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Wage Differentials Among Regulated, Private and Government Sectors: A Case Study

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INTRODUCTION

There is an extensive literature in economics dealing with wage differentials, both black-white and male-female. The earliest studies focused on developing theoretical models to explain differentials but included some empirical estimates as well. These included Becker's (1957) neo-classical model, the human capital model developed by Becker (1964) and then Mincer and Polachek (1974), and Arrow's (1973) and Phelps' (1972) theory of statistical discrimination. More recently, political factors have been used to explain discrimination (Borjas, 1980, 1982; Beller, 1977, 1982), as have theories of segmented labor markets (Lloyd and Niemi, 1979). Following these developments, a large empirical literature has also emerged in order to measure and explain the size of the differentials and to look at changes over time or in different segments of the economy. For example, Smith (1977) analyzed the relative degree of these differentials in private versus public (federal, state, and local) employment; and Montgomery and Wascher (1985) focused on differences between the manufacturing and service sectors. Despite much excellent work in this area, important gaps remain which this research seeks to reduce. First, there has been no empirical evaluation of the relative wage differentials in the regulated sector of the economy compared to the private or government sectors. Our research provides some evidence on this issue. Second, most previous empirical studies focus on broad occupational groupings; as a result, their results do not entirely separate the effects of occupational self-selection from those of other characteristics. This paper avoids the problem of occupational self-selection by studying a single occupational group—electrical engineers. Finally, and perhaps most importantly, previous works tend to focus on just one theoretical explanation of inter-institutional wage differentials. We set forth four reasons that have been used in the past to explain, either explicitly or implicitly, why one might expect different wage gaps in varying institutional settings. We then evaluate our evidence in the light of all four theories simultaneously.

We plan to accomplish these objectives by examining the patterns of wage differentials in private, regulated and government sectors by sex and race. The paper is organized in the following way. We first review important theoretical models and recent empirical evidence. We then describe the data set, summarize the results of the regression models, and use the results to provide evidence on the relative degree of discrimination in the private, regulated and government sectors. We conclude with a summary and discussion of the theoretical and methodological implications of our findings.

LITERATURE REVIEW: THEORETICAL MODELS

Much of the literature on black-white and male-female wage differentials is concerned with separating the impact of human capital differences from the effects of discriminatory behavior on the part of employers. More recent literature applies the methodology in these studies to examine discriminatory behavior by employers in different sectors of the economy. An excellent summary of general theories of

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discrimination (especially sex discrimination) as well as review of many of the empirical findings can be found in Blau (1984) and Blau and Ferber (1986).

There appear to be four basic theories that lead one to expect different degrees of wage discrimination among public, private, and regulated sectors of the economy: the neoclassical model, the organized constituency theory, the regulatory compliance model, and the statistical discrimination theory. The first theory predicts that discrimination is likely to be greater in the public and regulated sectors than in the private sector, and the other three predict the opposite.[1]

Using standard neoclassical arguments, Becker (1957) argues that competition is likely to drive out discrimination. Employers can gain competitive advantages by substituting lower paid but equally productive nonwhites or women for higher priced whites or men, so competitive pressures on profit-maximizing firms make discrimination costly. Since public sector bureaus are neither entirely competitive nor profit-maximizing, one would expect on the basis of this theory that discrimination is more likely to occur in the public than in the private sector. Alchian and Kessel (1962) extend this argument to the regulated sector, which is largely sheltered from competition by being legally and politically prohibited from maximizing profits while being legally permitted to operate as a monopoly under the guardianship of public utility commissioners. Since regulated firms (and public bureaus as well) cannot maximize profits, they have an incentive to substitute non-pecuniary for pecuniary income. Discriminatory behavior is one such non-pecuniary indulgence.

In the organized constituency model, the role of special interest groups points to the opposite conclusion about intersectoral wage discrimination. Hamilton, Madison and Jay (1788), Dahl (1956), Olson (1982), Peltzman (1976) and Stigler (1971) have pointed out the disproportionate influence of small groups on American politics. Eisinger (1982) describes the "politics of ethnicity" characteristic of many cities, in which jobs and other political benefits are allocated to a particular ethnic minority as a result of the group's organized political influence, and Borjas (1980) has applied the theory of minority group influence to the issue of wage discrimination. According to the theory of small group influence, the presence of minority voters in an electoral or other politically relevant constituency means that politicians and politically accountable regulatory commissioners are likely to respond to minority preferences for wage equality. Since the political preferences of organized constituencies do not affect the competitive private sector, the theory leads to an expectation of greater discrimination against black minorities in the private than in the public or regulated sectors.

The organized constituency theory may not, however, explain male-female wage discrimination. Women do not comprise as recognizable and unified a constituency as blacks. Blacks, unlike women, are a statistical minority. This implies that the black constituency should have lower organization costs and therefore be politically more active and influential than the female constituency (Olson, 1982; Peltzman, 1976). Thus, the constituency theory may well apply only to intersectoral differences in black-white wage discrimination.

Moreover, the organized constituency theory may well account only for differences between the public and the other two sectors. Blacks are better organized as an influential voting group than as a group that gains power from its ability to contribute to campaigns, provide information, or engage in other lobbying or monitoring activities. Influencing regulatory bodies to reduce discrimination undoubtedly requires more than votes because rate setting and other issues are far more salient to the public than employment practices. As a result, the regulated sector, while not immune from voting results, is apt to be less responsive to black political interests concerning wage disparities than the government sector, and may not be responsive at all. The overall implication is that the constituency theory predicts only that black-white wage discrimination will be less in government than in the other two sectors; it is unlikely to account for male-female intersectoral wage gaps at all.

The theory of regulatory compliance predicts that the probability of compliance with anti-discrimination regulations is a function of the probability that non-compliance will be detected times the cost of punishment, given that the punishment is actually enforced (Viscusi and Zeckhauser, 1979; Becker, 1968). The Equal Employment Opportunity Act of 1972 prohibits discrimination against blacks and women, and gives the Equal Employment Opportunity Commission (EEOC) power to punish

discriminatory practices in all sectors of the economy. If there are intersectoral differences in the probabilities that EEOC will detect and punish violators, then these differences could account for observed intersectoral differences in wage gaps.

Consider first the probability of detection. All employment establishments, no matter what their sector, are subject to enforcement by EEOC. However, EEOC investigates discrimination issues only when a complaint is filed. Officials involved in hiring decisions must therefore estimate the probability that a complaint will be filed to estimate the probability of detection. Such a task requires a considerable amount of costly information. We assume instead that officials base their estimate on readily available information, such as their informal observations about the size of the target groups (females and blacks) relative to the total workforce, and use a simple proposition: the larger the proportion of the target group, the more likely it is that complaints will be filed.[2] These proportions vary across sectors. Based on all occupations, the proportion of women is highest (.52) in government; it is next highest in the private sector (.46), and lowest in the regulated sector (.29). For blacks, the proportions are .15, .11, and .11 in the government, private, and regulated sectors, respectively.[3] Using data from our own survey, the percent of women who are electrical engineers in government, in the private sector, and in the regulated sector is 5%, 3%, and 3%, respectively. For black engineers, the corresponding percentages are 3%, 2%, and 2%. While some of these differences are not large, they are consistent, and lead to the conclusion that the estimate of the probability of detecting discrimination is somewhat greater in the governmental arena than in the other two sectors.

The probability of detection might also be affected by the Office of Federal Contract Compliance Programs (OFCCP) in the Department of Labor. This office has authority over all firms that are under federal government contract, including many private firms and most regulated firms. All firms with Federal contracts are required to submit information on employment patterns. Therefore, the probability of detection is likely to vary with the relative frequency of federal contracting in the private and regulated sectors.[4] Since the federal government buys electricity from virtually every electric utility, where many electrical engineers work, the threat that noncompliance with anti-discrimination regulations will be detected is likely to be larger in the regulatory arena than in the private sector.

The cost of punishment, once an infraction is detected, is not likely to vary across sectors. Back pay, the primary punishment that EEOC can levy, is likely to weigh more heavily on firms in the private sector than on regulated firms and public bureaus, because competitive pressures make those firms more marginal. However, rather than mete out maximum punishments, lower-cost and delayed compliance arrangements are likely to be negotiated, particularly if the penalty could put a constituent out of business. Therefore, the chance of maximum penalties is likely to be lower in the private sector (Langbein and Kerwin, 1984). The result is that the cost of punishment by EEOC, given that it is actually enforced, may be close to the same among sectors. This is also true for OFCCP.[5]

Overall, these considerations suggest that, in the case of electrical engineers, if the EEOC were the only relevant regulatory agency, the expected cost of noncompliance with equal employment regulations will be larger in the public than in the other two sectors. But the regulated and private sectors are additionally subject to regulatory pressure from the OFCCP, which we hypothesize to be more effective at attaining compliance in the regulated than in the private sector. The upshot is that, because there are two regulatory authorities with somewhat different jurisdictions, no comparison of the relative costs of noncompliance between the government and the other two sectors can be predicted. By contrast, the regulatory compliance theory does clearly predict that, because of OFCCP, the expected costs of noncompliance in the regulated sectors will exceed those in the private sector.

The theory of regulatory compliance also predicts that obedience will be greater when its costs are less. It may in general be easier for firms and agencies to comply with gender than with race targets, because the supply of educated women is greater than that of educated blacks. Thus, if there were no differences in expected non-compliance costs for race and gender issues, we would expect smaller gender than racial wage gaps in all three employment arenas.

The statistical discrimination model indicates how the high costs of information can also explain differences in discrimination among sectors of the economy (Posner, 1981; Arrow, 1973). According to

this perspective, employees in competitive markets are paid according to their marginal product, but many factors make it difficult and costly to predict or even evaluate *ex post* an individual's contribution to total marginal product. Such high information costs may make it rational for employers to discriminate on the basis of statistical expectations. Women, for example, may find that their future productivity is discounted because employers expect them to have a shorter worklife due to child-rearing responsibilities. Blacks' future productivity may be discounted because of expected educational quality deficiencies that result from prior racial discrimination (Gronau, 1982). As long as such statistical discrimination appears to be efficient, it is more likely to be found in the competitive private sector than in the public or regulated sectors, and it is as likely to apply to black-white wage differentials as to male-female wage gaps.

LITERATURE REVIEW: EMPIRICAL EVIDENCE

Most of the empirical work in this area has confirmed the theories that predict lower wage differentials in public organizations relative to private firms. There are, however, a number of indirect tests of the hypothesis that competition drives out discrimination. These do not entail intersectoral comparisons, but instead examine the relation between competition and discrimination within the private sector. Not all of these studies focus on wage differences. For example, Alchian and Kessel (1962), in a study involving the regulated sector *per se,* found that unregulated industries hired more than twice the percentage of Jewish MBAs from Harvard than regulated industries, which favored gentile Harvard MBAs. Cymrot (1985) found that the free agent rule in baseball, which increased competition, significantly reduced the salary differential between otherwise comparable black and white players. Ashenfelter and Hannan (1986) found that increasing market concentration within the banking industry reduced the employment of women relative to men.

There have been four explicit tests of the hypothesis that ethnic or racial minorities, because of their political power, will be effective in reducing discrimination in the public sector, but none compare the public sector to the regulated and private sector, and none explicitly focus on intersectural wage discrimination. Eisinger (1982) finds that, holding other variables constant, indicators of black political mobilization in American cities are assoicated with a larger percentage of black employment in the total city workforce. Borjas (1980), in a study not explicitly concerned with wage discrimination, finds that significant wage differentials among similarly qualified individuals employed in different federal agencies can be explained by indicators of the political power of the agency's constituency. In a subsequent study, Borjas (1982) found that measures of the political power of federal agencies' black constituency significantly reduced black-white wage discrimination. In other words, federal agencies with influential black constituents were less likely to discriminate against their own black employees. Finally, Sav (1986) examines black-white enrollment and graduation ratios in public colleges and universities as a function of proxies for black political power in the 50 states, holding other variables constant. All of the theoretically relevant coefficients were significant and had the correct sign.

There are few explicit tests of the theory of regulatory compliance in the context of wage discrimination. Nonetheless, several studies reveal that the equal employment opportunity and affirmative action programs of the federal government have reduced occupational segregation and the wage gaps of women, and that affirmative action has increased the employment of blacks and women (Beller, 1977; Beller, 1982; Leonard, 1985). Data in Beller (1977: 311, 316) are consistent with the regulatory compliance theory in that the government, which faced lower probabilities of investigation and punishment at the time of the study, also shows a smaller reduction in gender based wage differentials than the private sector.

The remaining empirical studies compare wage discrimination in the public and the private sectors, but they do not comprise explicit tests of theories of intersectoral wage determination. Using variants of the human capital model, they consistently find that discrimination is less in the public than the private arena. For example, Long (1975) found that productivity adjusted black-white earnings ratios are consistent with the hypothesis that employment discrimination is less intense in the public than in the private sector, mainly because payoffs to education for blacks in the private sector are less than in the

public sector. Within the public sector, Long found discrimination at the federal level to be greatest, followed by state and then local government. In a later study, Long (1976) replicated his original findings that blacks earn less than comparable whites in the federal and private sectors, but the black-white differential is larger in the private sector. This finding held true for all workers, and for the white collar subset as well. In addition, Long found that women earn less than comparable men in both sectors, but the gap is greater in the private sector, not only for all workers but for white collar workers as well.

S. Smith (1977) found that wage gaps due to sex discrimination exist throughout the economy. Although the degree of discrimination appeared to be largest in the private sector, wage differences were significant in the governmental sectors as well. There tended to be a decrease in the degree of discrimination with the level of government.

D. Alton Smith (1980), in a study designed to update Long's work and to correct for S. Smith's failure to account for the differential probabilities of blacks and whites getting jobs in the public sector, found that the federal government pays all race and gender groups more than the private sector, when productivity differences were controlled. The advantage of federal employment was greatest for white females, and lowest for white males; the federal employment wage advantage for black males and females was just slightly greater than that for white males. Contrary to previous findings, these results suggest that the federal government does not discriminate at all. The wage advantages of federal employment largely disappear at the state and local government levels, with the exception of black males in state government, who also earn considerably more than comparable black males in the private sector.

Overall, the empirical literature seems curiously divided into two types. On one hand, the human capital studies provide evidence of intersectoral wage differences, but are atheoretical because they ignore explanations that could account for those differences. On the other hand, the studies that explicitly test theories of intersectoral wage gaps tend to ignore alternative explanations of the same phenomenon: they test one theory against a null hypothesis rather than against a different theory. We intend to interpret the findings that follow in the light of multiple theories.

DATA

The data for this study come from a random sample of non-student members of the Institute for Electrical and Electronics Engineers (IEEE), based on a survey mailed in January, 1987. Members of IEEE share a common occupation in electrical engineering; most have a BS or MS in electrical engineering, but a significant minority have degrees in computer science, physics, and mathematics.

The survey response rate was 40.5%. This rate, while not especially high, compares favorably to previous surveys of this population, which have garnered response rates between 33% and 46%. The sample is not significantly different from the regional distribution of the population at the .01 level.

We restricted our analysis to non-Asian IEEE members who were employed full time in non-academic jobs. Academics were excluded because the data do not permit separating those who work in public from those who work in private educational institutions. We omitted Asians because the theories we test generally compare groups with greater human capital assets and wages (males, whites) to those with lesser human capital assets and wages (women, blacks and hispanics). Table 1 shows the relative size of the subgroups we examine.

The regulated sector refers to public utility employees, as well as to respondents in the private sector who designated their field of primary technical interest as broadcasting, cable systems, communications, nuclear and plasma sciences, radiation, or power engineering, all of which are highly regulated. The survey did not distinguish among federal, state or local government employees. The private sector excludes employees of not-for-profit laboratories or firms.

REGRESSION RESULTS

We estimated regression parameters for whites and blacks employed in government, in the private sector, and in the regulated sector, and for males and females for each of the three arenas. Like estimates

TABLE 1
Distribution of Full-Time Employed non-Asian IEEE Members not Employed in Academic Institutions, by Gender, Race and Sector

			N	%*
Male	White	Regulated	2168	24.4
		Government	1125	12.6
		Private	5122	57.6
	Black & Hispanic	Regulated	51	0.6
		Government	31	0.3
		Private	90	1.0
Female	White	Regulated	59	0.7
		Government	55	0.6
		Private	188	2.1
	Black & Hispanic	Regulated	4	0.0
		Government	5	0.0
		Private	1	0.0
Total			8899	

*Percents may not sum to 100 because of rounding.

from previous research, each equation included as exogenous variables education, work experience, a dummy for veteran status, a dummy for the presence of children under 18, a dummy for race or sex, a dummy for metropolitan location, and a dummy for the Southern region. In addition, education and experience were included as both linear and nonlinear terms, and the interaction between education and experience was also incorporated in some models.[6] Education is measured on a scale from 0 to 4, where 0 means no college degree, 1 indicates a BA or BS, 2 represents some graduate school, 3 is a MA or MS, and 4 is a PhD. Experience is measured as years of professional experience in electrical engineering or related fields. The dependent variable is the log of the respondent's 1987 annual salary. Although both linear and non-linear forms with and without the interaction term were estimated for each of the twelve subsamples, only the linear equation without the interaction term is presented. The F- and t-statistics for this equation were consistently superior to those from any other form for every subsample.[7] Tables 2 and 3 present the results for race and gender, respectively.

According to Table 2, education and experience have the expected positive effect on wages for every subgroup. Among electrical engineers, being a veteran has either no significant effect on wages, or a negative one. Apparently, for white engineers in the private sector, experience in the armed services has a significant and continuing opportunity cost in terms of lost wages. Having children is associated with significantly higher wages for whites in all three sectors, but not for blacks. Neither gender nor living in a metropolitan area significantly affects wages for any subgroup in Table 2. Living in the South, however, depresses the wages of white engineers who are employed in the private sector. The R^2's are highly significant and range from .27 to .61. These values, together with the relative stability and correct signs of the coefficients, suggest that these equations can be used to gauge salary discrimination ratios with some reliability.

We turn next to Table 3, which presents the regression results for men and women in the three sectors. The linear model without the interactive term is significant for all equations. Within each equation, educational level and years of experience always possess the correct positive sign and are significant at the 3% level or better in all six equations. Veteran status is significant for women in the government and for men employed in the private sector; as in the race equations, it continues to have a

TABLE 2
Regression Results for Whites and Blacks Employed in Government, Private, and Regulated Sectors. (t-Statistics in Parentheses)

	Dependent Variable: Log of Wages					
	Gov't. Whites	Gov't. Blacks	Pvt. Whites	Pvt. Blacks	Reg. Whites	Reg. Blacks
Intercept	10.21 (186)	10.26 (59)	10.25 (281)	10.19 (141)	10.27 (211)	10.34 (55)
Educ.	.120 (8.98)	.156 (3.58)	.134 (16.80)	.193 (4.74)	.131 (11.71)	.137 (2.49)
Prof. Exp.	.017 (18.83)	.015 (4.30)	.017 (28.84)	.018 (5.68)	.017 (22.38)	.017 (3.41)
Veteran status	−.038 (−1.86)	−.002 (−.03)	−.048 (−3.49)	−.010 (−.15)	−.013 (−.79)	.037 (.39)
Children	.067 (3.62)	.088 (1.38)	.100 (8.60)	.090 (1.48)	.110 (7.67)	.091 (1.11)
Sex*	.039 (.85)	.022 (.14)	.053 (1.68)	—	.042 (.95)	.009 (.07)
Metro. area*	−.05 (−1.66)	−.082 (−1.04)	.024 (1.33)	—	−.002 (−.10)	−.055 (−.48)
South	.001 (.04)	−.065 (−.58)	−.076 (−3.98)	.011 (.11)	−.017 (−.91)	−.070 (−.88)
R^2	.41	.71	.27	.56	.32	.41
Adj. R^2	.40	.61	.27	.53	.32	.30
$F_{prob.}$	.0001	.0002	.0001	.0001	.0001	.0024
N	998	28	4597	71	1933	48

*Omitted when the value is invariant within the subsample.

negative sign. The presence of children is significantly associated with higher wages for men in all three sectors, but not for women. In both Table 2 and 3, having children appears to be correlated with higher wages for the putatively advantaged subgroups. Neither race nor living in a metropolitan area is significant for any subgroup, but living in the South significantly diminishes the wages of male engineers in the private sector and female engineers in the regulated sector. The F-tests for goodness of fit are highly significant, with R^2's ranging from .26 to .65.

Overall, the regression results are indicative of a considerable amount of structural variation in wage determination among sectors, between blacks and whites, and between males and females. The next section of the paper discusses whether these variations contribute to systematic differences in black-white and male-female wage ratios across the three sectors of the economy.

EVIDENCE ON WAGE DIFFERENTIALS

In order to evaluate the wage differentials for blacks and whites, and for males and females, in the private, regulated and government sectors, the gross wage differentials were decomposed into two components. This technique, which has become standard in the empirical literature cited earlier, was

TABLE 3
Regression Results for Men and Women Employed in Government, Private, and Regulated Sectors
(t-Statistics in Parentheses)

	Dependent Variable: Log of Wages					
	Gov't. Men	Gov't. Women	Pvt. Men	Pvt. Women	Reg. Men	Reg. Women
Intercept	10.29 (164)	10.15 (52)	10.27 (201)	10.18 (189)	10.30 (188)	10.32 (61)
Educ.	.118 (8.83)	.184 (3.23)	.135 (16.59)	.150 (6.34)	.130 (11.59)	.114 (2.22)
Prof. Exp.	.017 (18.71)	.031 (3.66)	.017 (28.49)	.025 (9.11)	.017 (22.27)	.045 (5.99)
Veteran status	−.032 (−1.59)	−.168 (−2.32)	−.047 (−3.37)	−.045 (−.35)	−.011 (−.63)	−.187 (−1.09)
Children	.069 (3.72)	.021 (.30)	.101 (8.58)	.054 (1.45)	.111 (7.68)	−.025 (−.44)
White*	−.033 (−.594)	−.040 (−.27)	.035 (.76)	—	.022 (.48)	−.091 (−.93)
Metro. area	−.05 (−1.67)	−.073 (−.70)	.024 (1.29)	.023 (.51)	−.004 (−.17)	−.015 (−.21)
South	−.0004 (−.02)	.019 (.18)	−.077 (−3.97)	−.016 (−.32)	−.015 (−.77)	−.190 (−2.73)
R^2	.39	.70	.26	.57	.31	.70
Adj. R^2	.39	.64	.26	.56	.31	.65
$F_{prob.}$	.0001	.0001	.0001	.0001	.0001	.0001
N	984	42	4514	154	1925	56

*Omitted when the value is invariant within the subsample.

developed by Blinder (1973) and Oaxaca (1973) and refined by Jones (1983) and Filer (1983). The gross wage differential is defined as the difference between the mean of the log of wages of males and females (or whites and blacks). Average wages of males (or whites) may be higher for two reasons: (1) differences in the average characteristics (and implicitly, the productivities) of the two groups; and (2) differences in the returns to the average characteristics of the groups, presumably due to discrimination. As has been frequently pointed out, to the extent that important variables are omitted from the original regression equations, the degree of discrimination would be less than reported by this technique. Mathematically, the decomposition is done in the following way:

$$\overline{W}^H - \overline{W}^L = \Sigma\, b^H(\overline{X}^H - \overline{X}^L) + \Sigma\, \overline{X}^L(b^H - b^L)$$

where H is the "high" group, L is the "low" group, b are the coefficients from the regression equations, W is the log of wages and X are characteristics or independent variables in the regression models.

The left-hand term is the gross differential between the two groups. The first term on the right represents the value of the difference between the average characteristics of the high and low groups. The second term on the right represents the difference in the way the low wage groups would be evaluated using the high wage regression coefficients and how they are, in fact, evaluated in their own wage equation.

Table 4 presents the results of this decomposition. They are conclusive in several respects, but still leave some of the questions raised earlier unanswered. As far as the gross differentials are concerned, the sexual wage gaps are much wider than the racial gaps in all three sectors.

The first part of Table 4 summarizes the black-white differentials by sector. While the gross differentials across the three sectors are relatively invariant, the "unexplained" differences, those attributable to different rates of return to endowments, are substantially larger in the private and regulated sector than they are in the public sector. When the government sector is analyzed relative to the other two, most telling is the complete lack of any "discriminatory" differential between black and white electrical engineers in the government. In fact, these results indicate that black electrical engineers are compensated at a higher rate for any given set of endowments. On the whole, a rather clear picture emerges from this part of the Table: the "unexplained" differentials reveal a clear divergence between the government and the other two sectors. The private and regulated sectors both appear to discriminate against black engineers, at least in terms of wages, while in the government, there is virtually no wage discrimination against black engineers. There appears to be very little difference in wage discrimination between the regulated and private sectors, with only a 7 percentage point higher value in the regulated sector.

Things change somewhat in analyzing the sex differentials in the second half of Table 4. Here, we find no difference between the government and regulated sectors in the percent of wage differential attributable to discrimination. Unlike the race-based results, we find no discrimination against female engineers in the private sector; what discrimination-based wage differential there is emerges in the government and regulated sectors alone. These results differ from those found in other empirical studies, such as Long (1975, 1976), Treiman and Hartman (1981), and Smith (1977). However, because of the narrowly defined occupational categories in the data set, the absolute size of the wage differentials will be smaller than in most other studies, which are based on a wide dispersion of occupations. Thus, any economy-wide wage gaps due to occupational discrimination will not appear here.

Overall, while the gross wage differential is larger between gender than race groups in all three sectors, the percent attributable to discrimination, where it exists, is larger for the race groups than the sex groups only in the private and regulated sectors. In the government, the reverse is true: there is virtually no discrimination against black electrical engineers, while women electrical engineers fare worse than their male peers.

TABLE 4
Wage Differentials for Black-White and Male-Female Categories: Private, Regulated, and Government Sectors[1]

	Private	Regulated	Gov't.
		White-Black	
Gross differential	.087	.055	.067
Due to differences in coefficients (unexplained)	.027	.021	−.042
Percent of gross (due to "discrimination")	31%	38%	−63%
		Male-Female	
Gross differential	.247	.278	.290
Due to differences in coefficients (unexplained)	.000	.038	−.041
Percent of gross (due to "discrimination")	0%	14%	14%

[1]These results are based on the linear models without the interaction terms; however, the linear model with the interaction term yields the same qualitative differences among the sectors.

CONCLUSION

The results cast some empirical light on the theories of discrimination discussed above. While the narrow occupational category of electrical engineers that comprises the data base for this study is advantageous in that it eliminates salary differences due to occupational self-selection, it has disadvantages as well. Specifically, the use of a single occupation as well as the relatively small number of blacks and women in some of the equations mean that the results cannot be generalized to the extent we would like. Nonetheless, the evidence does allow some tentative conclusions to be drawn.

First of all, the racial results are clearly consistent with the organized constituency theory, which predicts that wage discrimination against blacks will be less in government than in the other two sectors, which is what Table 4 shows. By contrast, the gender results are clearly consistent with the neo-classical theory. According to this theory, competition should drive out discriminatory behavior by employers. As a result, there should be no wage discrimination in the private sector, in contrast to the less competitive sectors. Table 4 upholds this expectation, since there appears to be virtually no discrimination against women in the private sector and roughly comparable amounts of discrimination in the other two sectors, whether measured in absolute or percentage terms.

The data in Table 4 support only in part the expectation that compliance will be greater when its costs are lower. Based on this, one would expect less discrimination against women than blacks. Not only are the gross differentials larger between men and women than between blacks and whites, the percent of the gross due to discrimination is larger for the race equations than for the gender equations only in two of three sectors. The government is the exception, probably as a result of the political influence of blacks.

The data appear to be generally inconsistent with the regulatory compliance hypothesis that, because of OFCCP, the expected costs of noncompliance will be greater in the regulated than in the private sector. If this hypothesis were true, there should be less discrimination in the regulated than in the private sector. Yet, for both the gender and the racial results, the opposite is true.

The data are not very consistent with the statistical discrimination theory either. That model predicts the precise opposite of the neo-classical model, leading to the expectation that discrimination, assuming it is efficient, would be greatest in the competitive private sector and less in the other two. Just as the private sector is not consistently the least discriminatory, it is not consistently the most discriminatory either. Instead, based on the absolute and percentage discrimination differentials in the race equations, the private sector is more discriminatory than the government but less discriminatory than the regulated sector. In the gender equations, the private sector is the least discriminatory.

In sum, while a comparative examination of four theories of intersectoral wage differentials reveals relatively more support for the neo-classical and organized constituency theories than for the regulatory compliance and statistical discrimination theories, one cannot necessarily generalize from the sample evidence presented here.[8] It is also important to point out that both the neo-classical and statistical discrimination theories are deficient in that they account only for differences between the competitive private and the less competitive regulated and government sectors, ignoring differences between the latter two. These theories are equally deficient in that they ignore differences between racial and gender groups, yet the discrimination differentials between blacks and whites are clearly unlike those between men and women.

More important, while the literature generally presents these theories as conceptually separate accounts of institutional differences among labor markets, such a separation may in fact be impossible. As Beller (1977) points out, regulatory (and political) pressures to hire women (and blacks) facilitate the acquisition of information about the likely productivity of female (or black) employees, and may also alter tastes for discriminatory behavior. Thus, tastes and expectations may either be endogenously determined, or they may be exogenous. To the extent they are endogenously dependent on political (or regulatory) forces, it is impossible to reject or accept the statistical discrimination and neo-classical explanations based on intersectoral differences in the returns to human capital. Rather, micro level data that measure the preferences and productivity expectations of hiring officials, as well as the human capital, racial and gender characteristics of the employees, are necessary to separate the neo-classical and statistical

discrimination theories from each other and from the other two explanatory accounts. In a similar vein, micro level data about the subjectively expected costs of non-compliance are necessary to separate the regulatory compliance theory from the organized constituency theory. Studies purporting to uphold or reject either the regulatory compliance theory or the organized constituency theory without holding constant the preferences and productivity and non-compliance expectations of hiring officials may therefore be drawing unwarranted inferences.

NOTES

The Institute for Electrical and Electronics Engineers generously provided the data for this study. Only the authors, however, are responsible for the findings, opinions, and interpretations presented here.

1. The human capital model could also account for inter-sectoral wage differences, in that human capital differences may vary across the private, public, and regulatory sectors. We try to remove as many intersectoral human capital differences as possible, so as to separate the human capital model from models that are more explicitly institutional. We do this by examining only one occupation and by holding constant factors like education and experience in the regressions that follow. However, to the extent that we fail to make human capital factors invariant across sectors, our results may confound human capital models with inter-sectoral models of wage determination (Polachek, 1984).
2. Such a simple decision rule has intuitive appeal, since hiring officials can easily estimate the relative size of target groups and may reasonably forecast that where there are numerous blacks or women, there will be more complaints. Implicitly, officials may act on the rule, "Where there's smoke, there's fire." The forecast may even have empirical veracity, since the relative predominance of minorities and women may be indicative of low wage, low skill occupations for which filing complaints is politically and socially more acceptable, and may even be economically more rational, particularly where there is union or other support for the costs of filing complaints.

   Of course, hiring officials could use a different decision rule than the one we employ here, and different hiring officials could use different rules. In the absence of empirical information about these decision rules, some a priori assumption is required to make the regulatory compliance theory yield testable predictions. As we argue below, this as well as other problems with the regulatory compliance theory make it necessary to acquire such empirical information in order to give the theory an unbiased test.
3. These proportions were computed from 1985 data on nonagricultural employees provided by the Bureau of Labor Statistics. The regulatory sector is defined by employees in transportation and public utilities. The government sector is defined by employees in public administration and by those listed in other SIC codes who work for the government. The private sector is all other employees, excluding self-employed and unpaid family workers.
4. Unlike EEOC, OFCCP compliance reviews are not complaint-based.
5. OFCCP can punish by withholding federal contracts, but it has never administered this penalty. Instead, like EEOC, it negotiates with firms.
6. These represent the standard set of independent variables used in the empirical studies cited in Section I. Other explanatory variables not included here are union membership and marital status, as well as interactions involving these variables, such as crosses between marital status and experience. Marital status is proxied by the presence or absence of children under 18, and union membership is not relevant for this particular population.
7. Furthermore, the sizes and signs of the coefficients were not very sensitive to changes in the functional form.
8. The small minority sample sizes in this research reflects the paradox that one strength of this analysis is also its weakness. Studies of a single occupation such as this one remove the bias due to occupational self-selection, but are likely to be plagued by small sample sizes of minorities within sectors. The Current Population Survey data that others often rely on overcomes the small sample problem but does not offer a sufficiently fine occupational breakdown.

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