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ABSTRACT

This report investigates six differences in promotions to administrative positions in elementary and secondary education and assesses the influence of affirmative action and equal employment opportunity enforcement. Conclusions are based on longitudinal data from Oregon and New York for thousands of individual educators employed during the 1970's and on data gathered from discrimination complaints. The study focuses on whether apparent discrimination exists in the promotion structures for men and women in public education and whether federal and state equal employment opportunity and affirmative action policies have reduced apparent discrimination. The major finding is that significant apparent discrimination present in the early 1970's declined by more than half by the late 1970's and that equal employment opportunity enforcement contributed to the decline. Interpretations of the New York results are less conclusive than for Oregon because only federal Title IX enforcement was implemented in New York, thereby reducing the availability of complementary evidence in comparison to Oregon. Section 1 of the study sets out a model of promotions based on human capital theory, briefly discusses methods of measuring discrimination, and offers a framework for analyzing the influence of equal employment opportunity and affirmative action policies. Section 2 presents and evaluates the empirical results for the two states. Section 3 summarizes the major conclusions. (CJH)

SEX DIFFERENCES IN PROMOTIONS: EEO AT WORK IN PUBLIC EDUCATION

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Abstract

Unlike previous investigations of employment-related discrimination, which deal almost exclusively with issues of compensation or occupation segregation, this paper examines discrimination in promotions. Specifically, the paper investigates sex differences in promotions to administrative positions in elementary and secondary public education and assesses the influence of affirmative action and equal employment opportunity enforcement. Based upon longitudinal data for thousands of individual educators, discrimination complaints, and other related evidence for the states of Oregon and New York, we conclude that significant apparent discrimination present in the early 1970s declined by more than half by the late 1970s and that equal employment opportunity enforcement contributed to the decline.

SEX DIFFERENCES IN PROMOTIONS: EEO AT WORK IN PUBLIC EDUCATION

INTRODUCTION

Previous investigations of sex differences in employment have concentrated almost exclusively on issues of compensation or occupation segregation. Despite the fact that differential rates of promotion are a primary determinant of within-occupation variations in earnings, discrimination in promotions has received little attention. Moreover, existing studies of promotions are limited largely to the analysis of aggregate data or poorly controlled case episodes. The explanation for this pattern of research is simple: promotions are "low incidence" events that are intrinsically longitudinal, requiring longitudinal data for large numbers of individual employees.

Nowhere are sex differences in promotion patterns as stark as in elementary and secondary education, where women constitute a substantial majority of teachers and men comprise an even larger majority of school administrators. Because the states of Oregon and New York maintain longitudinal data for individual educators, we are able to overcome some of the previous obstacles to investigations of promotions. The data for each state provide employment information for tens of thousands of individual educators employed during the 1970s, enabling us to follow individual employment patterns from year to year and district to district. In this way we are able to examine sex differences in promotions to administrative positions, as well as the possible influence of equal employment opportunity (EEO) legislation implemented during the 1970s. Documentation for the influence of such policies is weak in general, but particularly so for

administrative promotions in public education.[1]

In this paper, section I sets out a simple model of promotions based on human capital theory, briefly discusses methods of measuring discrimination, and offers a framework for analyzing the influence of EEO and affirmative action policies. Section II presents and evaluates the empirical results for the two states. A final section summarizes our major conclusions.

THEORETICAL FRAMEWORK

Our analysis of promotions to administrative positions follows the traditional human capital approach to the measurement of wage discrimination (e.g., Malkiel and Malkiel 1973; Mincer and Polacheck 1974; Oaxaca 1973a, 1973b; Polachek 1975; and Antos and Rosen 1975, all of whom apply hedonic labor market analysis to the issue of wage discrimination in public education). The probability than an individual teacher will be promoted is the product of (1) the probability of applying for promotion and (2) the conditional probability of being selected for promotion from the pool of applicants. Since data on individual applications are not available, however, the two probabilities cannot be estimated separately. Even if application data were available, one might not be able to separate the two probabilities since the probability of applying is itself a function of the

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[1] The general evidence on EEO effects is surveyed in Brown (1981) and Blau (forthcoming). Haven, et al (1980) provide a general survey of sex discrimination in promotions to administrative positions in public education, and Williams (1981) provides a detailed analysis of this issue for Oregon.

probability of being selected. Thus, we specify a reduced-form promotion equation based upon observed determinants of the two probabilities. Because of the problem of identifying structural effects from our reduced-form equation, we rely upon ancillary information to determine the extent to which changes in the reduced-form structure reflect changes in the application structure versus changes in the actual selection structure.

Both the probability of exceeding minimum qualification requirements for a higher position and the probability of exceeding the qualifications of other applicants are directly related to an individual's particular qualifications. Therefore, we specify the reduced-form probability of being promoted to an administrative position as a function of individual characteristics relevant to administrative work in education (e.g., experience and education), as well as variables related to administrative aspirations and the probability of applying (e.g., extra-duty administrative assignments).

This promotion model is estimated using the multivariate logit technique since the dependent variable is qualitative. The probability that an individual teacher j is promoted to an administrative position between one period and a subsequent period is assumed to be expressed by

$$P(ADMIN) = e^{bX}/(1 + e^{bX})$$

where P(ADMIN) is the probability of promotion to an 'ministrative position,

b is a vector of coefficients, and X is a corresponding vector of explanatory variables.[2]

Measuring Discrimination

The standard approach to measuring wage discrimination (e.g., Polachek 1975) requires separate coefficient estimates for males and females and asks the question, "How much would the sex differential in wages narrow if women were subject to the male wage structure, but the work-related characteristics of women remained as they are?" The answer is obtained by multiplying the male coefficients by the mean values of the explanatory variables for females, summing the products, and subtracting the actual (log) mean wage for women. This gap is a measure of apparent discrimination. Strictly speaking, however, the gap is the residual effect of all omitted variables, e.g., unmeasured human capital, individual aspirations, and institutional features, as well as discrimination.

Alternatively, one can ask the question, "How much would the sex differential in wages narrow if men were subject to the female wage structure, but the characteristics of men remained as they are?" The answer to this question is obtained by multiplying the female coefficients by the mean values of the explanatory variables for males, summing the products, and subtracting this sum from the actual (log) mean wage for men. This gap is also a measure of apparent discrimination. As with any index number problem, the two measures need not be consistent.

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[2]See Nerlove and Press (1973) for a more detailed discussion of logistic models.

For application to promotion discrimination, we modify this procedure in two ways. First we use the individual values of the explanatory variables rather than the mean values. That is, the predicted promotion rate is calculated as the average of the individually predicted promotion rates. This is necessitated by the highly nonlinear nature of the logistic function underlying the logit estimation procedure (e.g., the logarithm of the mean is not the mean of the logarithms). Second, since so few women are promoted, the dominant promotion structure is clearly the male one. Hence, we rely only upon the male promotion structure to measure levels and changes in apparent discrimination.

Public Policy Influence

By calculating and comparing indexes of apparent discrimination for periods during the 1970s, we seek not only to gauge the degree to which the observed difference in promotion rates for males and females can be explained by differences in individual characteristics, but also to test whether the gap left unexplained has been affected by EEO and affirmative action efforts implemented during the period. Our method of testing the possible influence of such efforts is necessarily implicit: we estimate promotion structures before and after the initiation of enforcement efforts and assess the degree to which observed changes might be attributable to such efforts. If other factors that influence sex differences in promotions during the period are assumed to change slowly, sharp changes in sex differences in promotions can be tentatively attributed to policy intervention. However, we do rely upon auxiliary evidence (such as discrimination complaints, administrative certifications and applications for promotion) in apportioning any observed changes between the influence of policy intervention and other factors.

The major EEO enforcement effort we consider is the federal Title IX amendment passed in 1972 and related enforcement guidelines issues in 1975 which apply to educational institutions. A relevant portion of the enforcement guidelines reads as follows:

> (A) General. (1) No person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination in employment, or recruitment, consideration, or selection therefore, whether full-time or part-time, under any education program or activity operated by a recipient which received or benefits from Federal financial assistance.
>
> (2) A recipient shall make all employment decisions in any education program or activity operated by such recipient in a nondiscriminatory manner and shall not limit, segregate, or classify applicants or employees in any way which would adversely affect any applicant's or employee's employment opportunities or status because of sex (Barrer 1976, p. 376).

We focus on Title IX rather than the more generally applied Title VII because the enforcement provisions of Title IX are both more extensive and more severe than those under Title VII, including suspension of federal funds.[3] Because Title VII was already in place during the periods we examine, our estimates will reflect the incremental affect of Title IX and state statutes.

In Oregon the federal Title IX regulations are complemented by similar requirements by the Oregon State Board of Education. Oregon

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[3]The 1977 decision of Romeo Community Schools vs. HEW, 438 F. Supp. 1021 (E.D. Mich, 1977) by a federal district court largely invalidated Title IX for employment issues in that district, but most states (including Oregon and New York) remain subject to the full effect of Title IX and related enforcement guidelines.

Oregon Administrative Rule (O.A.R.) 581-22-241 adopted in early 1976 requires that

(1) Each local district shall maintain personnel policies including, but not confined to, the following:
   (a) an affirmative action plan assuring equal employment opportunity;
   (b) position descriptions, j- requirements, and evaluation procedures for all personnel; and
   (c) a liaison system between the local board and its employees.

(2) Personnel policies shall be provided to all school employees and made available to the public.

Violation of these rules can result in the withdrawal of all state basic school support funds by the Oregon Department of Education.[4]

In New York there is no equivalent to O.A.R. 581-22-241, although there are statements of similar policies by the State Board of Regents. Thus, while New York is fully subject to the provisions of federal Title IX and its enforcement guidelines, there is no state-level enforcement involving possible suspension of state funds. Thus, comparison of Oregon and New York provides an opportunity to distinguish the relative effectiveness of the federal versus state-level measures.

Since federal enforcement of Title IX began essentially in 1975 for both Oregon and New York and enforcement of O.A.R. 581-22-241 began in early 1976 for Oregon, we can partition the 1970s into the pre-enforcement period prior to the 1975-76 school year and the enforcement period subsequent to that year.

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[4] O.A.R. 581-22-241 was replaced in 1980 by O.A.R. 581-22-715, which has similar language (Williams 1981, p. 45).

EMPIRICAL RESULTS

In this section we present and evaluate empirical results for both Oregon and New York. For a number of reasons, we view the empirical analysis for Oregon as our primary evidence, and that for New York as secondary. First, the New York data cannot be partitioned into pre- and post-enforcement periods that coincide exactly with the implementation of federal and state enforcement efforts, whereas the Oregon data can be partitioned on that basis. Second, the two periods for New York are not of equal length; one period consists simply of two adjacent years. Third, the empirical specification we are able to estimate for New York is less complete than the specification for Oregon, as discussed below. Finally, the amount of complementary evidence (e.g., discrimination complaints) is more limited for New York than for Oregon. Nevertheless, the New York results do provide evidence that enhances the interpretation of the Oregon results and that suggests the generality of the conclusions.

Oregon

The empirical analysis for Oregon is based upon data from the Annual Report on Certificated Personnel maintained by the Oregon Department of Education. This is an annual census of all certified elementary and secondary teaching and administrative personnel in the state of Oregon, as of October 1 of each school year. By compiling these data by year and matching yearly records for the same educator, we are able to observe employed educators from year to year within Oregon, including those who have moved from one district to another. Complete data are available for the school years 1971-72 through 1978-79 for about 31-32,000 educators each year. Since we have a longitudinal census of employees, we are able to estimate detailed

promotion structures. In the absence of such data, previous studies have been unable to estimate such detailed structures.

To examine the possible effects of the enforcement of Title IX and related state guidelines, we divide the full period into equal subperiods, 1971-72 to 1974-75 and 1975-76 to 1978-79. This division corresponds to the implementation of enforcement guidelines for Title IX in mid-1975 and the adoption of O.A.R. 581-22-241 in early 1976. In each three-year period, we begin with all teachers who are not administrators at the beginning of the period but who are employed full-time at both the beginning and end of the period. Thus, we are able to observe all promotions of teachers to administrative positions from the pool of non-administrative educational personnel. We are also able to compare sex differences in promotions after 1975-76 to sex differences in promotions before that year, offering a tentative appraisal of the effectiveness of the two governmental policies.

Differences in promotion behavior between these two periods, however, cannot be attributed entirely to these policies. Undoubtedly, other factors, such as changes in applications due to a rise in professional aspirations among women, may also be important. Hence, we rely on additional evidence about discrimination complaints, administrative certifications, and applications for promotion in attributing any changes in relative promotion rates for males and females to public policy intervention.

Table 1 presents the definitions and sample means by sex for the dependent variable (ADMIN) and the explanatory variables. All variables refer to the beginning of the period unless otherwise indicated. ADMIN includes superintendents, assistant superintendents, principals, vice-principals, directors, consultants, and administrative specialists, with the largest proportion accounted for by the principal and vice-principal

categories. Total teaching experience is decomposed into experience outside the district (EXOD) and experience inside the district (EXID) to allow for possibly varying effects. A third experience variable (DROP) indicates whether the educator dropped out of teaching for more than one year during the period.[5]

The education variables measure the extent of graduate work on a linear scale from one to three (EDUC) and any change in educational attainment during the period (EDOT). The teaching level variable (SEC) accounts for possible differences between the secondary and elementary levels due to demand or supply factors, and the assignment variable (OTHER) accounts for differences between regular classroom teachers and other educational personnel (e.g., counselors, librarians, speech therapists, etc.). Finally, a variable for extra pay assignments (EXTRA) is included to account for administrative aspirations, as well as for possible experience effects of the assignments.[6]

Maximum-likelihood estimates of the logistic empirical specification of the determinants of promotions to administrative positions are presented in Table 2 for both the 1971-72 to 1974-75 and 1975-76 to 1978-79 periods.

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[5] One year was allowed because the experience variable (from which DROP is computed) is often subject to an error of one year, depending on whether the current year is included in total experience.

[6] Information regarding race is not available in the Oregon data. This is not a severe problem, however, since the black population is an extremely small percentage of the total population in Oregon and is largely concentrated in Multnomah County. The results reported here are essentially invariant to the inclusion of a dummy variable for this county.

Table 1 Variable Definitions and Sample Means for Oregon

Variable	Definition	1971-72/1974-75		1975-76/1978-79	
		Male	Female	Male	Female
ADMIN	One if an administrator by end of period, zero otherwise.	.040	.010	.036	.013
EXOD	Years teaching experience outside district.	2.346	2.569	2.0062	2.021
EXID	Years teaching experience inside district.	6.553	7.019	7.891	7.374
DROP	One if out of teaching more than one year during period, 0 otherwise.	.102	.099	.070	.097
EDUC	Equal to one for work beyond bachelors; two for masters; three for Ph.D.	1.212	.689	1.314	.894
EDOT	One if EDUC changed during period, zero otherwise.	.167	.181	.215	.318
SEC	One if at secondary level, zero otherwise.	.628	.253	.610	.277
OTHER	One if not regular classroom teacher, zero otherwise.	.065	.075	.072	.091
EXTRA	One if performing work for extra pay, zero otherwise.	.514	.152	.589	.247

Notes: Unless otherwise indicated, variables refer to the beginning of each period. Elementary school teachers are the omitted group for SEC. The data source is described in the text.

The asymptotic t-statistic is in parenthesis below each coefficient. In addition, the difference between the male and female coefficients (and corresponding t-statistic) is listed alongside the estimates for each period.

The coefficients for experience outside the district (EXOD) are all positive, but are significant (.05 level) only for females in the later period. The coefficients for experience inside the district (EXID) are generally negative, significantly so for the later period. This suggests that variations in teaching experience within the range observed are either irrelevant to promotion or simply reflect a "selection" effect, where those who remain in teaching the longest are least likely to become administrators. The education variables (EDUC and EDOT) are significantly positive in both periods (.05 level), and the female coefficients do not differ significantly from the male coefficients. The teaching level variable (SEC) is negative and significant for males in the early period and positive and significant for females in the later period. Only in the later period is the difference in the male and female coefficients significant. The significantly positive coefficient in the later period for females may be due to a catch-up effect at the secondary level, since female promotions at this level have averaged at only about four percent of the total. Alternatively, it may indicate that females at the secondary level became the most interested in pursuing administrative careers. Educators who are not regular classroom teachers (OTHER) are significantly less likely to become administrators in both periods, and the difference in the male and female coefficients is insignificant in both periods. Work for extra pay (EXTRA) is positively and significantly related to the probability of becoming an administrator in both periods for males, but only in the later period for females. However, there

Table 2 Logit Estimates of Promotions for Oregon
(t-statistics in parenthesis)

Independent Variables	1971-72 to 1974-75			1975-76 to 1978-79		
	Males	Females	Difference	Males	Females	Difference
Intercept	-4.163	-5.385	1.222	-5.835	-6.548	.713
	(-19.20)	(-20.80)	(3.62)	(-19.32)	(-16.05)	(1.41)
EXOD	.005	.012	-.007	.023	.060	-.037
	(.31)	(.54)	(-.26)	(1.54)	(3.14)	(-1.50)
EXID	-.019	.011	-.030	-.038	-.058	.020
	(-1.69)	(.68)	(-1.53)	(-3.29)	(-2.98)	(.88)
DROP	-.336	.264	-.600	-.123	.076	-.199
	(-1.51)	(.80)	(-1.50)	(-.53)	(.26)	(-.03)
EDUC	.801	.847	-.046	1.404	1.355	.049
	(7.63)	(6.21)	(-.27)	(10.08)	(6.84)	(.21)
EDOT	1.046	.353	.693	1.620	1.002	.608
	(5.07)	(1.03)	(1.73)	(6.82)	(2.65)	(1.38)
SEC	-.277	-.240	-.037	.024	1.102	-1.078
	(-2.26)	(-.94)	(-.13)	(.19)	(5.45)	(-4.50)
OTHER	-6.403	-5.478	-.926	-6.591	-7.067	.476
	(-2.21)	(-1.90)	(-.23)	(-2.33)	(-1.87)	(.10)
EXTRA	.204	-.231	-.028	.687	.408	.279
	(1.70)	(-.70)	(-1.23)	(5.06)	(2.05)	(1.16)
F-value	8.58	6.16		18.63	18.21	
Observations	7643	9081		8309	9473	

Notes: Coefficients are maximum-likelihood estimates of a logistic function obtained using the PREDICT procedure in the Statistical Analysis System (SAS). See Table 1 for variable definitions and sample means and the text for a description of the data. The t-statistics for differences in the male and female coefficients are based on a zero covariance between the coefficients.

is no statistical difference in the male and female coefficients in either period.[7]

To summarize, in the early period, only the intercept is statistically different for males and females; and in the later period, none of the coefficients differ significantly for males and females except for SEC, which turns to the advantage of females. Thus, the logit results are consistent with a significant reduction in apparent discrimination between the two periods. To measure the change more formally we use the procedure outlined earlier. First, we calculate the individual promotion probabilities for females based upon the male promotion structure. The average of these probabilities predicts the promotion rate for women one would observe if they faced the male promotion structure, but retained the same individual characteristics. Using this approach, apparent discrimination (the gap between the predicted and actual female promotion rates) is .019 (179 percent of the actual female promotion rate) in the early period, and only .00783 (62 percent of the actual female promotion rate) in the later period. This implies that apparent discrimination in Oregon declined by about 65 percent,

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[7] These results are not sensitive to a number of alternative specifications, e.g., the introduction of quadratic terms for experience and education or an interaction term for the two experience variables. In addition, similar results are obtained when considering promotions only to positions requiring formal administrative certification, e.g., vice-principal and principal. Unfortunately, information regarding administrative certification is not available in the Oregon data.

measured as a fraction of the actual female promotion rates.[8]

Although we are unable to perform a formal test for whether this dramatic change is attributable primarily to EEO efforts (i.e., Title IX and O.A.R. 581-22-241), the change is both significant and sharp. During the same period the proportion of female teachers seeking administrative certification and applying for certified administrative positions increased, but did not jump sharply (Stockard 1980, pp. 40-48). Therefore, the sharp change in female promotions appears to reflect changes in selections rather than applications. Moreover, if the diminution of apparent discrimination

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[8] The discrimination index for year i equals

$$\frac{e^{(b_i^m X_i^f)}}{[1 + e^{(b_i^m X_i^f)}]} - \frac{e^{(b_i^f X_i^f)}}{[1 + e^{(b_i^f X_i^f)}]}$$

Part of the estimated decline in apparent discrimination may be due to a narrowing of the difference between male and female characteristics from the first period to the second. Since our discrimination index is based only on female characteristics, the index one would find if female characteristics had not changed can be computed by subtracting from the relevant exponents above the difference in female characteristics between the two periods (weighted by the appropriate male or female coefficients). In this manner the discrimination index that would occur if female characteristics remained the same becomes:

$$\frac{e^{(b_2^m X_2^f) - b_2^m (X_2^f - X_1^f)}}{[1 + e^{(b_2^m X_2^f) - b_2^m (X_2^f - X_1^f)}]} - \frac{e^{(b_2^f X_2^f) - b_2^f (X_2^f - X_1^f)}}{[1 + e^{(b_2^f X_2^f) - b_2^f (X_2^f - X_1^f)}]}$$

This adjusted index for Oregon for the second period is computed to be .0020, smaller than the unadjusted index of .00783. Thus, the apparent decline in discrimination over the two periods is more pronounced when the index is adjusted for differences in female characteristics. A similar conclusion is reached if the first period male and female coefficients are used to weight the changes in female characteristics.

were due simply to an increase in female applicants and not a true reduction in discrimination, the number of discrimination complaints should have increased. Instead, complaints dropped sharply. The average number of individual complaints from school districts filed with the Oregon Bureau of Labor and Industries was 21 per year in the 3 years prior to 1975, rose to 46 in 1976-77, declined to 16 in 1978, and declined further to only 9 in 1980 (Williams 1981, p. 53). Combined with the evidence in Table 2, this pattern indicates that complaints were low prior to O.A.R. 581-22-241 and the enforcement of Title IX, rose substantially in the period of implementation, and declined sharply thereafter, presumably due to the diminution of discrimination. We conclude that EEO legislation and enforcement appears to have significantly reduced apparent sex discrimination in Oregon.[9] We are unable at this point, however, to determine the relative importance of Title IX versus O.A.R. 581-22-241.

New York

The empirical analysis for New York is based upon data obtained from the New York State Department of Education for the school years 1972-73, 1976-77, and 1977-78. As with the Oregon data, by matching yearly records for the same educator, we are able to observe employed educators in each year

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[9] The period we examine also coincides with the dramatic expansion of teacher unionism. However, no direct effects of unionism on promotions are apparent. Administrators are almost never members of a bargaining unit, promotions are outside the bounds of mandatory bargaining, and there are virtually no purely sex-related differences in teacher compensation.

even if they move from one district to another.[10] To examine the issue of structural change, we divide the data into the two periods, 1972-73 to 1976-77 and 1976-77 to 1977-78. In each period we begin with all those teachers who are not administrators at the beginning of the period, but who are employed full-time at both the beginning and end of the period.

Unfortunately, these data and sample periods for New York pose at least three difficulties. First, the break in the two periods comes one year too late to coincide with the implementation of Title IX enforcement efforts. Thus, the pre-enforcement period for New York contains three years of pre-enforcement promotions and one year of post-enforcement promotions. The severity of this problem depends upon how quickly enforcement became effective. The problem disappears, for example, if the enforcement took at least a year to have significant effects. With no information on the timing of the effects, however, we suspect that any structural change due to EEO enforcement will be less distinct for New York than for Oregon. Second, the post-enforcement period contains only two adjacent years. This not only reduces substantially the number of observed promotions, but also confounds the use of DROP and EDOT. DROP is necessarily zero, and EDOT has insufficient variation to be included.[11] Finally, it is not possible in

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[10] To reduce the observations to a tractable number for logit estimation, a one-in-four random sample was drawn from the population. In addition, New York City data are excluded from the analysis to avoid possible structural differences.

[11] None of the female teachers promoted in the adjacent school years 1976-77 and 1977-78 had a concurrent change in education. In this case, the logit model including EDOT cannot be estimated. The same problem arises if the education level variable (EDUC) is entered as separate variables for each level, and we are forced to use the single variable (EDUC) and then check for nonlinearity with a quadratic term.

the New York data to calculate a variable for extra pay assignments (EXTRA) or for not being a regular classroom teacher (OTHER).

The definitions and means of the dependent and explanatory variables for New York are displayed in Table 3, and maximum-likelihood estimates of the logistic promotion model are presented in Table 4.

The results yield a large number of statistically significant coefficients at the .05 confidence level, considerably more than for Oregon. The larger proportion of statistically significant coefficients for both sexes and both time periods is evidence of the more formalized promotion criteria adopted in New York. To receive administrative certification and be eligible for promotion, teachers in New York were required to meet certain minimum experience and education requirements, as well as spend the full-time equivalent of six months in a recognized administrative internship program. These requirements help to account for the positive and significant estimates for experience and DROP, since similar requirements related to these variables were not in place in Oregon. This point is also supported by a positive coefficient for an interaction between DROP and EDOT in the early period (not presented here). The fact that teaching experience is more important in New York than Oregon may also be due to the differences in average district and school size in the two states. Average district size, for example, is about 3,000 students in New York, but only about 1,500 students in Oregon. If additional experience (or age) is more important for larger districts, then one would expect experience to be more important in New York. The negative coefficient for the secondary level assignment variable reflects the proportionately fewer administrative openings at the secondary level during both periods.

Although the signs of the statistically significant coefficients are

Table 3 Variables and Sample Means for New York

Variables	1972-73 to 1976-77		1976-77 to 1977-78	
	Males	Females	Males	Females
ADMIN	.031	.008	.010	.003
EXOD	2.980	3.160	3.086	3.286
EXID	8.496	8.219	12.276	12.009
DROP	.018	.035	0.000*	0.000*
EDUC	1.315	.992	1.597	1.379
EDOT	.221	.266	.055*	.066*
SEC	.686	.323	.679	.322

*Not included due to insufficient variation.

Notes: See Table 1 for a definition of the variables and the text for a description of the data.

Table 4 Logit Estimates of Promotions for New York
(t-statistics in parenthesis)

Independent Variables	1972-73 to 1976-77			1976-77 to 1977-78		
	Males	Females	Difference	Males	Females	Difference
Intercept	-4.717	-7.022	2.305	-6.471	-7.292	.821
	(-19.61)	(-19.15)	(5.26)	(-11.85)	(-12.57)	(1.029)
EXOD	.058	.046	.011	.075	.069	.007
	(4.35)	(2.09)	(.43)	(3.47)	(2.14)	(.18)
EXID	.034	.053	-.019	-.008	.040	-.048
	(3.46)	(3.84)	(-1.12)	(-.42)	(1.72)	(-1.59)
DROP	.737	.106	.631	*	*	*
	(7.59)	(.23)	(1.34)			
EDUC	.841	1.133	-.292	1.237	.633	.604
	(2.57)	(6.69)	(-.79)	(5.01)	(2.57)	(1.67)
EDOT	.486	1.270	-.784	*	*	*
	(2.28)	(3.93)	(-2.03)			
SEC	-1.205	-.76	-.444	-1.514	-1.279	.235
	(-10.56)	(-3.25)	(-1.70)	(-6.51)	(-2.70)	(.45)
F-value	41.56	15.68		23.32	4.86	
Observations	10858	13401		10517	13288	

*Not estimated due to insufficient variation; see text.

Notes: Coefficients are maximum-likelihood estimates of a logistic function obtained using the PREDICT procedure of the Statistical Analysis System (SAS). See Table 3 for sample means, Table ' for variable definitions, and the text for a description of the data. The t-statistics for the differences between male and female coefficients are based on a zero covariance between the coefficients.

generally consistent for both sexes and both time periods, we find statistically significant differences between males and females in the magnitudes of the coefficients for two variables: the intercept and EDOT. As with Oregon, the intercept differs significantly (.05 level) for males and females in the early period (with an advantage for females), but not in the later period. Similarly, the coefficient for EDOT is significantly different for males and females in the early period, but the variable EDOT lacks sufficient variation for estimating the respective coefficients in the later period. When we apply the index procedure for evaluating discrimination, as outlined above, apparent discrimination in New York declined by about 52 percent (compared to 65 percent for Oregon), measured as a fraction of the actual female promotion rates. Thus, the incremental effect of the state statute in Oregon does not appear large. This conclusion may be mitigated by the fact that in New York we consider only a one-year interval two years after initiation of Title IX enforcement, whereas in Oregon we consider a three-year interval coinciding exactly with enforcement of Title IX and the Oregon statute. If compliance with EEO guidelines was initially sluggish, this difference in the observed post-enforcement periods may mask a somewhat larger true effect for a state statute.

We are cautious, however, in fully attributing the change in female promotions in New York to EEO and affirmative action due to increases in certifications of females for administrative positions. If these increases were accompanied by proportionate increases in female applications for administrative positions, one could expect the rate of female promotions to increase, even with no weakening of discrimination. Without the additional information that was available for Oregon (especially evidence on discrimination complaints), it is not clear if female promotions decreased

due to an increase in female certifications and applications, or if the female certifications and applications increased due to a perceived diminution of discrimination.

CONCLUSION

We have addressed two issues in this paper: (1) Is there apparent discrimination in the promotion structures for men and women in public education? and (2) Have federal and state equal employment opportunity and affirmative action policies reduced any apparent discrimination? Our primary evidence based on Oregon data indicates that in the early 1970s female teachers were significantly less likely to be promoted than similarly qualified male teachers, but by the late 1970s the difference was no longer significant. In addition, index measures of apparent discrimination declined by more than half during the same period. The fact that this sharp change coincided with the enforcement of federal Title IX and a similar state statute, combined with ancillary evidence on administrative certifications and discrimination complaints, suggests that (one or both) measures influenced the decline in discrimination.

For New York, where only Title IX enforcement was implemented, similar trends in apparent discrimination are found. Therefore, the incremental effect of a state statute does not appear large. However, interpretations of the New York results are less conclusive than for Oregon, due in part to the lack of complementary evidence similar to that available for Oregon. Hence, the conclusion that apparent discrimination declined significantly during the 1970s and that EEO enforcement influenced the decline can be made confidently for Oregon, but only tentatively for New York.

The decline in apparent discrimination in female promotions in Oregon from the first period measured (1971-72 to 1974-75) to the second period (1975-76 to 1978-79) is calculated to be 65 percent, a significant change. In real terms, such a change translates to approximately 50 to 60 more women promoted to administrative positions during the later period. It is interesting that the sharp decline in apparent discrimination was not accompanied by a dramatic increase in the proportion of female teachers seeking administrative positions. This supports the assumption that the decline in apparent discrimination resulted from strong EEO efforts. As additional support for this hypothesis, discrimination complaints dropped sharply during the same period of time. From this evidence it can be inferred that EEO legislation and enforcement reduced sex discrimination in Oregon. These results of the 1970s are a noteworthy achievement and indicate that the legislation and enforcement efforts are worthy of continued and vigorous support.

References

Antos, J. and S. Rosen, "Discrimination in the Market for Public School Teachers," Journal of Econometrics (May 1975).

Barrer, M., ed., Journal of Reprints of Documents Affecting Women, Washington, D.C.: Today Publications and News Service (1976).

Blau, Francine, "Discrimination Against Women: Theory and Evidence," in William A. Harity, ed., Labor Economics: Modern Views, Boston: Martinus Nijhoff (forthcoming).

Brown, C., "The Federal Attack on Labor Market Discrimination: The Mouse that Roared?" in R. Ehrenberg, ed., Research in Labor Economics, Vol. 5, New York: JAI Press (1982).

Haven, E., P. Adkinson and M. Bagley, "Women in Educational Administration: The Principalship," mimeo, National Institute of Education Contract No. 400-79-0698 (December 1980).

Malkiel and Malkiel, "Male-Female Pay Differentials in Professional Employment," The American Economic Review (September 1973).

Mincer, J. and S. Polachek, "Family Investments in Human Capital: Earnings of Women," Journal of Political Economy (March/April 1974).

Nerlove, M. and S. Press, "Univariate and Multivariate Log-linear and Logistic Models," R-1306-EDA/NIH, Santa Monica: Rand Corporation (1973).

New York State Department of Education Technical Report, "Women Administrators in New York State Public Schools, 1968-1980," Information Center on Education, Albany, New York (May 1981).

Oaxaca, R., "Male-Female Wage Differentials in urban Labor Markets," International Economic Review (October 1973a).

_____, "Sex Discrimination in Wages," in Discrimination in Labor Markets, O. Ashenfelter and A. Rees, eds., Princeton: Princeton University Press (1973b).

Polachek, S., "Potential Biases in Measuring Male-Female Discrimination," Journal of Human Resources (Spring 1975).

Williams, P., The Impact of Anti-Sex Discrimination Laws on the Employment of Oregon School Principals, unpublished Ph.D. dissertation, University of Oregon (1981).