Information Sciences	.332 (.061)**	.292 (.043)**
School of Engineering Technology	.237 (.061)**	.113 (.044)*
School of Marine Sciences	.221 (.052)**	.149 (.037)**
School of Economics	.216 (.058)**	.173 (.041)**
School of Social Work	.261 (.075)**	.165 (.054)**
Sociology Dept.	.081 (.089)	-.010 (.064)
Wildlife Ecology Dept.	.103 (.083)	.045 (.060)
Time at University of Maine	.007 (.001)**	-.001 (.001)
Highest degree is below a PhD	-.227 (.024)**	-.034 (.021)
Race--nonwhite	.002 (.029)	-.007 (.020)
Age	.007 (.001)**	.002 (.001)
Time in rank	--	.000 (.000)**
R-squared	**.659**	**.830**

Notes: Standard errors are shown in parentheses. Coefficients represent the approximate percentage change in salary due to a one-unit change in each independent variable. Each model also includes dichotomous variables for departmental affiliation (reference category = math/statistics). Reference categories: Male, Associate Professor, tenure track, Math/Statistics Dept., Highest degree is a PhD, Race=White.

* coefficient is statistically significant at p = 0.05, ** coefficient is statistically significant at p = 0.01 (two-tailed tests).

† Includes the following departments, each with < 5 faculty: Advanced Structures and Composites Center, Climate Change Institute, Honors College, Intensive English Institute, Public Administration, Theater, and Water Research Institute.