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ABSTRACT

Using wage regression equations, this paper examines the wage determination process for educators at the elementary and secondary levels in Oregon. The propositions tested include whether educators are responsive to wage differentials between their teaching jobs and alternative occupations, as well as within the educator labor market, and whether these wage differentials tend to be eroded over time. The researchers conclude that educators are at least as responsive to wage differentials as other workers, but are not as responsive to differentials in teaching jobs as to those between teaching and other occupations. Wage differentials are generally found to erode over time; however, positive wage differentials tend to be liquidated more readily than negative differentials. This is especially true when the labor market is characterized by an excess supply of teachers. (Author/WD)

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MOBILITY AND WAGE EQUILIBRATION IN THE EDUCATOR LABOR MARKET

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"Frustrated teachers stew over working conditions, but most don't quit."
-- Wall Street Journal (10/14/1980), p. 1.

The belief that educators are not responsive to wage differentials between teaching and other occupations or to differentials between districts within teaching is widespread.[1] This belief, combined with rigid wage structures within districts, leads to the related perception that wages for teachers are also unresponsive to these wage differentials, hence that existing differentials tend not to be eroded over time.

This paper examines the wage determination process for educators and tests four specific propositions. First, we test the degree to which educators are responsive to wage differentials between their teaching jobs and alternative occupations in deciding whether to leave teaching for other employment. Second, we test whether these market wage differentials are significant factors in determining individual patterns of wage change, i.e., whether the differentials tend to be eroded over time. Third, we address the narrower issue of whether educators are responsive to wage differentials within the educator labor market in deciding whether to leave one school district for employment in another. Thus, we can compare the relative sensitivity of educators to market wage differentials at large (proposition two) versus wage differentials solely among educators. Finally, we test whether the educator wage differentials are a significant determinant of individual patterns of wage change from one school year to the next, i.e., whether these existing wage differentials also tend to be eroded over time. In all four tests, we deal exclusively with non-administrative instructional personnel for kindergarten through the twelfth grade.

The paper is organized as follows. In section I we present estimates for the determinants of wages in the labor market at large and examine occupational

mobility and wage change for educators in the context of the labor market at large (propositions one and two). In section II we present estimates for the determinants of wages for educators and examine interdistrict mobility and wage change solely within the educator labor market (propositions three and four). In the final section, we briefly summarize the major conclusions.

I. Market Wage Differentials, Occupational Mobility, and Wage Change.

The empirical analysis in this section is based upon the monthly Current Population Survey (CPS) taken by the United States Bureau of the Census. The CPS is a stratified random sample containing about 56,000 households. In the past, the May survey has contained information on the wages and other related employment characteristics of household members. Because the CPS also has some limited longitudinal, or panel, properties, it is possible to match some respondents in May surveys a year apart. This property enables us to estimate wage change equations based upon those teachers employed in adjacent years. The years 1974 and 1977 are used for the wage level regressions, and the years 1974-75 and 1977-78 for the occupational mobility and wage change analysis. Unfortunately, job-specific information for educators is limited to occupation (grade range taught) and geographic location (state/region, large metropolitan city).

Market wage differentials.

To obtain market wage differentials (i.e., the logarithmic difference between an educator's wage in teaching and the wage (s)he could expect in the labor market at large), we estimate a standard cross-section wage equation of the form

$$LnW = X\beta + \varepsilon \qquad (1)$$

where LnW is the natural logarithm of the individual's wage; X is a vector of personal and geographic characteristics, β is a corresponding vector of coefficients, and ε is the error term. (See for example Hanoch [1967] and Mincer [1974].) Table 1 presents estimates of eq. (1) for nonagricultural wage and salary workers for the years 1974 and 1977. Variable names, definitions, and means are also presented. Twenty-six binary state/region variables are included in the regressions, but omitted from the table for brevity. The results are entirely as expected given previous research using CPS data -- wages are lower for nonwhite and female workers, higher for workers in large cities and union members, and increase with education and (at a decreasing rate) with experience. The experience variables are interacted with the binary variable for female workers for two reasons: (1) years of experience (EXP) is proxied by age minus education minus six, a more accurate proxy for men than women; and (2) the true coefficients may also differ (i.e., women are typically found to have different wage-experience profiles). The results for FEXP and FEXPSQ support these two factors jointly, but cannot distinguish them.

If we assume that on average market differentials are zero, the wage predicted by the regression estimates of eq. (1) is an individual worker's potential (or expected) wage in the labor market at large. Hence, the residual (i.e., the logarithmic difference between the actual and predicted wage) from the regression equations in Table 1 can be viewed as the worker's market differential (DIFF). Since we have embedded race, sex, union, and regional wage differentials in DIFF, our analysis assumes that these differentials are approximately the same over one year intervals. DIFF contains a number of potential components, including worker-specific differences in job search efficiency, compensating variations for training and working conditions, measurement error in the actual wage, and even a residual potential wage component

Table 1 Wage Level Regressions (CPS Data)

Variable	Definition	1974 Mean	1974 Coefficient	1977 Mean	1977 Coefficient
Independent Variables					
Intercept	--	--	.041 (1.77)	--	.325 (21.78)
NWHITE	One if nonwhite, zero otherwise.	.09	-.086 (-6.94)	.11	-.092 (-10.58)
FEMALE	One if female, zero otherwise.	.42	-.167 (-10.79)	.44	-.145 (-13.69)
EXP	Years of experience, (Age - EDUC - six).	20.65	.042 (42.27)	17.62	.043 (54.91)
EXPSQ	EXP squared.	645.20	-.0007 (-32.89)	519.48	-.0007 (-41.46)
FEXP	(EXP) x (FEMALE).	8.62	-.023 (-14.66)	7.60	-.020 (-17.41)
FEXPSQ	FEXP squared.	269.66	.0004 (11.13)	224.03	.0003 (11.55)
EDUC	Years of education completed.	11.91	.071 (53.48)	12.25	.069 (68.58)
LSMSA	One if in 44 largest SMSAs, zero otherwise.	.71	.105 (12.83)	.38	.069 (14.64)
UNION	One if union member, zero otherwise.	.25	.182 (21.44)	.23	.238 (36.48)
Dependent Variable					
LnW	Natural logarithm of the wage per hour.	1.33		1.50	
R^2			.457		.441
No. Observations			13667		23890

Notes: The t-statistics are in parenthesis below the ordinary least squares coefficients. Twenty-six binary state/region variables are included in the regressions, but are omitted here for brevity. Data are from the Current Population Survey, U.S. Bureau of the Census (see text for details). The sample consists of nonagricultural wage and salary workers.

if the wage determination process is incompletely specified.[2] Knowledge of these components is important in interpreting results based upon DIFF in the analysis below.

Occupational mobility.

As indicated earlier, the CPS has limited longitudinal properties. Hence, it allows one to follow some of the respondents in one May survey to the May survey a year later. This enables us to observe educators who remain in teaching, as well as those who leave teaching. However, the data do not permit us to distinguish whether educators left teaching voluntarily or were discharged. For this reason, we view our turnover equation (the probability of leaving teaching) as a reduced-form representation of the equation explaining quit behavior for individuals and the equation explaining the discharge behavior for school districts. Our equation for the probability of leaving teaching for alternative employment takes the form

$$P(OCCHG) = f(NDIFF, PDIFF, X) \qquad (2)$$

where P(OCCHG) is the probability of changing occupations (i.e., leaving teaching); NDIFF (PDIFF) equals DIFF if DIFF is negative (positive) and X represents a vector of other relevant personal, job-related, and general economic characteristics. We expect workers to be less likely to quit the larger their actual wage relative to their predicted wage (i.e., the larger the value of NDIFF or PDIFF). Alternatively, employers may be responsive to wage differentials in making layoff decisions. That is, they may attempt to lay off workers with positive values of PDIFF. Consequently, we expect the estimated coefficient for NDIFF to identify the quit response of individuals, but the estimate for PDIFF to be a combination of the quit response of the individual and the layoff response of employers, if it exists to a significant degree.[3]

The occupational mobility model is estimated using the multivariate logit technique. Ordinary least squares estimates are not efficient when the dependent variable takes on qualitative values (e.g., the zero - one values for OCCHG). The logit technique is used to account for the qualitative nature of OCCHG. The probability that individual j leaves a teaching job in one year for a nonteaching job in the subsequent year is assumed to be expressed by:

$$P_j(\text{OCCHG}) = e^{b'X_j}/(1 + e^{b'X_j}) \qquad (2)$$

where $b'(X)$ is a vector of coefficients (explanatory variables).

Maximum-likelihood estimates of the logistic empirical specification of the occupational mobility model (eq. (2)) are presented in Table 2 along with the sample means. The estimated coefficients are the percentage change in the probability of leaving teaching given a unit change in an explanatory variable. The t-statistic for each coefficient follows in parenthesis. Below the t-statistic is the derivative, evaluated at the sample means. The derivatives express the absolute change in the probability of leaving teaching given a unit of change in the independent variable. (See Nerlove and Press [1973].)

The coefficient for NDIFF is significantly negative (.05 level, one-tail test) in both equations, indicating that educators do respond to market wage differentials in deciding to leave teaching. For educators with an actual wage below their potential wage a one percent increase in the actual wage relative to the predicted wage decreased the probability that an educator would leave teaching by .11 in 1974-5 and by .14 in 1977-78. Significantly, the larger coefficient is obtained in the period with the tighter labor market (1977-78). Auxiliary estimates for eq. (2) for workers in the economy at large (not reported here) suggest that educators are at least as responsive to

Table 2 Determinants of Occupation Change for Educators (CPS Data)

Independent Variable	1974-75 Mean	1974-75 Coefficient	1977-78 Mean	1977-78 Coefficient
Intercept	--	4.408 (2.35)	--	8.223 (5.17)
NDIFF	-.12	-1.482 (-1.88) -.112	-.15	-1.215 (-1.71) -.138
PDIFF	.18	-.167 (-.23) -.013	.13	.543 (.82) .062
NWHITE	.08	.304 (.43) .023	.08	.227 (.38) .026
FEMALE	.70	-.250 (-.40) -.019	.71	-.828 (-1.43) -.094
EXP	15.65	-.015 (-.57) -.001	14.86	-.057 (-1.93) -.006
FEXP	11.75	-.034 (-1.04) -.003	10.93	.034 (1.00) .004
EDUC	16.43	-.295 (-2.75) -.022	16.37	-.517 (-5.99) -.039
LSMSA	.67	-.016 (-.04) -.001	.35	1.156 (3.53) .132
UNION	.31	-.723 (-1.58) -.054	.50	-1.433 (-3.61) -.163
SEC	.41	-2.171 (-4.03) -.165	.41	-1.397 (-2.99) -.159
ELEM	.44	-1.502 (-3.08) -.114	.42	-2.025 (-4.16) -.231
KIND	.05	-.273 (-.40) -.021	.08	-1.600 (-2.55) -.182
F		(12,502) 3.306		(12,559) 6.190
No. Observations		513		570

Notes: The dependent variable is (binary) occupation change from the first to the second year (mean is .08 for 1974-75, .11 for 1977-78). Coefficients are maximum-likelihood estimates of a logistic model obtained from the Predict procedure of the Statistical Analysis System. The asymptotic t-statistic is in parenthesis below each coefficient, followed by the derivative evaluated at the mean. The omitted group for SEC(ondary), ELEM(entary), and KIND(ergarten) is OTHER (special education teachers, librarians, etc.). See Table 1 and text for explanations of the other variables.

wage differentials in deciding whether to change occupations as other workers in general. The coefficient for PDIFF is insignificant in both regressions, perhaps indicating that school districts are not responsive to market wage differentials in discharging employees (or alternatively that the quit response for individuals cancels the employer response). Thus, these results support our first proposition that educators are responsive to market wage differentials in deciding whether to leave teaching.

The remaining variables are of secondary but important interest. Experience (EXP), years of education (EDUC), being in a large city (SMSA) or a union member (UNION), and being a secondary (SEC), elementary (ELEM), or kindergarten (KIND) classroom teacher are linked (significantly in at least one regression) with being less likely to leave teaching. These results could be due to the presence of enclave rents associated with the characteristic (e.g., salary scales with undue compensation for experience, education, etc.), with skills specific to the occupation, or with other "fixities" associated with occupational mobility.

Wage change.

To test our second proposition that the market wage differentials from eq. (1) are a significant factor in determining individual patterns of wage change for educators, we estimate logarithmic wage change equations using the same explanatory variables as in the occupation mobility equations above. Here, however, we expect a priori that both PDIFF and NDIFF will have negative signs. This prediction arises from the hypothesis that market forces tend to erode noncompensating wage differentials. That is, the higher (lower) the initial wage relative to the potential or predicted wage, the lower (higher) the rate of wage growth. Our analysis of wage change specifically for educators, therefore, resembles in varying degrees that of Taubman (1975), Ehrenberg and Oaxaca (1976),

Mellow (1978), and Antos and Mellow (1979) in more general contexts.[4]

Estimates of the wage change equation for 1974-75 and 1977-78 are presented in Table 3. Again, the dependent variable is the logarithmic difference between the wage in one year and the wage in the previous year. As predicted, the coefficients for NDIFF and PDIFF are significantly negative (.01 level, one-tail test) in both regressions.[5] The coefficient for PDIFF, however, is significantly larger (.01 level, two-tail test) than the coefficient for NDIFF in both regressions, suggesting that (within the span of a year) positive market differentials for educator are more readily liquidated than negative ones. This would tend to occur if the labor market at large were relatively slack or if the educator labor market were slack relative to the larger market. The periods examined generally exhibit both these characteristics, although the national unemployment rate fell from 7.0 to 6.0 percent in 1977-78, compared to a rise from 5.6 to 8.5 percent in 1974-75. Thus, the results in Table 3 provide support for our second proposition that market wage differentials are a significant factor in determining individual patterns of wage change for educators, i.e., that the differentials tend to be eroded over time.

The effects of the other variables in Table 3 have a number of competing explanations. They could represent general market equilibration, erosion of specific enclave rents associated with the characteristic, or compensation for changes in productive characteristics that are linked with initial characteristics (e.g., the level of experience in a wage change equation is clearly related to the quadratic term for experience in a wage level equation), or other factors. In any case, being nonwhite or female is associated with higher rates of wage growth in both periods (except for females in 1977-78), and experience is associated with lower rates of growth. The coefficients for the remaining variables are generally insignificant.

Table 3 Wage Change Regressions for Educators (CPS Data)

Independent Variable	1974-75 Coefficient	1977-78 Coefficient
Intercept	-.015 (-.08)	.176 (1.23)
NDIFF	-.309 (-4.27)	-.283 (-4.81)
PDIFF	-.763 (13.65)	-.674 (12.47)
NWHITE	.132 (2.51)	.134 (3.03)
FEMALE	.113 (2.22)	.024 (.53)
EXP	-.004 (-1.64)	-.006 (-2.67)
FEXP	.004 (1.52)	.003 (1.18)
EDUC	.005 (.48)	-.001 (-.08)
LSMSA	.048 (1.60)	-.009 (-.36)
SEC	.024 (.48)	-.076 (-1.65)
ELEM	-.026 (-.55)	-.039 (-.93)
KIND	-.079 (-.98)	-.076 (-1.22)
R^2	.372	.341
No. Observations	513	570

Notes: The dependent variable in both regressions is the logarithm of the ratio of the wage per hour in the first year to the wage per hour in the second year (an approximate percentage change in wages). Coefficients are followed by t-statistics in parenthesis. The omitted group for the SEC, ELEM, and KIND variables is OTHER (e.g., special education teachers, librarians, etc.). See Table 1 and text for explanations of remaining variables and Table 2 for the sample means. Variables included in the regressions but omitted here for brevity are four regional binary variables and binary variables indicating transition among SEC, ELEM, KIND, and the omitted OTHER from the first to the second year.

II. Educator Wage Differentials, Interdistrict Mobility, and Wage Change.

The empirical analysis in this section 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 certificated teaching personnel in the state of Oregon, as of October 1 of each school year. Thus, we are able to observe employed educators from year to year within Oregon even if they move from one district to another. To maintain comparability with the estimates based upon the CPS in the previous section, we use the 1973-74 and 1976-77 school years for the wage level regressions, and school years 1973-74 to 1974-75 and 1976-77 to 1977-78 for the interdistrict mobility and wage change analysis.

Educator wage differentials.

To obtain noncompensating wage differentials within the labor market for educators in Oregon (i.e., the logarithmic difference between an educator's actual wage and the wage (s)he could expect in the educator labor market), we estimate the standard cross-sectional wage equation (eq. (1)) based upon data for educators in Oregon. An individual's predicted or potential wage in education (in logarithmic form) can then be calculated by applying the estimated β coefficients to that individual's vector of personal and job-specific characteristics.[6]

Table 4 presents estimates of eq. (1) for full-time Oregon educators for the school years 1973-4 and 1976-77. Sample means for the variables are also presented. The dependent variable is the logarithm of the total salary per contract day. The estimates provide no surprises (except perhaps for the coefficients associated with female educators). Wages increase significantly (at a decreasing rate) with years of actual experience in education (EXP) and increase significantly with levels of education acquired (EDUC1, EDUC2, and EDUC3). Higher wages are also associated (significantly) with teaching at the

Table 4 Wage Level Regressions for Educators (Oregon Data)

Variable	Definition	1973-74 Mean	1973-74 Coefficient	1976-77 Mean	1976-77 Coefficient
Independent Variables					
Intercept	--	--	3.692 (1034.84)	--	3.928 (1375.82)
FEMALE	One if female, zero otherwise.	.57	-.018 (-4.50)	.56	-.015 (-4.59)
EXP	Total years teaching experience.	9.39	.040 (64.27)	9.65	.038 (80.27)
EXPSQ	EXP squared.	147.14	-.0009 (-40.27)	148.15	-.0009 (-50.38)
FEXP	(EXP) x (FEMALE).	5.46	-.004 (-5.82)	5.26	-.004 (-6.11)
FEXPSQ	FEXP squared.	90.59	.0002 (5.81)	81.44	.0001 (6.45)
EDUC1	Bachelor degree plus additional hours.	.23	.050 (20.63)	.29	.068 (35.94)
EDUC2	Masters degree.	.35	.117 (51.00)	.40	.124 (67.11)
EDUC3	Doctorate.	.002	.227 (12.40)	.003	.218 (17.35)
KIND	One if kindergarten worker.	.01	-.004 (-.44)	.01	-.004 (-.76)
SEC	One if secondary worker.	.42	.020 (9.90)	.42	.021 (13.86)
OTHER	One if not regular classroom teacher.	.07	.010 (2.81)	.07	.008 (2.89)
SECOND	One if responsible for secondary area.	.16	.055 (22.54)	.17	.014 (7.80)
EXTRA	One if performing work for extra pay.	.36	.018 (8.77)	.41	.028 (17.92)
LANE	One if working in Lane County.	.11	.017 (5.68)	.10	.035 (15.63)
MULT	One if working in Multnomah County.	.22	.140 (61.61)	.19	.046 (25.65)
Dependent Variable					
LWAGE	Natural logarithm of the total salary per contract day.	4.02		4.26	
R^2			.615		.700
No. Observations			23335		24264

Notes: The t-statistics are in parenthesis below the regression coefficients. Elementary workers are the omitted group for KIND and SEC. Data are described in the text.

secondary level (SEC); not being a regular classroom teacher (OTHER); being responsible for a secondary teaching assignment (SECOND); performing work for extra pay (EXTRA); and being employed in the two most urbanized counties (LANE and MULT). The binary variable for females (FEMALE) suggests that women educators are paid significantly less (about two percent less) than male educators with identical values for the explanatory variables included in the regression equations. Similarly, the experience variables interacted with the FEMALE variable (FEXP and FEXPSQ) indicate that over relevant periods of experience the wage-experience profile for female educators lies below that for males. These wage differentials by sex are unrelated to differential access to formal administrative positions; administrative workers (i.e., principals, superindenents, etc.) are excluded from the analysis.[7]

Following the procedure in Section I, we obtain wage differentials within the educator labor market in Oregon from the residuals of the regression equations in Table 4. The caveats regarding the interpretation of wage differentials provided in Section I are also relevant here, although the more elaborate specification of the equations in Table 4 may diminish their importance.

Interdistrict mobility.

Using data for educators employed full-time in adjacent school years (i.e., the school years 1973-74 to 1974-75 and 1976-77 to 1977-78), we are able to estimate an equation predicting interdistrict mobility. Again, we interpret this equation as a reduced-form representation of both the quit behavior of individuals and the layoff behavior of employers. Thus, the predictions for PDIFF and NDIFF are the same as those in Section I.

Maximum-likelihood estimates of the logistic empirical specification of the determinants of interdistrict mobility are presented in Table 5, along with the sample means. The estimated coefficients represent the

Table 5 Determinants of Interdistrict Mobility of Educators (Oregon Data)

Independent Variable	1973-74 to 1974-75 Mean	1973-74 to 1974-75 Coefficient	1976-77 to 1977-78 Mean	1976-77 to 1977-78 Coefficient
Intercept	--	-2.470 (-12.33) -.055	--	-2.573 (-15.29) -.064
NDIFF	-.05	-3.580 (-4.01) -.079	-.04	-3.510 (-4.62) -.087
PDIFF	.03	-4.499 (-2.83) -.099	.03	-5.394 (-4.08) -.133
FEMALE	.56	.018 (.81) .004	.55	-.390 (-1.92) -.010
EXP	10.42	-.198 (-4.47) -.004	10.63	-.226 (-6.74) -.006
EXPSQ	165.27	.003 (1.57) .0001	165.84	.004 (3.28) .0001
FEXP	5.90	-.036 (-.66) -.001	5.65	.067 (1.42) .002
FEXPSQ	98.17	.001 (.39) .0000	88.22	-.003 (-1.38) -.0001
EDUC1	.23	-.240 (-1.76) -.005	.29	-.218 (-1.95) -.005
EDUC2	.36	-.158 (-1.29) -.004	.40	-.301 (-2.71) -.007
EDUC3	.002	-4.105 (-.86) -.091	.003	-4.012 (-1.07) -.099
KIND	.01	.130 (.25) .003	.01	-.798 (-1.36) -.020
SEC	.42	.256 (2.49) .006	.42	.581 (6.41) .014
OTHER	.07	.590 (3.55) .013	.08	.352 (2.34) .009

Table 5 (Continued)

Independent Variable	1973-74 to 1974-75 Mean	1973-74 to 1974-75 Coefficient	1976-77 to 1977-78 Mean	1976-77 to 1977-78 Coefficient
SECOND	.16	.484 (2.49) .011	.17	-.025 (-.21) -.001
SECOND2	.17	-.551 (-2.75) -.012	.13	-.037 (-.29) -.001
EXTRA	.37	1.635 (9.08) .036	.42	.481 (5.14) .012
EXTRA2	.39	-1.643 (-9.02) -.036	.04	.275 (1.51) .007
LANE	.11	-.297 (-1.84) -.007	.11	-.358 (-2.20) -.009
MULT	.21	-1.144 (-7.11) -.025	.18	.670 (6.50) .017
F	(19,19992)	22.448	(19,20783)	24.608
No. Observations		20801		20010

Notes: The dependent variable is a binary variable indicating a change in school district from the first to the second year (mean is .02 for 1973-74 to 1974-75, .03 for 1976-77 to 1977-78). Coefficients are maximum-likelihood estimates of a logistic model obtained from the Predict procedure of the Statistical Analysis System. The asymptotic t-statistic is in parenthesis below each coefficient, followed by the derivative evaluated at the mean. The omitted group for KIND(ergarten) and SEC(ondary) is ELEM(entary); the omitted group for OTHER is CLASS(room) teacher. Variables followed by a "2" are values for the second year). See Table 4 and text for explanations of of the data and other variables. Coding error in EXTRA2 prohibits an accurate interpretation of EXTRA and EXTRA2 in the 1976-77 to 1977-78 regression.

percentage change in the probability of leaving one district for employment in another district within Oregon given a unit change in an explanatory variable. The t-statistic for each coefficient follows in parenthesis. Derivatives are below the t-statistic and express the marginal effect of a unit change in the independent variables on the absolute probability of leaving one school district for employment in another. Derivatives are evaluated at the sample means.

The coefficient for NDIFF is significantly negative (.01 level, one tail test) in both equations, indicating the educators paid below their potential wage respond to the differential in deciding to change districts. For these educators, a one percent increase in the actual wage relative to their potential wage decreased the probability of changing districts by .08 in 1973-74 to 1974-75 and by .09 in 1976-77 to 1977-78. The coefficient for PDIFF is also significantly negative in both equations, suggesting that districts are not sensitive to wage differentials, but that individuals are. For educators paid above their potential wage a one percent increase in their actual wage relative to the predicted wage decreased the probability they would change districts by .10 in 1973-74 to 1974-75 and by .13 in 1976-77 to 1977-78. The coefficient for PDIFF is larger in absolute value than the coefficient for NDIFF in both regressions, significantly so in the later period. Two speculative explanations for the larger coefficient for PDIFF are (1) that a one percent increase in DIFF decreases the number of potential job openings with even higher wages proportionately more for those paid above their predicted wage than for those below their predicted wage; and (2) that educators with positive wage differentials exhibit unexplained characteristics relevant to wage determination (e.g., low job search costs or extraordinary personal pressures for higher earnings).

In any case, these estimates provide support for the proposition that educators are responsive to wage differentials within teaching in deciding whether to change districts (proposition three).

The remaining variables do not generally have direct, unambiguous interpretations. The EXP, FEXP, and EDUC variables may reflect job-specific skills (or enclave rents associated with the variables) that tend to tie workers to a particular district. The variables for secondary teaching assignments (SECOND and SECOND2) and for extra pay assignments (EXTRA and EXTRA2) suggest that some educators are pushed and others pulled across district lines (or, alternatively, some educators are held by districts) by the presence of these assignment opportunities/responsibilities. Thus, individual educators tend to sort themselves according to their preferences regarding secondary subject area and extra pay assignments and regarding the wage premiums attached to the assignments.

Wage change

To test our final proposition that the wage differentials within the educator labor market are a significant factor in determining individual patterns of wage change for educators, we estimate logarithmic wage change equations using the same explanatory variables as in the interdistrict mobility equations above. As in the wage change analysis in section I, we expect both PDIFF and NDIFF to have negative coefficients. Estimates of the wage change equations for school years 1973-74 to 1974-75 and 1976-77 to 1977-78 are presented in Table 6. The dependent variable is the logarithmic difference between the wage in one year and the wage in the previous year. As predicted, the coefficients for NDIFF and PDIFF are significantly negative (.01 level, one tail test) in both regressions. The coefficient for NDIFF is substantially below that for PDIFF (in absolute value) for 1973-74 to 1974-75, but approximately the same in 1976-77 to 1977-78. That is, positive differentials are more

Table 6 Wage Change Regressions for Educators (Oregon Data)

Independent Variable	1973-74 to 1974-75 Coefficient	1976-77 to 1977-78 Coefficient
Intercept	.140 (81.90)	.107 (75.88)
NDIFF	-.088 (-13.33)	-.147 (-25.32)
PDIFF	-.298 (-41.19)	-.153 (-22.26)
FEMALE	-.005 (-2.37)	-.003 (-1.76)
EXP	-.004 (-15.74)	-.003 (-16.75)
EXPSQ	.0001 (9.32)	.0001 (8.73)
FEXP	.0007 (2.28)	.0006 (2.19)
FEXPSQ	-.00002 (-1.36)	-.00002 (-1.87)
EDUC1	.002 (2.13)	.002 (2.62)
EDUC2	.000 (.15)	-.001 (-1.05)
EDUC3	-.002 (-.19)	-.011 (-2.10)
EDOT	.021 (7.64)	.008 (5.77)
KIND	.005 (1.20)	.002 (.83)
SEC	.004 (4.32)	.002 (3.32)
OTHER	.002 (1.18)	.002 (1.49)
SECOND	-.030 (-16.79)	-.006 (-6.30)
SECOND2	.012 (7.15)	.003 (3.42)
EXTRA	-.019 (-12.45)	-.005 (-7.76)
EXTRA2	.024 (16.02)	.012 (7.62)

Table 6 (Continued)

Independent Variable	1973-74 to 1974-75 Coefficient	1976-77 to 1977-78 Coefficient
LANE	.009 (1.29)	-.005 (-.98)
LANE2	.004 (.61)	.004 (.84)
MULT	-.054 (-9.45)	-.030 (-5.73)
MULT2	.035 (6.17)	.016 (3.07)
R^2	.241	.192
No. Observations	20010	20801

Notes: The dependent variable in both regressions is the logarithm of the ratio of the total salary per contract day in the first year to that in the second year (an approximate percentage change in salary per day). Coefficients are followed by t-statistics in parenthesis. See Table 5 for means and explanations of variables. Coding error in EXTRA2 prohibits an accurate interpretation of EXTRA and EXTRA2 in the 1976-77 to 1977-78 regression.

readily liquidated than negative differentials in the earlier period. This is exactly the result one would expect given that there was a substantial excess supply of teachers in Oregon during this period (relative to the later period of 1976-77 to 1977-78). Thus, these estimates tend to affirm our final proposition that existing wage differentials within education are a significant factor in determining individual patterns of wage change from one school year to the next, i.e., that existing wage differentials within teaching are eroded (at a modest rate) over time.

The results for the remaining variables are generally similar to those in the earlier wage change equations in section I. However, significant differences between the responses of wage changes to changes in the level of experience for males and females are present in the Oregon estimates. Moreover, the relationship between wage changes and experience is clearly nonlinear (quadratic terms for experience were omitted from the CPS estimates due to the small sample).

III. Conclusion.

In this paper we examined four propositions regarding teacher wage responsiveness. First, we tested the responsiveness of educators to wage differentials between their teaching jobs and alternative occupations in deciding whether to leave teaching for other employment. Our empirical results suggest that teachers are at least as responsive to wage differentials as other workers.

Second, we tested whether these market wage differentials between teaching jobs and alternative occupations are significant factors in determining individual patterns of wage change from one year to the next, i.e., whether

the differentials tend to be eroded over time. Our empirical analysis suggests that within the span of one year positive market wage differentials for educators, i.e., premiums above the predicted wage, tend to be liquidated more readily than negative differentials. This would tend to occur if the labor market at large were relatively slack, or if the educator labor market were slack relative to the larger market. The period of the 1970s generally exhibits both these characteristics.

Third, we considered the narrower issue of whether educators are responsive to wage differentials within the educator labor market in deciding whether to leave one school district for employment in another. We found that teachers are responsive to wage differentials for teaching jobs, but not as strongly responsive as to wage differentials between teaching and other occupations. Moreover, responsibilities for secondary subject areas and extra pay assignments tend to pull some educators and push others across district lines.

Finally, we tested whether the educator wage differentials are a significant determinant of individual patterns of wage change from one school year to the next, i.e., whether these wage differentials also tend to be eroded over time. Our results indicate that both negative and positive wage differentials tend to be eroded, and that positive differentials are more readily liquidated than negative differentials when the relevant labor market for educators has excess supply.

Footnotes

[1] The earlier results of Pedersen (1973) for Michigan are an important exception to the second point.

[2] Antos and Mellow (1979, p. 69) provide a discussion of these issues, and Lillard (1977) presents results which suggest that more than half the residual variance in general cross-section wage regressions is due to the omission of worker-specific factors.

[3] There is little empirical evidence that wage differentials play an important role in employer layoff decisions (see for example Antos and Mellow [1979]). Even so, we follow the conservative strategy of at least allowing for a potential employer response to positive wage differentials (PDIFF).

[4] As in most of these studies, we must explicitly assume that the initial wage is measured without error, otherwise spurious correlation arises between the dependent variable (wage change) and NDIFF and PDIFF. This is likely to be more of a problem in the CPS data (where wage information is reported by household members) than in the Oregon data used in the next section (where the wage information is collected directly from personnel information at the district level). Experimentation with CPS estimates with the subsequent wage as the dependent variable, however, and with separate coefficients for the predicted and initial wages suggests that the negative effects of the wage differential are not the result of spurious correlation.

[5] Turnover is clearly an intermediating variable in the wage determination process. However, alternative regression equations including turnover as an explanatory variable yield similar estimates for PDIFF and NDIFF, suggesting that their effects are primarily direct for the group as a whole.

[6] Antos and Rosen (1975) provide a more thorough discussion of wage determination (hedonic price) equations for educators.

[7] Unfortunately, there is no race information in the Oregon data, hence a race variable could not be introduced into our equations for Oregon. Most of the black population, however, are concentrated in Multnomah County, the most urban county, which is included in the equations as a binary variable.

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