

**Gender Differences in Agency Head Salaries:
The Case of Public Education**

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Abstract

This study demonstrates a quantitative approach to assessing gender discrimination in public salaries at the individual level. Using data from 1000+ school districts in Texas over a period of 4 years, the results show that gender differences in superintendent's salaries are subtle rather than systematic. Female superintendents who replace male superintendents receive lower compensation. Local district wealth also interacts with gender to affect salaries.

Gender Differences in Agency Head Salaries: The Case of Public Education

Over 30 years have passed since the passage of the *Equal Pay Act*, the first modern statute directed at protecting workers against wage discrimination. *The Equal Pay Act of 1963* prohibits unequal pay for equal or “substantially equal” work performed by men and women. This legislation was quickly followed by the *Civil Rights Act of 1964*, which prohibits wage discrimination on the basis of race, color, sex, religion, or national origin. Together, these laws revolutionized the American workplace. Despite the advancements made by women in the workforce, however, sex-based wage discrimination has persisted. Indeed, the Department of Labor reports that in 1999 women earned approximately 77 percent as much as men did, up a little more than a dime since 1963. African-American and Latino women fare worse at 65 percent and 59 percent, respectively (Department 1999).¹

Although women are making great strides in certain labor sectors (Blau and Kahn 1994), many problems remain. A preponderance of studies on the employment distribution of women and men provides evidence that women often face glass ceilings and glass walls at the federal and state levels (Baron and Newman 1989; Bullard and Wright 1993; Cornwell and Kellough 1994; Crum and Naff 1997; Kellough 1989; Lewis and Emmert 1986; Lewis and Nice 1994; Mani 1997; Naff and Thomas 1994; Newman 1994; Pfeffer and Davis-Blake 1987; Reid, Kerr and Miller 2000). In this work, we extend the analysis to an examination of gender differences in salary among a set of administrators who have reached the top of the organizational ladder, school superintendents.

Researchers have predicted that as more women occupy line positions in school districts (such as assistant superintendents or directors), we would see more women join the ranks of the

¹Raw comparisons such as these omit any controls for human capital or tastes for leisure and thus may over or under estimate the actual wage gap.

superintendency (Schmuck 1982). This, however, has not been the case. Nationally only about 4 percent of district superintendents are women, while more than 20 percent of line district office positions are filled by women (Schuster and Foote 1990). In her study on the promotion of teachers to administrative positions, Joy (1998) found that men are more likely than women to be selected for promotion during the school year, even when the teacher's desire for promotions and credentials are considered. Examining the explanations for the small percentage of women holding superintendencies is beyond the scope of this work, but we take an important step in assessing sex-based wage disparities among individuals who become superintendents.²

Two objectives guide this paper. The first is whether gender has any unique effect on superintendent salaries above and beyond the effects of such suspected income-related factors as human capital, local resources, and job performance. To address this question we assess the salaries of male and female school superintendents in Texas over time (1995-1998) to determine whether sex-based wage disparities exist. The second is to illustrate how gender differences should be assessed, thus creating a template for future researchers seeking to examine this question in other public organizations.

Prior Studies of Gender Discrimination in Salaries

Numerous studies of sex-based salary disparities have demonstrated unequivocally the existence and persistence of salary disparities in both the private and public sectors. Although the private sector has made some progress toward pay equity (Furchgott-Roth and Stolba 1996; O'Neill 1985; O'Neill and Polacheck 1993), significant sex-based pay gaps continue (Groshen 1991; Macpherson and Hirsch 1995; Sorensen 1994; Hutlin 1999). These gaps remain even after researchers control for human capital differences such as education, years of experience, tenure in current job, and the education level of the employee.

²We considered using a Heckman selection bias correction in case some districts simply were unlikely to hire women superintendents. The selection bias equation predicted poorly suggesting that salary levels are not affected by whether or not the district will hire a female superintendent.

Similar research in the public sector has produced analogous results. Several studies using aggregate data on public sector wages provide strong evidence of sex-based pay disparities at all levels of government (Bullard and Wright 1993; Lewis and Emmert 1986; Miller, Kerr and Reid 1999; Lewis and Nice 1994; Pfeffer and Davis-Blake 1987; Reid, Kerr and Miller 2000). These disparities have been linked to gender composition at the occupational level (Lewis and Nice 1994; Pfeffer and Davis-Blake 1987), at the organizational level (Lewis and Emmert 1985; Blau and Kahn 1999), and at the job level (Treiman and Hartmann 1981). Pfeffer and Davis-Blake (1987) demonstrated in their study of college and university administrators that the proportion of female incumbents depressed the wages for both male and female administrators. In recent research on glass ceilings in U.S. state-level bureaucracies, Reid and Miller (2000) concluded that women are underrepresented in higher paying positions (in proportion to their numbers in the agency). This previous research provides a rich foundation for our inquiry of whether gender has any unique effect on superintendent salaries above and beyond the effects of income-related factors.

One frequent difference between the private sector and the public sector studies concerns the level of aggregation. Private sector studies often examine gender discrimination at the individual level; public sector studies generally aggregate data to examine groups of jobs. Public sector studies are generally aggregate because public classification systems establish pay levels for specific jobs rather than for individuals. The present study is relatively unique, therefore, in using individual data for public agency heads in numerous organizations.

The previous research on sex-based wage disparity follows a standard human capital approach for determining whether a pay gap exists. This approach regresses wages on the sex of the employee and those factors thought to legitimately influence earnings such as education, job performance, and organizational resources. Although we start with this standard approach, our research goes a step further to consider how salaries are affected by turnover and replacement.

This more subtle form of analysis will illustrate that other studies in the literature that do not deal with such nuances may not tease out all of the sex-based wage disparity that exists in organizations.

Data and Methods

The data base used for analysis contains all full-time Texas school superintendents from 1995-98. Texas has over 1000 superintendents, approximately 8% of all superintendents nationwide; the total number of cases for analysis is 4103. All data were provided by the Texas Educational Agency and were cleaned of obvious errors. Because these are pooled time series data, we include a set of year-dummy variables to adjust for serial correlation.

The market for school superintendents may differ from that for other public agency head positions. The market can be characterized as competitive with full information, that is, all positions are announced and individuals know the salary of the previous superintendent and salaries that similar-sized districts are paying. Under such circumstances, paying below market wages based on ascriptive characteristics such as gender is more difficult.

Dependent Variable

The dependent variable for analysis is the annual salary for the district superintendent. This figure includes salary and benefits from official sources and may not include perquisites such as club memberships, transportation allowances, and similar factors. The mean salary is \$68,400 and is positively skewed. To adjust for the skew and also to facilitate interpretation, a log transformation of the salary figure was taken.³

Independent Variables

Assessing whether or not there is gender discrimination in salaries requires that one control for all other factors likely to affect salary rates for managers including scope of the job, local resources, job performance, and personal investments in human capital (Ehrenberg,

³The log transformation, a standard practice in human capital equations, will allow us to interpret the coefficients in terms of percentage increases or decreases.

Chaykowski, and Ehrenberg 1988). Quite clearly the major factor in determining a superintendent's salary is the scope of the job, that is, how much responsibility and authority the superintendent has. We measure this using the total revenue (operating and capital) of the school district (when controlling for budgets, student enrollments and other similar factors are uncorrelated with salary). This variable is also positively skewed and was subject to a log transformation.

Local resources were measured by the percentage of revenues from local (rather than state or federal sources). Texas' state funding formula is redistributive in nature, so the larger percentage of a district's money that is raised locally is an indicator of district wealth. This factor can influence salaries in two ways. First, percent local funds is positively correlated with per student educational expenditures and thus indicates a more ample budget. Second, local wealth is also related to the cost of living in a community implying that such communities will need to compensate employees better.

Job performance should be related to salaries. Schools have multiple goals; and as a result, measuring the performance of a superintendent is difficult and likely contains many subjective judgements. One aspect of performance, however, might be amenable to quantitative measurement. Texas relies heavily on standardized tests with schools; districts are ranked by the state; and such rankings are front page news through out the state. The importance of the state standardized test (known as TAAS) suggests that superintendents could be rewarded for high scores. The indicator used is the percentage of the district's students who passed the TAAS exam last year.⁴

Human capital is the experience and skills that an individual brings to the job. Four measures of human capital are available—years of administrative experience, age, tenure in the

⁴We use last year's test score because that would be known at the time the school board would set the superintendent's salary for the year.

current job, and whether or not the individual holds a doctoral degree.⁵ Each should be positively related to salary.

In addition to scope of the job, performance, and human capital, we include three dummy variables to indicate whether or not the superintendent is female, African American, or Latino. Our concern is with gender discrimination, but given the relative scarcity of black and Latino administrators, one also needs to control for race and ethnicity in the models.

Results

School districts are classic glass ceiling organizations. In our set of districts, women comprise 75% of the teachers, 51.3% of the assistant principals, 47% of the principals, 35.8% of the assistant superintendents, but only 8.4% of the superintendents. Table 1 presents a demographic comparison of male and female superintendents. On average, women superintendents are paid slightly more than male superintendents, but they also oversee larger school districts with bigger budgets. Descriptive data such as this, while interesting, tell us very little about whether or not gender discrimination exists in salaries simply because the comparisons do not control for other factors that influence salaries.

[Table 1 About Here]

Gender discrimination in employment can have two different characteristics. In one case, women could be paid constant percentage less than men at all levels of experience, skills, and performance. This situation would be indicated by a significant negative coefficient for the gender variable.⁶ In the second case, women might be rewarded less for a given level of

⁵The key educational distinction is between individuals with a master's degree and those with a doctorate. Table 1 shows that virtually all superintendents have at least a masters degree.

⁶This is known as a test for a change in intercept. See Jacobsen (1998: 293) for a lucid discussion of these models.

experience, skills, or performance. For example, an earned doctorate might be worth a 6% salary increase for a male but only 3% salary increase for a female. This study will examine both possibilities.

The first two columns of table 2 shows the regression equation to determine if women are paid less at all levels of experience, skills, and performance. The overall level of prediction (79%) compares favorably with other studies of school superintendent salaries (see Ehrenberg, Chaykowski, and Ehrenberg 1988). The coefficient for gender (.0042) is both small and statistically insignificant; it suggests that women are paid 0.42% more than men all other things being equal (or about \$300 at average salaries). The results suggest no discrimination on the basis of gender.

[Table 2 About Here]

The other coefficients in this regression also merit some discussion. The major factor in determining superintendent salaries is the scope of the job; the contribution of the district's budget is far greater than any other single factor or set of factors. A one percent increase in the districts budget is associated with a .15 percent increase in superintendent's salary, all other things being equal. Local revenues also matter. Since the independent variable is not logged in this case, the coefficient can be multiplied by 100 and interpreted as a percent (see Tufte 1974). In this case, a one percentage point increase in the local funding percentage is associated with a 0.1% increase in salary. Since the standard deviation for percent local funds is 23%, the overall impact of this variable could be as high as 10% in total salary.

Each of the human capital factors is significant and in the predicted direction. The coefficients are relatively small, however, except for the doctorate degree. The possession of a doctorate is associated with a 5.95% increase in salary, all other things being equal.

Performance matters but not a great deal. An increase of one percentage point in students passing the TAAS is associated with a salary increase of 0.09%, all other things being equal. A

standard deviation increase (about 12.3%) translates into a 1.35% increase in salary. Race matters but ethnicity does not. The coefficient for Latinos is essentially zero, but the coefficient for blacks suggests approximately an 11 percent premium is paid to African American superintendents. Although an investigation of this phenomenon is beyond the scope of this paper, black superintendents are few in number and this premium likely reflects an imbalance in supply and demand.⁷

The third and fourth columns of Table 2 show the regression for determining if gender interacts with other variable to adversely affect women's salaries. The top set of coefficients in the table can be interpreted as the relationships for male superintendents; the bottom set of coefficients are essentially how much different the relationship is for women. To illustrate, the doctorate coefficient indicates that possession of the degree is worth approximately a 6% increase in salary for men. The corresponding coefficient for women (-.0206) indicate that a doctorate for women translates into only about a 4% salary increase (or 2.06% less). This difference while interesting does not meet standard levels of statistical significance.

Two aspects of the regression merit examination. The first is whether or not the coefficients for women as a group are systematically different from those for men. This is done with a joint f-test that simultaneously determines if all the coefficients for women could be zero (and thus do differ; see Pindyck and Rubinfeld 1991: 110-2). The joint f-test at the bottom of the table is highly significant indicating that the women's coefficients are significantly different from the men's.

The joint test, however, cannot reveal discrimination since positive coefficients on one factor might be compensated for negative findings on another; it only shows that there are systematic differences. The individual coefficients need to be examined to determine what those

⁷Inner city school districts are especially likely to hire black superintendents. Texas has several large cities and many of these have more than one inner city school district. There are never more than 10 black superintendents in any given year.

factors might be and if there is cause for concern. In many cases, individual coefficients may not be significant because interaction equations such as this one induce a great deal of collinearity. This is especially a problem when the number of cases is small; with 4000+ plus cases, that is not a problem in this case.

The bottom set of coefficients has only a single coefficient that meets traditional levels of statistical significance, that for percent local funding. For each increase of one percentage point of funds coming from local sources, men are paid 0.11% more and women are paid 0.06% less all other things being equal. While these figures appear small, a one standard deviation change in percent local funding (23%) is associated with a gender wage gap of 3.9%. Particularly in relatively wealthy school districts (those with a high percentage of local funds), gender differences superintendent salaries could be substantial.⁸ The remaining coefficients in the bottom half of the table should be considered statistically indistinguishable from zero with the result that no inferences should be drawn.

Although table 2 attempts to control for all relevant factors that could influence salaries other than gender, there is always a possibility that something has been omitted. As a result, some assessments of gender discrimination take a different tack. They compare how the salary for a given job changes when a woman replaces a man to how the salary changes when a man replaces a woman. Since we have data over a four-year time period, we have data on 500 cases where new superintendents were hired. In sixty cases a male superintendent was replaced by a female superintendent; in 38 cases a female superintendent was replaced by a male; in all other cases the gender of the superintendent remained the same.

⁸Another way to illustrate this relationship is to split the sample at the median, 37% local funding and rerun the first equation from table 2. For districts with less than 37% in local funds, women superintendents are paid 3.3% more than men all things being equal; in districts with more than 37% local funding, women are paid 2.3% less than men all things being equal. Both coefficients are statistically significant.

Table 3 presents a regression equation where the dependent variable is the change in logged salary from one year to the next. The intercept can be interpreted as the percent change in salary if there is no change in superintendent (4.11%). In general when a new superintendent is hired, he or she is paid about 2.63% less than the previous superintendent. Subtracting the other coefficients from this base gives the change in salary when there is a change in gender. When a male is hired to replace a female superintendent, the salary remains virtually the same ($-.0263 + .0206 = -.0057$). When a female is hired to replace a male superintendent, the salary drops by 7.5% ($-.0487 - .0263 = -.0750$). These findings are relatively strong evidence that at least in some cases gender discrimination exists.

[Table 3 About Here]

This exploration of superintendent changes and the assessment of individual factors suggests that we reformulate our base model of salaries to include the interaction of local funds with gender and the replacement of a male superintendent with a female one. The results of this regression are shown in table 4. This regression yields a more specific conclusion about gender and salaries. There appears to be preferences in terms of gender that are reflected in salary differences in specific situations. First, all other things being equal, a female superintendent who replaces a male superintendent is paid an estimated 5.5% less in salary. Second, gender preferences interact with local funding in an interesting pattern. One can combine the interaction coefficient ($-.0015$) with the gender coefficient ($.0746$) to find gender differentials at different levels of local funding using the following formula:

$$\text{Salary Differential} = .0746 - .0015 (\text{Local Funding})$$

At 90 percent local funding (71 districts have at least 90% local funding), the coefficient becomes $-.0604$ or women are paid approximately 6.0% less than men all other things being equal. At 10 percent local funding (82 districts meet this criterion), the coefficient becomes $.0596$ or women are paid approximately 6% more than men. Gender discrimination affects both

men and women when local control is considered. Third, the coefficient for gender by itself is now positive and significant. Women superintendents make 7.5% more than men all other things being equal (including percent local funds and replacement of a male superintendent).

Overall the relationships show a complex pattern; there is some evidence of discrimination in salaries in specific situations. In some cases, women are disadvantaged such as when replacing a male superintendent or in relatively wealthy districts. In other cases males are at a disadvantage such in districts that are relatively poorer and in general.

Whether or not these differences constitute discrimination based on gender depends on the specific situation. Salaries are legitimately determined by a wide variety of factors including the track record of the superintendent in managing the district; such factors need to be considered in individual cases. Regression analyses such as this one cannot provide evidence of actual discrimination; it can only provide information about salary differences. To conclude that discrimination exists requires the examination of the specific case involved.

Conclusion

The study presented a template for how to conduct studies of salary discrimination at the individual level. Substantively, the gender differences that we found were subtle rather than systematic. Such small differences are likely the result of a market for agency heads that relies on open competition and full information. Whether the individual differences found constitute discrimination or not can only be resolved by examining the individual cases. This techniques tells the public manager where to look but is not a substitute for a careful assessment at the individual level. The technique that we use is likely to be useful in other situations where agency head salaries are not set by law such as city managers or local agency heads (e.g., public works administrators, police chiefs, etc.).

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Table 1. A Comparison of Male and Female Superintendents

| <u>Variable</u> | <u>Females</u> | <u>Males</u> |
|---------------------|----------------|--------------|
| Years of Experience | 21.7 | 24.3 |
| Age | 50.4 | 50.2 |
| Tenure (years) | 5.7 | 6.8 |
| Masters Degree % | 67.1 | 74.4 |
| Doctorate % | 32.9 | 23.2 |
| Student Enrollment | 4570 | 3543 |
| Budget (millions) | 12.7 | 9.8 |
| Salary | 70,015 | 68,225 |

Table 2. Gender and Salaries
 Dependent Variable = Log (Salary)

| Independent Variable | Intercept Only | | Full Interaction | |
|---|----------------|---------|------------------|---------|
| | Slope | t-score | Slope | t-score |
| Budget Size (logged) | .1558 | 102.53 | .1554 | 96.72 |
| Local Revenue Percent | .0010 | 11.52 | .0011 | 12.55 |
| Human Capital Factors | | | | |
| Experience (Years) | .0025 | 8.66 | .0026 | 8.47 |
| Age | .0009 | 3.79 | .0009 | 3.53 |
| Tenure | .0006 | 2.43 | .0007 | 2.64 |
| Doctorate | .0595 | 12.59 | .0600 | 12.05 |
| Performance (last years) | .0009 | 5.21 | .0009 | 5.17 |
| African American | .1099 | 5.59 | .0970 | 4.39 |
| Latino | -.0001 | .02 | .0028 | .32 |
| Female | .0042 | .63 | -.0513 | .51 |
| Female x Budget | ---- | -- | .0073 | 1.41 |
| Female x Local Revenue | ---- | -- | -.0017 | 5.38 |
| Female x Experience | ---- | -- | -.0011 | 1.07 |
| Female x Age | ---- | -- | .0007 | .59 |
| Female x Tenure | ---- | -- | -.0019 | 1.83 |
| Female x Doctorate | ---- | -- | -.0206 | 1.29 |
| Female x Performance | ---- | -- | .0003 | .54 |
| Female African American | ---- | -- | .0655 | 1.33 |
| Latina | ---- | -- | -.0330 | 1.30 |
| <hr/> | | | | |
| R-Squared | .79 | | .80 | |
| Standard Error | .1175 | | .1171 | |
| F | 1213.48 | | 723.67 | |
| N | 4103 | | 4103 | |
| Joint F-test (9, 4085) = 4.09 p = .0001 | | | | |

Dummy variables for individual years not reported.

Table 3. Changes in Salary: New Superintendent

Dependent Variable = First Difference of Logged (Salary)

| Independent Variable | Slope | t-score |
|----------------------|--------|---------|
| Intercept | .0411 | 25.42 |
| New Superintendent | -.0263 | 5.16 |
| Female Replaces Male | -.0487 | 4.40 |
| Male Replaces Female | .0206 | 1.48 |

| | |
|----------------|-------|
| R-Square | .02 |
| Standard Error | .0084 |
| F | 18.20 |
| N | 3045 |

Table 4. Gender and Salaries: The Impact of Gender Change and Local Wealth

Dependent Variable = Log (Salary)

| <u>Independent Variable</u> | <u>Intercept Only</u> | |
|-----------------------------|-----------------------|----------------|
| | <u>Slope</u> | <u>t-score</u> |
| Budget Size (logged) | .1558 | 102.99 |
| Local Revenue Percent | .0011 | 12.59 |
| Human Capital Factors | | |
| Experience (Years) | .0025 | 8.56 |
| Age | .0009 | 3.77 |
| Tenure | .0006 | 2.35 |
| Doctorate | .0583 | 12.39 |
| Performance (last years) | .0009 | 5.21 |
| African American | .1082 | 5.52 |
| Latino | -.0013 | .15 |
| Female | .0746 | 5.41 |
| Female Replaced Male | -.0551 | 3.38 |
| Female x Local Revenue | -.0015 | 5.10 |
| <hr/> | | |
| R-Squared | .80 | |
| Standard Error | .1170 | |

F

1063.73

N

4103