Evaluating Whether Employment Practices At District of Columbia Water And Sewer Authority Are Racially Neutral

by

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I. INTRODUCTION

This report contains the results of my preliminary study of compensation and promotions for employees of District of Columbia Water and Sewer Authority ("WASA"). I have been asked to analyze whether the awarding of employee compensation and the selections of employees for promotions are racially neutral. Using the data provided by WASA, I have identified 999 individuals who are African-American and are also employed at WASA (interns are excluded) at any time between approximately October 24, 1999 and December 31, 2001.

My analyses use data provided by WASA to compare employee outcomes for African American and Caucasian employees of WASA who are similarly situated. I use these data to examine statistically whether employment outcomes are consistent with racially neutral practices. Racially neutral employment practices exist when there are no systematic differences in outcomes – i.e., compensation or promotions– by race for similarly situated employees. Systematic differences exist when there are statistically significant patterns associated with race; that is, systematic differences exist when there are racial differences that are unlikely to arise from random variation or chance.

I find that the awarding of compensation at WASA is not racially neutral. Between 1999 and 2001, African Americans receive significantly lower levels of compensation than do Caucasian employees with the same job title and tenure at WASA.

I was unable to reach any conclusions with respect to the analysis of WASA's selections of employees for promotions.

II. ANALYSES OF COMPENSATION AND PROMOTIONS

In this section, I analyze the racial neutrality of the compensation paid to employees and the selections of employees for promotions at WASA. I analyze salaries for WASA employees by race between 1999 and 2001.

. Economists expect that salary will vary with the productivity of workers. Productivity of workers is not directly observed, however, and is difficult to measure. For that reason, economists generally focus upon the characteristics that make one worker more or less productive than another, rather than upon productivity itself. Human capital theory is a widely accepted analysis of the determinants of productivity differences among individuals. The theory focuses upon the investments that individuals make that increase their skills and thus make them more productive. The following factors are particularly important:[1]

(1) Experience, measured by tenure with an employer or in a particular job; and

(2) Occupational expertise acquired before hire.

Therefore, human capital theory leads us to some common sense conclusions. If one individual has more job experience or comes to WASA with more valuable occupational experience, he or she is more likely to be entitled to a higher salary.

To quantify racial differences, it is necessary to control for any *systematic* differences between African-American and Caucasian employees in their qualifications (that are the result of employee - as opposed to WASA - actions) at the time of hire. There are, then, two important elements of employee qualifications that determine whether they should be included in the analysis of WASA's employment decisions:

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1 Usually formal education is included as a human capital factor that affects salaries. I did not receive any data on education from WASA.

(1) the qualifications differentials are systematic by race *after* the inclusion of other included credentials; and

(2) the qualifications differentials are not the results of decisions made by WASA.

Salaries at WASA are being studied in order to determine the extent to which employee's race affects salaries. Therefore, it is *only* necessary that the analyses compare equivalently qualified *groups* of African-Americans and Caucasians. Any qualifications that affect salaries that are possessed by equivalent proportions, or in equal intensity, by both racial groups *after* controlling for any qualification differences already included in the model or analysis, cannot affect the size of the racial disparity and, therefore, cannot affect the true level of racial disparity in compensation.

The salary analyses are not designed to explain the salaries of particular WASA employees. Although it is difficult to imagine a situation where a computer or statistical model would be used to award compensation for individuals, such a model would have to include all relevant qualifications for which *any* employees differ. In that way, a model that is designed to identify individual compensation is fundamentally different from a model that is designed to determine differences in compensation across groups of employees defined by a characteristic, such as race.

Any racial differences in qualifications of employees that arise from WASA's previous selections for promotion, job assignments, or its past compensation decisions (as opposed to the credentials and abilities that employees possessed when they started at WASA) are part of WASA's actions that may create racial disparities in compensation. Controlling for such differences in qualifications could inappropriately reduce estimates of average racial differences.

Compensation differences that cannot be explained by differences in credentials that employees bring to WASA are suspect if they are also associated with race. After appropriately taking account of productivity, economists generally attribute such differences to discrimination.

I use Human Resources data provided by WASA for my compensation analyses.[2] It should be noted that the data supplied do not include all of the information that I requested and would prefer to have for my analysis. The database contains limited information on all transactions involving WASA employees between approximately October 24, 1999 and December 31, 2001. The transactions data include information on the activities that changed the status of employees, including (but not limited to) salary changes, job assignment changes, and promotions. I use the data to determine which African American and Caucasian employees are active at the end of each year. All regular employees "active" at the end of the year are included in the analyses.

To analyze whether there is a pattern of racial disparities in salaries at WASA, I use linear regression analysis (the appropriate technique for analyzing a continuous dependent variable such as salary). I examine whether there is any difference in salaries by race, after adjusting for potential racial differences in occupation and experience. The regression analysis technique I employ is commonly used by economists to measure the impact of explanatory variables such as race and other employee characteristics on a dependent variable such as salary. The technique is illustrated in Table 1, which summarizes the analyses for the years 1999 through 2001.

In these analyses, the regression coefficient for race tells us the percentage effect of race on annual salaries after adjusting (or controlling) for the effect of the other explanatory variables included in the regression equation. The employee characteristics used in calculating the differential are race, job title, and tenure at WASA. It should be noted that job title is assigned by WASA. In my compensation analysis I assume that job title assignments are race neutral. If, however, such assignments are not race neutral, my compensation analysis may underestimate the true size of racial

2 I have received the following data files: active employees' job and compensation history, active employees' job and compensation history setup first line data, employee rosters by department at the end of each year from 1999 through 2001, inactive employees' job and compensation history.

differences in compensation at WASA. The racial differential that I measure reflects the average salary disparity between African Americans and Caucasians with the same time at WASA and the same job title. The dependent variable is the natural logarithm of the annual salary.[3]

Table 1, row 1, reports that African Americans earn approximately 4.6% less than Caucasians with the same tenure at WASA and the same job in 1999.[4] The racial differences in 1999 salaries were 4.82 standard deviations beyond zero or no difference. Standard deviations are a measure of statistical significance that courts use to assess whether a racially neutral process could have generated the observed racial differences by chance. As the number of standard deviations *increase*, the probability that racial differences could have been generated by chance *decreases*. The courts generally require that a racial difference be a *minimum* of two standard deviations, which is comparable to a *maximum* probability of five in one hundred (or five thousand in 100 thousand) that a racial difference is due to chance. A difference of 4.82 standard deviations means that the probability is less than seven in 100 thousand that the racial difference occurs by chance.

Row 2 of Table 1 reports the same differential for 2000. In 2000, the difference is 5.6% or 5.87 standard deviations.

Finally, row 3 of Table 1 reports the differential for 2001. In 2001, the difference is 5.5% or 5.87 standard deviations.

The wage disparity by race is statistically significant for all years between 1999 and 2001. The wage differences by race for each year are substantially greater than the two standard deviations usually required by the courts to dismiss chance as the reason.

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3 The use of logarithms is a technical adjustment that is commonly made in such analyses.

4 Since the dependent variable is the natural logarithm of annual salaries, each regression coefficient may be interpreted as the approximate percentage effect of the dependent variable of a unit change in the independent variable. However, the regression coefficient is only an approximate percent. To get the actual percentage p, one must compute p $= e^{\beta}-1$ where β is the coefficient. For this coefficient, $e^{-.0474446}-1 = -.046$.

I have also attempted to analyze WASA's selections of employees for promotions. It is my understanding that many promotions at WASA involve a change in the employee's pay grade. It is my further understanding that some job titles include some employees who are on career ladders and some who are not. I was not able to conduct a meaningful analysis of promotions since I did not have any information on pay grade or any indication of which employees were on career ladders in the data provided to me.

III. ANALYSIS OF INITIAL SALARY

In this section, I analyze whether there are racial differences in initial salary levels. The analysis uses an ordinary least squares regression analysis of (the natural logarithm of) initial salary for employees hired between October 24, 1999 and December 31, 2001. I examine whether there are any racial differences in annual base salary rates assigned at hire, after adjusting for racial differences in qualifications (i.e. experience and job title). The results show that the initial base salaries for African Americans were set 2.8% lower than those for Caucasians hired in the same year and in the same job title. The racial difference is 0.99 standard deviations beyond no difference (or zero). While this difference is below two standard deviations the statistical test is not very powerful ("useful") due to relatively small number of initial hires and the relatively large number of job titles.[5] The results imply that at least half of the racial differences in total compensation could be due to racial differences in initial salary levels. Additional data of the sort I initially requested would be required to confirm or reject this hypothesis.

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5 Power refers to the ability of the analysis to make correct decisions, that is, to uncover discrimination when it exists. As the number of observations in an analysis decreases and the number of characteristics controlled increases, the power of the statistical test decreases.

VI. CONCLUSIONS

My statistical analysis is consistent with racially discriminatory compensation practices at WASA. My analysis provides evidence that WASA's salaries are not racially neutral. African-American employees have statistically significant lower salaries than Caucasians. African-Americans receive 4.6% to 5.6% less than Caucasian employees in the same job and with the same tenure at WASA.

Finally, African-American employees at WASA are more likely to be assigned a lower salary than comparably qualified Caucasian employees.

My conclusions are preliminary because they are based on the limited data that have been made available to me. If I receive additional data, I will consider how it might affect the preliminary conclusions I have reported here.

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