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Abstract

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EXECUTIVE SUMMARY

Salaries, promotions, and salary growth of men and women in a large, diversified firm were examined for the years 1980 through 1986. Consistent with other studies, men's average salary was higher than women's average salary. However, statistical adjustment for gender differences in education, tenure, time at level, experience, and job level substantially reduced the salary advantage of men over women.

Although the average salary of men was higher than that of women in 1980 and 1986, women actually received greater numbers of promotions, as well as larger percentage salary increases between 1980 and 1986. One reason for women's salary growth advantage was the higher average performance ratings of women between 1980 and 1986. One important reason for women's promotion advantage was their greater liklihood of being in (lower) job levels where promotion opportunities were greatest.

As a result of the greater promotion and salary growth rate for women, the ratio of men/women salaries rose from .84 in 1980 to .88 in 1986, thus reducing the raw salary gap (1 - .84 = .16) by 25% ([.88 - .84]/.16) in a six year period. Projection of salary growth patterns observed during the 1980-1986 period suggests that the pay of men and women would equalize in approximately 15 years.

A key implication of the study is that the conclusion one draws regarding the promotion and compensation practices of firms with respect to men and women may differ depending on the methodology and type of data used. Thus, for example, examination of data at multiple points in time facilitates study of human resource processes. Study of these processes may yield different implications than sole reliance on a "snapshot" of human resource outcomes taken at a single point in time.

access to firms, occupations, and jobs. Fuchs (1971), in fact, contended that virtually the entire earnings gap between men and women could be explained if an occupational classification scheme having sufficient detail were used, but noted that the question of why men and women had different occupational distributions then needed to be resolved (see also Sanborn, 1964). Although it is clear that access to jobs and occupations is an important determinant of earnings, little research has examined the question of why such attainments differ according to gender.[2]

A second problem with market-wide studies of gender-based discrimination is that they provide no direct information on worker productivity at the level of the firm. As one consequence, previous research has had to rely on indirect measures of productivity (e.g. experience, tenure, and education). However, some evidence indicates that such measures may converge poorly with measures of productivity at the level of the firm (e.g. Medoff & Abraham, 1981; Brown, 1982).

All firms attempt to assess the productivity of their workers in one way or another. Many firms formalize this process by, for example, regularly conducting performance appraisals of employees. In these firms, compensation and internal staffing (e.g. promotion) decisions are often explicitly based on such productivity measures.[3] These measures have a number of desirable characteristics. First, they are designed to assess worker productivity in a specific job in a specific firm. Second, such measures are influenced by human capital characteristics only insofar as the latter are useful in performing the particular job in question. In other words, firm-level productivity measures potentially carry information on the quality of the match between the worker's abilities and what the job requires. Third, these job-specific productivity measures reflect differences in worker motivation, which together with the ability-job requirements match, affect actual individual performance levels.

Given the discussion above, three avenues of labor market discrimination research would appear to be especially useful. First, firm-level research is needed that examines differences in men and women's salaries adjusted for possible differences in job-specific productivity measures. Second, research on the determinants of occupational and job attainments would also be helpful. Some evidence indicates that substantial gender-based within-firm job segregation may exist (Bielby & Baron, 1986), suggesting that job level may be an important determinant of gender-based salary differences within firms. Although within-firm analyses have been rare in the literature, they have indeed found the effect of job level on earnings differences to be quite large, especially relative to within-job differences (Malkiel & Malkiel, 1973; Halaby, 1979; Rosenbaum, 1985). Third, longitudinal data would permit study of changes in salary. Further, such data would aid in assessing the extent to which firms' promotion practices contribute to job level differences. Again, it would also be useful to know what role job specific performance measures play in promotion and salary increase decisions.

In the present research, we examine possibile gender differences in attainment in a large, private firm. Specifically, we focus on three general issues. First, controlling for job level, performance ratings, and individual characteristics, is there a salary disadvantage against women? Second, given longitudinal data, we can move beyond cross-sectional analyses and examine models of salary change in over time, addressing questions of the following type. Do women's salaries grow at the same rate as men's? Do men and women receive equal salary increases for a given level of performance? Do men and women receive equal salary returns from promotions within the firm? Unlike much previous research, moreover, we not only measure whether a promotion has occurred, but also the number of promotions over time. Third, controlling for initial job level, performance, and individual

characteristics, do men and women receive different numbers of promotions over time? In other words, are women, for example, held to higher promotion standards (Olson & Becker, 1983)?

The Firm

The data are from the personnel information system of a firm that produces a highly diversified set of industrial and consumer products. It has roughly 100 manufacturing operations in more than 30 states. The firm enjoyed general financial success during the period of the study, as evidenced by revenues that grew faster than the Consumer Price Index and a return on equity that comfortably exceeded the median for the Fortune 500.

Exempt jobs are the focus of this study. Professional, managerial, sales, and technical jobs are the major broad categories. Examples of some of the most common job titles include engineer, senior engineer, sales representative, area sales manager, administrative assistant, technologist, supervisor, and maintenance supervisor.

Compensation policies and practices of the firm are typical of those in the Fortune 500. For example, the firm participates in over 6 annual salary surveys for jobs included in the present study. The focus of these surveys varies. For instance, some focus on a selected group of perhaps 10-15 product market competitors. In contrast, others focus on labor market competitors that employ persons with similar skills or have similar occupations. Statistical methods are used to combine the results of surveys. However, considerable judgment is also exercised because of different degrees of confidence placed on the results of the various surveys. This is consistent with Rynes and Milkovich's (1986) argument that ad hoc judgments are typically made throughout the process.

Strategy also plays an important role in determining pay level. During the time period of the study, a policy of "paying with the leaders" was followed for

the jobs we examined. In practice, this policy meant establishing the pay policy line at the 50th percentile of the group of pay leaders.

The pay structure of the jobs included in this study was maintained with the help of a single national job evaluation system. The structure is defined by 15 job classes or levels, each with minimum and maximum rates of pay roughly 20% below and above the midpoint. A survey of 557 major U.S. firms by the Conference Board (1984) found that the median number of levels in exempt pay structures for all industries was 19. The compensable factors used in the job evaluation point system are: education/knowledge required, experience required, complexity of duties, working conditions, and responsibility. Of the 491 firms using formal job evaluation in the Conference Board study, 90% used a formal plan. Of this group, approximately 20% used a point plan of the general type used by the firm we studied.

An explicit pay-for-performance policy exists for the determination of individual pay increases. The policy is implemented through the use of annual merit increase guides (see Milkovich & Newman, 1987 for some examples). These guides are designed to control the cost of annual pay increases, as well as to encourage a distribution of increases to employees. According to the previously mentioned Conference Board survey, 83% of firms used such guides. In the firm we studied, recommended salary increase ranges were a function of (a) merit rating on one axis and (b) current position in the salary range on the other axis. Higher ratings and less penetration into the salary range at a particular level were associated with both larger and more frequent salary increases.[4]

Promotions are based on performance as well, with some additional consideration also given to years of experience accumulated with the firm. A salary increase comes with promotions. Again, the corporate compensation department issues yearly guidelines that specify the size of promotional increases. The importance of examining the firm's promotion system is increased by the fact that the firm engages

in a fairly strong practice of promotion from within. Thus, women's access to higher level jobs is most often governed by decisions made while they are current employees. Direct access from the external labor market is limited.

Performance is assessed through a formal, annual performance appraisal process.[5] The immediate supervisor rates each employee on a 4-point scale with 4 being the highest performance level. Raters receive instructions to consider not only how well job requirements were satisfied, but also the difficulty of the job requirements, as well as the appropriateness of methods used to satisfy the job requirements. The numerical rating is supplemented by a written description of the subordinates performance during the year. The complete appraisal is typically reviewed by a higher level manager.

We note that the method of appraisal, as well as its central role in making promotion and salary increase decisions is consistent with the way firms typically operate with respect to their exempt employees. The review system is also a common feature of performance appraisal plans.[6]

In equal employment opportunity (EEO), the firm's standard training for its managers included materials on EEO compliance with respect to staffing, access to training, compensation, and performance appraisal. The inclusion of EEO issues in training programs is typical of large firms.[7] Corporate personnel monitored managers' actions in these areas and encouraged improvement in those displaying subpar performance.

Several external events may have also had an effect on the firm's human resource practices. First, as with many large firms, it faced equal employment opportunity litigation during the 1970s. The major case involved a class action suit filed by female hourly employees in a very small number of the approximately 100 plants. This suit was eventually settled out of court for a substantial sum of money. As part of the settlement, the firm stated that it would also develop

a plan to enhance the hiring and promotion of female salaried employees. We wish to emphasize, however, that this litigation did not involve female salaried employees. Further, no formal or numerical goals for salaried women came about as a result of the litigation activity.

A second external influence was the recession of the early 1980s. Again, as with many other large firms, the firm we studied reduced the size of its white-collar workforce during this period. Much of this reduction came about through early retirement. As a result, the number of men in exempt jobs actually declined slightly over the course of the study. In contrast, the number of women in exempt jobs grew by over 50% during the same period.

METHOD

Sample

The present study includes two samples: exempt employees in job levels 1 through 8 (a) present in 1986 (the cross-sectional sample) and (b) present in both 1980 and 1986 (the longitudinal sample). The majority of exempt employees are employed in these levels (approximately 84% of men, 97% of women).[8] The cross-sectional sample includes 2412 women and 9647 men. The longitudinal sample includes 840 women and 5550 men.

Measures

The dependent variables are annual salary, salary growth, and promotions.[9] The first set of independent variables, referred to as human capital (HC) variables in this study, are firm tenure[10], job tenure (years at a particular job level), potential experience (age - years of schooling - 6), and education dummies for highest degree. Squared terms for job tenure, firm tenure, and potential experience are also included. In the cross-sectional analyses, the most recent performance rating prior to the most recent salary change is used. In the longitudinal analyses, the average performance rating over the 1980-1986 time frame is used.

The variables used in the present study are summarized in Appendix 1.

Analyses

The following salary equation is estimated separately for years 1980 and 1986:

$$Ln(S_{it}) = X_{it}B_t + e_{it} \quad (1)$$

where $Ln(S_{it})$ is a vector of the natural logarithm of salaries for i persons during time period t; X_{it} is a matrix of observations on the exogenous variables contained in Table 1; B is a coefficient vector; and e is a disturbance term composed of all unmeasured causes of salaries.

Given the availability of longitudinal data, we also estimate the following salary growth equation:

$$Ln(S_{i1986}/S_{i1980}) = X_{i1980}B + e_{i1980}. \quad (2)$$

Thus, salary growth is defined as the natural logarithm of the ratio of 1986 salary divided by 1980 salary.

Finally, we estimate a similar equation for the number of promotions received during the 1980-1986 period:

$$PROM = X_{i1980}B + e_{i1980}. \quad (3)$$

The salary growth and promotion equations provide a unique opportunity to study the attainment of men and women over time. These analyses may help explain the process by which men and women reach the differential levels of attainment so widely observed in cross-sectional research.[11]

Estimates of (1)--(3) were obtained separately for men and women and used to decompose salary, salary growth, and promotion differences into two components (Blinder, 1973; Jones, 1983): (a) differences in mean levels of endowments, and (b) differences in coefficients or prices received for these endowments. Because the result of a decomposition varies as a function of which group is used as the standard (Cain, 1986), we report decompositions using both the advantaged and disadvantaged group as the standard. In addition, we report corresponding "adjusted

ratios" (Cain, 1986, p. 746).

As discussed by Blinder (1973), Oaxaca (1973), Cain (1986), and others, such decompositions assume that the variables on the right side of the equation are exogenous to gender. If not, additional equations for these right side variables can, in theory, be added to the model. In the present context, for example, an equation for job level might be warranted. As Blinder argued, however, this latter strategy is often difficult in practice because of identification problems. Consistent with this point, we found the determination of job level and salary to be so closely intertwined that identification of a two equation model was not possible.

As an alternative, we follow the Blinder and Oaxaca approach of estimating a series of equations, introducing variables of more questionable endogeneity in steps to the X vector. Thus, in the cross-sectional salary analyses, for example, we introduce job level last. This strategy permits an examination of how the decomposition results change in response to different model specifications.

RESULTS

Table 1 reports means for (a) all employees active in 1986 and (b) employees active in both 1980 and 1986. The women/men salary ratio is somewhat higher based on employees active in both 1980 and 1986. One explanation may be the fact that this latter group does not include new entrants to the jobs. New entrants are more likely to begin in lower job levels and have less time accumulated at each level. Both factors contribute to lower pay relative to higher tenure employees. The larger growth of women's employment in the firm's exempt jobs relative to that of men suggests that most new entrants were women.

Table 2 reports mean 1980 and 1986 salaries, and their ratio as a function of 1980 job level and gender. These results allow comparisons between men and women starting at the same level in 1980 (but not necessarily at the same level

as of 1986). Overall, the ratio of women's salary to men's salary is .84 in 1980, rising to .88 in 1986, thus eliminating 25% of the salary differential. Consistent with this narrowing differential, the mean salary for women increased by a greater percentage (61%) between 1980 and 1986 than did the salary of men (54%).

Within 1980 job levels, similar trends emerge, although the salary differentials are much narrower. The ratios of women's mean salaries to those of men range from .93 to .95 in 1980. In all cases, these ratios increased between 1980 and 1986. Again, the decreasing salary differentials are consistent with the greater salary growth of women observed at each 1980 job level. A cursory examination of the 1980 job levels having sufficient numbers of both men and women (1--3) reveals no obvious relationship between job level and gender differences in salary or salary growth.

One possible concern with the figures in Tables 1 and 2 is that there may a selection process related to gender and salary because the longitudinal sample includes only employees active in 1986. For example, one scenario is that men were observed to receive lower salary increases because men experiencing larger salary growth were more likely to leave the firm. Alternatively, discrimination against women could have resulted in all but the "cream of the crop" quitting, leaving us to observe only the latter group, which received relatively large increases.

Supplementary data, however, suggest that these are not likely problems. First, the voluntary quit rate averaged only around 2% per year over the course of the study. Second, and more important, we examined salary data on all men and women active in 1980 or 1984. The average salary of men and women grew by 35% and 40%, respectively during this period. Restricting the sample to only employees active in both 1980 and 1984 yielded growth rates for men and women of 46% and 53%, respectively. The key point is that the women/men ratio of growth rates was

approximately 1.14 in both cases, suggesting that focusing only on employees active in both years does not influence the observed relative salary growth of men and women. Finally, note that the ratio of 1.14 is identical to that found in the first row, final column of Table 2.

DECOMPOSITION OF SALARY DIFFERENCES

As Table 3 indicates, human capital variables alone are able to explain 0-32% of the salary advantage of men in the cross-section. Adding job level and performance rating to the model raises the explained percentage to 68-79%, suggesting that most of the gap is due to the fact that men tend to hold higher level jobs. The corresponding adjusted salary ratios (A_M and A_W), suggest that equalizing human capital would raise the salary ratio to .86-.90. Equalizing job level and performance rating as well would raise it to .95-.97.[12]

Note that adding performance rating actually results in a slight decrease in the explained percentage of the salary differential. Although not shown here, this finding was even stronger in analyses of specific job levels. The reasons are twofold. First, the mean performance rating of women is slightly higher than that of men (2.59 versus 2.52, overall in 1980). Second, although women receive a slightly greater return for a given performance rating, its inclusion in the model changes some of the other coefficients.[13]

In summary, the cross-sectional results suggest that men, in general, receive greater returns to explanatory variables, consistent with previous cross-sectional analyses of male-female salary differentials (Cain, 1986).

DECOMPOSITION OF SALARY GROWTH DIFFERENCES

Although women's salary levels fell short of men's, women, as noted earlier, experienced greater salary growth in percentage terms. Moreover, as the decompositions reported in Table 4 demonstrate, this salary growth advantage cannot be entirely explained by the models. The parentheses in Table 4 indicate cases

where differences in coefficients favor women. Appendix 2 reports the regression results.

In the overall analyses, 40-49% of women's greater salary growth can be explained by differences in human capital. Adding average performance rating raises the explained part to 50-62%. Finally, the inclusion of job level and number of promotions raises this figure to 72-74%. Within specific job levels, there is a good deal of variance in the extent to which human capital, average performance rating and promotions can explain the salary growth advantage of women.

Table 5 shows the contribution of specific factors to the salary growth differential in the model containing only human capital variables. An important factor accounting for women's advantage is potential experience. Because potential experience has a negative impact on salary increases, women benefit from having lower levels of potential experience and having a less negative coefficient.[14] Similarly, with respect to job level, women benefited from having a lower mean and a less negative return. The addition of promotion to the model results in a sharp reduction of the importance of potential experience and job level in accounting for the differential.

Another important factor is job tenure. Women received larger percentage salary increase returns to job tenure.[15] Recall that the firm's salary increase guide recommends smaller percentage increases as employees progress within the salary range at a given level. Because this position in the salary range is not likely to be a perfect function of job tenure, the latter may not completely capture the effect of current position in range. If men tend to be higher in the salary range than women, we would expect men to receive smaller increases than women.

Women's higher salary growth was also partly a function of their higher average performance ratings. Nevertheless, the coefficient on average performance rating was smaller for women indicating they received a smaller payoff to performance.

On the other hand, adding promotion to the model eliminated this disadvantage.

DECOMPOSITION OF PROMOTION DIFFERENCES

Table 6 reports the mean number of promotions received by men and women between 1980 and 1986 overall and as a function of 1980 job level. As in the case of salary increases, women had a distinct promotion advantage. Of further interest, this advantage like the women's salary growth advantage, does not decline at higher job levels. In fact, an examination of these simple descriptive statistics suggests the possibility that the advantage may be larger at higher job levels.

Table 7 presents the results of the decomposition of the promotion differential under different model specifications. (Appendix 2 contains the regression results.) A key finding is that the conclusion regarding the final model depends on which coefficients are used as the standard. When men's coefficients are used as the standard, the promotion advantage of women is completely explained by the variables in the final model. Table 8 presents results of the decomposition into specific factors. In the model containing human capital variables, the main advantage of women is again their combination of lower potential experience and a less negative promotion return to potential experience.[16]

As with the case of salary growth, the addition of job level and average performance rating greatly reduces the role of potential experience. Yet, as Figure 1 demonstrates, the role of potential experience remains very important. Although women receive smaller promotion returns to low levels of potential experience, their penalty at higher levels of potential experience is less than that of men. This finding is consistent with Lewis (1986).

Perhaps the most interesting finding, however, is that women receive a much smaller promotion payoff to average performance rating. Specifically, an increase of 1 point in average performance rating is associated with an additional .45 promotions for men, .33 promotions for women.

EFFECT OF PERCENTAGE FEMALE

In addition to characteristics of employees, characteristics of jobs such as percentage of female incumbents may contribute to pay and promotion differences. For these analyses, we included persons employed in job title codes having 10 or more incumbents. Although job title code information was available for both 1980 and 1986, the 1986 information was more complete and of better quality than that available for 1980. Nevertheless, we were able to develop a sample of 171 women and 1,697 men present in both 1980 and 1986 in fairly homogeneous job title groups.

In 1980, 91 job title codes had 10 or more incumbents. Of these 91 codes, 5 had 50% or more female incumbents. Of the 171 women, 43 (25%) were employed in these 5 codes in 1980. Of the 5 predominantly female codes, 2 had no male incumbents. These 2 codes (administrative assistant and secretary) employed 17% of all women in the sample. Of the remaining 86 job codes, which were predominantly male, 35 had no female incumbents. These 35 completely segregated codes employed 662 (39%) of the total 1,697 men. Examples of some of the larger completely male codes were technologist, maintenance supervisor, designer, and senior engineer.

Models of the type used earlier were estimated separately for men and women. Rather than performing a decomposition, however, a measure of the percentage of female incumbents in each job title code was added to each equation. As Table 9 indicates, among women, the impact of percentage female on 1980 salary is not statistically significant in any model. In the 1986 salary equation containing only human capital variables, the percentage female coefficient is negative and not statistically significant. However, the addition of job level (and performance rating) results in the coefficient being statistically significant and changes the sign such that percentage female has a positive impact on women's salaries in the final equation. Specifically, for each increase of 10 percentage points, salary is 0.7% higher. Thus, a change from a completely male to a completely female

job title code would be associated with a 7% higher 1986 salary.

In sharp contrast, men realized a salary penalty in both 1980 and 1986 for being in job title codes that had higher percentages of females. In both years, the penalty was much larger without controls for job level. In the final models, each increase of 10% female is associated with a .8% decrease in 1980 salary and a .5% decrease in 1986 salary. Thus, a change from a completely male to a completely female job would be associated with a 8% lower salary in 1980 and a 5% lower salary in 1986. Parenthetically, we note that the similarity of results obtained in the 1980 and 1986 cross-sections may reduce concerns regarding the quality of job title code information in 1980.

Results for the salary growth and promotion equations also appear in Table 9. In the case of women, percentage female appears to have no impact on either salary growth or promotions. In contrast, men's salary growth and promotion chances increase as percentage female increases. Recall that earlier decompositions indicated that women had an advantage over men in terms of promotions and salary growth. These results suggest the possibility that part of that advantage may be due to the gender composition of the job. It is possible that men receive some of the benefit that may be attached to predominantly female jobs.

DISCUSSION

We found that the ratio of women/men salaries rose from .84 to .88 over a 6 year period. Within job levels, salary ratios were higher (.93 to .95), but also increased over the period (.96 to .98 by 1986). Consistent with the narrowing differentials, women were found to receive a greater number of promotions and larger percentage increases in salary between 1980 and 1986.

Like numerous other cross-sectional studies, we found that the salary advantage of men could not be completely explained by higher levels of endowments, even using a relatively complete model that included job level and performance rating. More

detailed analyses at specific job levels resulted in still less of the salary differential being explained, although adjusted salary ratios were similar.

Nevertheless, using only human capital variables, the adjusted salary ratios (see Table 3) are among the highest in the literature (see Cain, 1986, Table 6). Further, the adjusted salary ratios for the models including job level exceed all such ratios summarized by Cain. Our estimates, however, may be somewhat inflated because of the (a) exclusion of higher job levels (held mostly by men) and (b) the use of salary rather than earnings.

In contrast to men's cross-sectional salary advantage, we found that women received both greater numbers of promotions and larger salary increases over a 6 year period. Other studies have found similar results with respect to unadjusted differences in both promotions (Tsui & Gutek, 1984; Stewart & Gudykunst, 1982; Lewis, 1986; Hartmann, 1987) and salary increases (Tsui & Gutek, 1984; Megdal & Ransom, 1985).

Although the promotion advantage could be largely explained by differences in mean endowment levels, the same did not hold true for the salary increase advantage. Thus, if one chooses to interpret the cross-sectional results as showing salary discrimination against women, one may be obliged to interpret the salary increase results as suggesting discrimination in favor of women.

The decomposition results were very sensitive to model specification. Human capital variables alone were able to explain anywhere from 0% to 32% of men's cross-sectional salary advantage. Adding job level and performance rating raised this range to 68-79%. Human capital variables were better able to account for differences in salary growth (40--49%) and promotions (51--62%). Again, however, adding job level and (average) performance rating increased this figure substantially (58--75% for salary increases; 73--102% for promotions). Of course, in the case of promotions and salary increases, the advantage to be explained

belonged to women.

Cain (1986) pointed out that the typical effect of including additional variables in a salary equation was to increase the adjusted women/men salary ratio. Consistent with this general finding, Milkovich (1980), Milkovich and Newman (1987), and Hildebrand (1980), among others, have argued that the adjusted women/men salary ratio might be closer to unity if unmeasured differences between men and women and relevant labor markets could be better incorporated in salary equations. In our study, we were able to move in this direction by including, for example, several experience measures, job level, and performance rating in our models.

Our results, however, indicated that at least in the case of performance rating, its inclusion actually led to a slight reduction in the adjusted women/men salary ratio. In the promotion and salary growth equations, where the unadjusted ratios exceeded unity, the inclusion of average performance rating led to sometimes sizeable increases in adjusted ratios. Thus, the common thread is that inclusion of performance rating does not help explain the raw salary advantage of men, but does explain some of the raw advantage of women with respect to salary growth and promotions.

Although women had an overall advantage in the salary increase and promotion process, they received a smaller payoff for their performance ratings. For example, based on the full promotion equation, men received an average of .45 additional promotions for each additional average performance rating point between 1980 and 1986. In contrast, women received an additional .33 promotions for each additional point. This finding is consistent with Olson and Becker's (1983) suggestion that women may be held to higher promotion standards than men.

The fact that women experienced a lower salary disadvantage in the cross-section, yet received better salary increases and more promotions over time offers an interesting contrast. One implication may be that because men are not favored

in the salary increase and promotion process, the explanation for women's salary level disadvantage must be sought elsewhere. If so, one alternative avenue of investigation should perhaps be the recruitment and initial placement of men and women.

Aside from possible differences in initial placement, it may be that women have not always been favored in terms of salary increases and promotions. In fact, the greater number of promotions and larger salary increases of women may reflect an attempt by the firm to reduce what was perceived to be an inequitable salary and job level structure. Rosenbaum (1985), for example, found a reduction in the negative impact of percent female on salary between 1965 and 1975 in his study. Further, he found that the impact of percent female on promotions changed from negative to positive over the same period. In the case of the Rosenbaum study, the firm had implemented a "serious" affirmative action program during the period of the study.

The firm that we studied had an ongoing affirmative action plan. We also noted, for example, that the firm covered EEO issues in its management training. Further, although EEO litigation pertaining to these issues among exempt employees does not appear to have been important, the firm did settle a case pertaining to such practices vis-a-vis hourly employees for a substantial amount. Although no formal goals or new practices resulted, one might speculate that this event enhanced or at least reinforced the vigilance with which progress toward affirmative action and EEO goals was monitored.

Any progress in the affirmative action area may have been facilitated by the general financial success of the company during the period of our study. Research by Rosenbaum (1979) suggests that promotion opportunities may be greater during periods of organizational (defined as employment) growth. The general financial success and growth of the firm we studied may have facilitated affirmative action

progress of women employees. It is interesting to note, however, that the bulk of employment growth in exempt jobs seems to have been among women rather than men.[17] As discussed earlier, this appears to have been partly due to a brief period of reduction in force during the early 1980s.

The promotion and salary growth advantage of women implies that the salary gap would eventually remedy itself if past trends were to continue. Note, however, that even a small initial salary disadvantage can take many years to be eliminated. As an example, a projection of salary growth rates over the 6 year period into the future indicates that the 1980 women/men salary ratio would not equal unity until the year 2003. Within job levels 1, 2, and 3, 1980 salaries would equalize in 1989, 1996, and 1992, respectively. Of course, as this equalization process works to its conclusion, women continue to receive lower salaries.

In addition to the focus on human capital, job level, and performance ratings, our study also examined the possibility that percentage female in a job code was a structural factor contributing to attainment differences. Consistent with Rosenbaum (1985), controlling job level generally reduced the impact of percentage female by a substantial amount. Consistent with Hartmann (1987), percentage female had a small positive effect on women's salaries (in 1986). Unlike Hartmann's results, however, percentage female had a negative impact on salaries of men. With respect to salary growth, the lack of a negative impact of percentage female for both men and women was consistent with Hartmann's findings. Regarding promotion, although Hartmann found a negative impact of percentage female for women, Rosenbaum found a positive impact by the end of his study period. Our results suggest no stable impact of percentage female on women's promotion rates. In contrast a positive effect was found for men.

The preceding summary does not really provide support for the idea that percentage female is an important structural property that negatively affects

women's (and perhaps men's) attainments. A better research strategy would be to examine its impact controlling for other characteristics of jobs or occupations that may be related to percentage female. This strategy was demonstrated by Treiman and Hartmann (1981) using national survey data at the occupational level. A stronger test, however, would make use of firm level data where similarity of occupational titles is more likely to actually correspond to similarity of work content. The effect of percentage female in different firms is another possible avenue of investigation (Pfeffer & Davis-Blake, 1987) in cases where job content is standardized.

Given our study's use of data from a single firm, there is a disadvantage relative to the coverage and external validity possible with market-wide or national surveys. Along these lines, replication studies would be necessary before attempting to answer the question of how typical our results are of other large firms' relative treatment of men and women. Nevertheless, the better coverage obtained using national survey data comes at the expense of not being able to measure productivity in the way that many firms actually measure it. Finally, recall that the policies and practices of the firm we studied tended to be consistent with those reported in surveys of other large firms.

Besides the job-specific productivity measures, the results of the present study were strengthened by the following. First, the use of longitudinal data should have reduced the impact of any unobserved, constant individual differences in productivity. Second, firm-specific differences in determinants of salaries (e.g. pay policies and practices) are obviously not an issue. Finally, the use of data from personnel records rather than self-reports typical of national surveys may have reduced the potential for reporting errors (Duncan & Hill, 1985).

In their agenda for basic research on comparable worth, Hartmann, Roos, and Treiman (1985) emphasized that "We need to understand better how wages are set

within enterprises and how they are affected by other employer practices, such as job assignment..." (p. 7). They stressed the importance, especially in large firms, of internal labor markets and promotion from within as aspects of job assignment. We hope that our research contributes to a better understanding of these processes.

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FOOTNOTES

1.Differences that exist between men and women in terms of preferences for different types of occupations may also reflect discrimination, whether its source is differential socialization in families, schools, and other pre-market institutions, or market-based.

2.This issue of differential attainment due to possible unequal access firms, occupations, and/or jobs is sometimes referred to as employment discrimination.

3.Based on a survey of personnel and industrial relations executives, the Bureau of National Affairs (1983) concluded that performance appraisal results are used by 86% of firms for making salary increase decisions and by 79% of firms for making promotion decisions concerning their white collar workers.

4.According to Hay Associates, the national actual median increase for 1982 ranged from 9% for "average performers" to 14.3% for "outstanding performers". By 1986, the corresponding figures were approximately 6% and 9%, respectively (Hay Compensation Associates, 1986). The corresponding figures for the salary guides used in the firm were similar.

5.Cain (1986) has argued that supervisory ratings of performance are not "admissible" because they "might reflect discrimination". However, the empirical evidence does not support this hypothesis, despite the fact that a large amount of both laboratory and field research has been devoted to this question (see Dipboye, 1985 for a review).

6.See the BNA survey results reported in footnote # 3 on promotion and salary increases. The same survey also indicates that rating scales and essays are the most commonly used methods of appraisal. Further 97% of firms review appraisals at a higher level.

7.A Bureau of National Affairs (1985) survey found that among firms with over 1000 employees, over 60% included EEO in their manager training programs. Further, EEO was the 4th (of 19) most commonly included issue in such programs.

8.The firm did not provide data on (a) former employees or on (b) active employees in levels 9-15.

9.The number of promotions is defined using salary increase codes, which indicate the reason for an increase (e.g. merit or promotion). The number of promotional increases between 1980 and 1986 is used as the definition.It should be noted that a promotion can occur without a change in job level. Similarly, job level can change in the absence of a promotion. Thus, the correlation between changes in job levels and the number of promotions is high but not perfect ($r = .73$). Although some evidence suggests that women receive more within-level promotions (Flanders & Anderson, 1973; Stewart & Gudykunst, 1982), this correlation did not differ by gender, suggesting that changes in job level and the number of promotions as defined by the firm were related in a similar manner for both men and women. Moreover, the women/men ratio of change in job levels was virtually identical to women/men ratio of the number of promotions (1.33 and 1.38, respectively). Thus, we chose to use the firm's definition of a promotion rather than attempt to draw inferences from changes in job level.

10.Firm tenure is based on the date used for calculating benefits. It is important to note that this date can differ from the original hire date. Therefore, this measure should give an accurate indication of the amount of actual time spent with the firm even for persons not continuously employed with the firm.

11.The inclusion of individual-specific intercepts in equations (2)--(3) could be used to eliminate bias due to any lack of independence between X time invariant components of e (Mundlak, 1978). Given data at two points in time, the use of individual-specific intercepts is equivalent to a first-differencing model. There are at least two problems with this model, however. First, variables that do not change over time (e.g. firm tenure) must be excluded. Second, it exacerbates any unreliability problems. As a result, differences in parameter estimates may stem from unreliability rather than elimination of the effects of nonindependence of X and e. In the present research, for example, performance rating is a key variable. King, Hunter, and Schmidt (1980) have estimated the upper bound reliability of supervisory ratings to be approximately .60. In the present study, the correlation between performance ratings in 1980 and 1986 is approximately .20. Using a formula given by Guilford (1954, p. 394), the resulting reliability of the change in performance rating would then be approximately .50. Across adjacent years, the correlation between performance ratings is closer to .40, resulting in a difference score reliability of .33. By averaging performance ratings and counting promotions over time, the reliability problem is reduced.

12.Within levels, very little of the pay gap could be explained. Because, however, the raw ratios were high (see Tables 1 and 2), the adjusted ratios were also high.

13.For example, adding performance rating to the equation having human capital variables increased the advantage realized by men in returns to job tenure.

14.The use of potential experience (age - schooling - 6), rather than actual experience is problematic for persons with intermittent labor force participation. Thus, the role of potential experience in explaining salary growth differences in our study may be partly artifactual. As an indirect test, we restricted the sample of women to unmarried women only. The resulting decomposition (of the full model) actually increased the importance of potential experience in explaining women's faster salary growth.

15.A more flexible functional form (dummy variables for each year of job tenure) did not change this conclusion.

16.We again restricted the sample of women to those who were unmarried. In this case, the importance of potential experience was diminshed somewhat, but remained important.

17.This is not to say that there were not also a substantial number of newly entering men as well. The net growth of women seems to have been higher because there were fewer women in exempt jobs at retirement age, for example.

TABLE 1 1986 Salaries of Men and Women, by 1986 Job Level

1986 Cross-sectional Sample						1986 Longitudinal Sample					
	Women		Men		W/M		Women		Men		W/M
Job Level	N	Mean Salary	N	Mean Salary		Job Level	N	Mean Salary	N	Mean Salary	
ALL	2412	35,503	9647	42,049	.84	ALL	840	40,004	5550	45,620	.88
1	859	29,451	1777	31,875	.92	1	114	31,092	386	32,519	.96
2	412	32,870	896	35,222	.93	2	156	34,675	325	35,869	.97
3	521	36,209	2151	37,795	.96	3	174	37,697	1032	38,789	.97
4	162	40,745	641	42,935	.95	4	98	41,589	468	43,584	.95
5	286	43,925	2184	46,307	.95	5	182	44,274	1617	46,819	.95
6	158	50,568	1859	53,410	.95	6	109	51,067	1607	53,557	.95
7	14	55,415	138	59,002	.94	7	17	55,805	114	58,968	.95

TABLE 2 1980 and 1986 Salaries of Men and Women, by 1980 Job Level

1980 Job Level	Women				Men				Women/Men		
	N	1980	1986	$\frac{1986^a}{1980}$	N	1980	1986	$\frac{1986}{1980}$	1980	1986	$\frac{1986^a}{1980}$
All	840	24,786	40,004	1.61	5550	29,606	45,620	1.54	.84	.88	1.14
1	348	21,954	35,762	1.63	872	23,516	36,479	1.55	.93	.98	1.14
2	177	24,014	38,862	1.62	774	25,171	40,009	1.59	.95	.97	1.05
3	195	26,635	43,048	1.62	1515	28,220	44,229	1.57	.94	.97	1.09
4	40	28,881	46,760	1.62	485	30,848	47,661	1.55	.94	.98	1.14
5	58	31,894	50,042	1.57	1307	33,801	51,346	1.52	.94	.97	1.10
6	14	35,717	52,768	1.48	571	37,705	55,225	1.46	.95	.96	1.03
7	0				26	36,840	54,321	1.47			

[a] $\frac{\text{Women [salary 1986/salary 1980] - 1}}{\text{Men [salary 1986/salary 1980] - 1}}$

TABLE 3 Decomposition of Salary Differences

Variables in Equation	R^2		Decomposition Standard Men		Women		Differential		
	Women	Men	Coeff	Endow	Coeff	Endow	Raw	A_M	A_W
1980 Longitudinal Sample									
HC	.19	.29	.73	.27	.86	.14	.84	.88	.86
HC, PA80	.21	.33	.76	.24	.88	.12		.88	.86
HC, Level	.58	.71	.28	.72	.31	.69		.96	.95
HC, Level, PA80	.62	.73	.31	.69	.32	.68		.95	.95
N of observations	840	5550							
1986 Longitudinal Sample									
HC	.29	.21	.80	.20	1.00	.00	.88	.90	.88
HC, PA86	.32	.28	.82	.18	1.01	-.01		.90	.88
HC, Level	.79	.80	.21	.79	.29	.71		.97	.97
HC, Level, PA86	.82	.83	.23	.77	.30	.70		.97	.96
N of observations	840	5550							
1986 Cross-sectional Sample									
HC	.30	.31	.68	.32	.73	.27	.84	.89	.88
HC, PA86	.33	.37	.70	.30	.75	.25		.89	.88
HC, Level	.81	.83	.25	.75	.22	.78		.96	.96
HC, Level, PA86	.83	.85	.27	.73	.24	.76		.96	.96
N of obsevations	2412	9647							

TABLE 4 Decomposition of Salary Growth Differences, by 1980 Job Level

Variables in Equation	R^2		Decomposition Standard						
			Men		Women		Differential		
	Women	Men	Coeff	Endow	Coeff	Endow	Raw	A_W	A_M
All Levels									
HC	.14	.21	(.51)[a]	.49	(.60)	.40	1.14	1.07	1.06
HC, AVGPA	.23	.30	(.38)	.62	(.50)	.50		1.09	1.07
HC, LEVEL	.15	.21	(.46)	.54	(.53)	.47		1.08	1.07
HC, LEVEL, AVGPA	.24	.31	(.25)	.75	(.42)	.58		1.11	1.08
HC, LEVEL, AVGPA, PROM	.39	.43	(.26)	.74	(.28)	.72		1.10	1.10
Level 1									
HC	.16	.29	(1.14)	-.14	(1.02)	-.02	1.14	.98	1.00
HC, AVGPA	.23	.43	(.51)	.49	(.80)	.20		1.07	1.03
HC, AVGPA, PROM	.35	.57	(.67)	.33	(.77)	.23		1.05	1.03
Level 2									
HC	.26	.30	(.50)	.50	(1.10)	-.10	1.05	1.03	1.00
HC, AVGPA	.37	.34	-.13	1.13	(.46)	.54		1.06	1.03
HC, AVGPA, PROM	.56	.45	-.28	1.28	(.10)	.90		1.06	1.05
Level 3									
HC	.14	.18	(.32)	.68	(.52)	.48	1.09	1.06	1.04
HC, AVGPA	.31	.31	(.30)	.70	(.58)	.42		1.06	1.04
HC, AVGPA, PROM	.53	.44	(.14)	.86	(.41)	.59		1.08	1.05

Note: Number of observations is 840 for women, 5550 for men

[a]Parentheses indicate that coefficients favor women.

TABLE 5 Decomposition of Salary Growth Difference between Men and Women

	WOMEN[a]			MEN		WOMEN			MEN		WOMEN			MEN	
	Total	% E		% E	% C	Total	% E	% C	% E	% C	Total	% E	% C	% E	% C
Variable															
INTERCEPT	-208		-208		-208	-147		-147		-147	-192		-192		-192
EDUCATION	6	4	3	5	0	-2	1	-1	3	-3	-2	0	2	2	-4
TENURE	-62	15	-76	6	-68	-70	18	-88	6	-76	-30	15	-45	7	-38
JOB TENURE	121	7	113	3	113	120	0	120	8	112	179	-11	190	-3	182
NONWHITE	-4	-2	-3	-1	-4	-3	-1	-2	0	-3	-1	-1	0	0	0
EXP	247	16	232	30	217	181	14	167	13	158	85	8	76	13	71
JOB LEVEL						31	10	20	18	13	-9	-1	-8	-4	-5
AVGPA						-12	16	-29	17	-29	13	13	0	13	0
PROM											59	49	10	46	13
TOTAL	100	40	60	45	55	100	58	42	75	25	100	72	28	74	26

[a]Group used as decomposition standard

TABLE 6 Mean Promotions for Men and Women, 1980-1986

1980 Job Level	Women		Men		Women/Men
	N	Mean	N	Mean	
All	840	1.29	5550	.94	1.37
1	348	1.29	872	1.21	1.08
2	177	1.38	774	1.22	1.14
3	195	1.34	1515	1.05	1.26
4	48	1.34	485	.94	1.47
5	58	.98	1307	.75	1.31
6	14	.57	571	.32	1.78
7	0		26	.34	

TABLE 7 Decomposition of Promotion Differences, 1980-1986

Variables in Equation	R^2		Decomposition Standard						
			Men		Women		Differential		
	Women	Men	Coeff	Endow	Coeff	Endow	Raw	A_W	A_M
				All Levels					
HC	.26	.27	(.38)[a]	.62	(.49)	.51	1.37	1.23	1.19
HC, AVGPA	.28	.30	(.32)	.68	(.47)	.53		1.25	1.20
HC, LEVEL	.26	.30	(.09)	.91	(.30)	.70		1.34	1.26
HC, AVGPA, LEVEL	.28	.34	-.02	1.02	(.27)	.73		1.38	1.27
				Level 1					
HC	.27	.32	(.34)	.66	(.42)	.58	1.08	1.05	1.05
HC, AVGPA	.27	.38	-1.15	2.15	(.22)	.78		1.17	1.06
				Level 2					
HC	.40	.32	(.47)	.53	(.66)	.34	1.14	1.07	1.05
HC, AVGPA	.43	.35	(.21)	.79	(.43)	.57		1.11	1.08
				Level 3					
HC	.27	.25	(.29)	.71	(.23)	.77	1.26	1.18	1.20
HC, AVGPA	.33	.30	(.28)	.72	(.26)	.74		1.19	1.19

Note: Number of observations is 840 for women, 5550 for men

[a]Parentheses indicate that coefficients favor women.

TABLE 8 Decomposition of Promotion Difference between Men and Women

	WOMEN[a]			MEN		WOMEN			MEN	
	Total	% E	% C	% E	% C	Total	% E	% C	% E	% C
INTERCEPT	-70		-70		-70	58		58		58
EDUCATION	28	4	24	8	20	2	2	0	2	0
TENURE	-60	7	-67	2	-61	-80	8	-88	-2	-78
JOB TENURE	-122	25	-147	20	-142	-107	23	-130	24	-131
NONWHITE	-5	-1	-4	1	-6	-4	-1	-3	1	-5
EXP	329	14	315	32	297	216	12	204	21	195
JOB LEVEL						90	23	67	47	43
AVGPA						-74	7	-80	9	-83
TOTAL	100	51	49	62	38	100	73	27	102	-2

[a]Group used as decomposition standard

TABLE 9 Regression Coefficient for Percentage Female

	WOMEN			MEN		
	B	SE	R^2	B	SE	R^2
1980 SALARY						
HC	-.0078	.0046	.30	-.0384**	.0040	.34
HC, Level	.0049	.0041	.53	-.0097**	.0027	.72
HC, Level, PA80	.0023	.0044	.54	-.0084*	.0026	.75
1986 SALARY						
HC	-.0049	.0040	.40	-.0434**	.0044	.30
HC, Level	.0123**	.0023	.83	-.0054*	.0024	.81
HC, Level, PA86	.0072**	.0023	.86	-.0050*	.0023	.83
1986/1980 SALARY						
HC	.0058	.0045	.23	.0102**	.0026	.23
HC, Level	.0039	.0048	.24	.0089**	.0026	.23
HC, Level, AVGPA	-.0025	.0053	.27	.0100**	.0024	.35
HC, Level AVGPA, PROM	-.0017	.0049	.37	.0039	.0022	.47
PROMOTION						
HC	.0293	.0259	.40	.1443**	.0199	.33
HC, Level	.0008	.0271	.44	.1075**	.0200	.36
HC, Level, AVGPA	-.0134	.0303	.44	.1124**	.0194	.39

Note: Number of observations is 171 for women, 1697 for men. Percentage female is measured in units of 10%

*p <.05

**p <.01

APPENDIX 1 Summary and Means of Independent Variables

	1980		1986		1986	
	Women	Men	Women	Men	Women	Men
Human Capital (HC)						
Highest Degree						
High School (or missing)	.473	.424	.473	.424	.515	.461
Associate	.033	.034	.033	.034	.040	.033
Bachelor of Arts	.162	.100	.162	.100	.122	.084
Bachelor of Science	.248	.352	.248	.352	.243	.323
Master of Science	.048	.053	.048	.053	.041	.050
Master of Arts	.020	.007	.020	.007	.012	.006
Master of Business Adm.	.004	.005	.004	.005	.006	.004
Doctor of Philosophy	.013	.026	.013	.026	.020	.038
Experience						
Potential Experience[a]	16.306	18.656	22.306	24.656	18.630	21.552
Potential Experience^2	364.875	435.740	596.546	695.606	454.968	572.402
Firm Tenure	9.040	11.376	15.040	17.376	10.839	14.043
Firm Tenure^2	126.955	186.459	271.435	358.972	170.645	273.685
Job Tenure	3.008	3.812	5.336	6.218	3.852	5.096
Job Tenure^2	11.765	18.352	37.382	51.181	20.634	36.138
Race (nonwhite=1)	.075	.050	.075	.050	.027	.021
Gender (male=1)	---	---	---	---	---	---
Job Level	2.206	3.434	3.515	4.421	2.641	3.694
Performance Rating	2.593	2.519	2.620	2.566	2.607	2.548
Average Performance Rating, 1980-1986 (AVGPA)	---	---	2.587	2.516	---	---
N of observations	840	5550	840	5550	2412	9647

[a]Age - years of schooling - 6

APPENDIX 2 Salary Growth and Promotion Regressions

	Salary Growth						Promotion			
Variable	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
INTERCEPT	0.639**	0.540**	0.350**	0.285**	0.254**	0.170**	2.578**	2.745**	1.418**	1.925**
ASSOC	-0.017*	0.054*	-0.014	0.046*	-0.013	0.042	-0.063	0.076	-0.013	0.074
BA	0.009	-0.006	0.026**	0.007	0.009	-0.009	0.085*	0.165	0.297**	0.266**
BS	-0.015*	-0.011	0.004	0.007	-0.005	-0.004	-0.113**	0.061	0.155**	0.177
MS	-0.026*	-0.054*	-0.002	-0.033	-0.006	-0.029	-0.300**	-0.258	0.074	-0.063
MA	-0.047*	-0.022	-0.026	-0.001	-0.039*	-0.017	-0.058	0.103	0.222	0.260
MBA	0.021	0.030	0.039*	0.041	0.040*	-0.025	-0.296	0.979	-0.012	1.081*
PHD	-0.070**	-0.065	-0.031**	-0.039	-0.021*	-0.017	-0.774**	-0.650	-0.182*	-0.369
TENURE(00)	-0.396**	-0.939**	-0.391**	-0.944**	-0.399**	-0.646**	-0.960	-5.221	0.143	-4.900**
TENURE SQ (00)	0.011**	0.026**	0.106**	0.024**	0.010**	0.015*	0.029	0.162**	0.007	0.147**
JOB TENURE	-0.003	0.029*	-0.004*	0.023	0.008**	0.054**	-0.182**	-0.484**	-0.212**	-0.515**
JOB TENURE SQ	-0.000	-0.004*	0.000	-0.003	-0.001**	-0.006**	0.011**	0.046**	0.013**	0.051**
NONWHITE	-0.009	-0.032	-0.002	-0.018	-0.007	-0.009	0.077	-0.200	0.099	-0.140
EXP(00)	-0.829**	-0.179	-0.648**	-0.141	-0.352*	-0.146	-8.073**	-0.582	-5.262**	0.083
EXP SQ (00)	0.009**	-0.004	0.007**	-0.004	0.003**	-0.000	0.108**	-0.052	0.068**	-0.064*
JOB LEVEL			-0.006**	-0.004	0.001	0.000			-0.135**	-0.066**
AVGPA			0.106**	0.101**	0.081**	0.081**			0.447**	0.334**
PROM					0.056**	0.061**				
R^2	.21	.14	.31	.24	.43	.39	.27	.26	.34	.28

[a]The (00) indicates that the coefficient was multiplied by 100

*p < .05
**p < .01

PROMOTION AND POTENTIAL EXPERIENCE,

BY GENDER