1. The most recently revised data available in March of 1989 are used throughout this study, which means that the Economic Discomfort Index differs somewhat from the contemporaneous index calculated at the time on the basis of preliminary data. The distinction between preliminary and revised data is particularly pronounced at seasonal frequencies for the unemployment rate. The use of revised data is appropriate to the extent that the economic discomfort citizens incur depends upon the economic circumstances of each individual and not upon activities raised by preliminary reports of the national unemployment rate or other variables as published at the time.

2. Interestingly enough, these attitudinal questions were not originally intended to elicit useful information. Rather, when Michigan Professor George Katona was developing the Survey of Income and Wealth for the Federal Reserve Board, he added the attitudinal questions in order to loosen up the respondents so that they would be more willing to answer the questions about their incomes and other personal financial details. (Currie, 1992).

3. See Bress and Ludvigson (1998) for a detailed explanation of how the index is calculated. The procedure for constructing the index ensures that the Consumer Sentiment Index is between 2 and 150; this means that the index, being bounded, cannot have a unit root.

4. Bress and Ludvigson (1998) provide a detailed comparison of the Michigan and the Conference Board measures of consumer sentiment, concluding that the latter is more useful for predicting consumption behavior. The Michigan measure is used in this paper because it is available for a longer time span.

5. The Leading Economic Indicators, originally developed in the 1930's by Arthur F. Burns and Wesley C. Mitchell of the National Bureau of Economic Research and published for many years by the Department of Commerce, is now compiled by the National Industrial Conference Board and reported on its web site: http://www.tiny.indicators.org/index.htm.

6. For making the comparisons reported in this paragraph we used monthly consumer sentiment data.

7. The monthly rate of inflation is \( p - \frac{1}{12} \), the quarterly rate is \( (p - \frac{1}{4}) / \frac{1}{4} \), and the annual rate \( (p - \frac{1}{12}) / \frac{1}{12} \).

8. GDP and the change in unemployment are highly co-linear (r = 0.908). "Olmstead's law" (1962) implies that changes in unemployment are closely related to the rate of GDP growth.

9. Regressions paralleling the remaining AR(1) regressions on the table but with the lagged dependent variable yield quite similar results. They are available from the authors on request.

10. Neither Nordhaus nor Sylla included the change in the unemployment rate in their presidential popularity regressions. The Index of Consumer Sentiment is preferred to Gallop's Presidential Popularity Index as the dependent variable in determining the effect of economic conditions on the welfare of citizens because the presidential popularity variable is likely to be influenced by non-economic as well as economic variables.

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D I S C R I M I N A T I O N B Y P A R T S:  
A FIXED-EFFECTS ANALYSIS OF STARTING PAY DIFFERENCES ACROSS GENDER  
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George Washington University  
Julie L. Hotchkiss  
Georgia State University  
and  
Barry Gerhart  
Vanderbilt University

INTRODUCTION

While the raw female-male earnings ratio in the United States has recently shown some progress toward unity, discussions continue about why wages are not yet equal for men and women (Blau and Kahn, 1995; Goldin, 1990). The debate about whether differences in women's and men's qualifications explain gender pay disparities, or whether discrimination is a more likely culprit, rages in both academic and popular press arenas. Supporting the discrimination explanation are studies concluding that less than one half of the pay gap between women and men is due to their differential qualifications (Blau et al., 1998; Cain, 1980; Heilpern et al., 1996; Treiman and Hartmann, 1981). Drawing conclusions about discrimination merely from this observation, however, reveals little about individual employers' culpability for discrimination, nor does it distinguish among three important types of potential discrimination: pay discrimination, job placement discrimination, and hiring discrimination. Several studies have found that the labor demand influences of occupation, industry, and firm (i.e., women and men work in different occupations, industries, and firms) are important explanations for pay differences between women and men (Bronars and Farnali, 1997; Groshen, 1991a; Johnson and Solon, 1986; Ot; 1991; Petersen and Morgan, 1995).

Determining the degree of employer discrimination is important because it indicates whether employers or public policy makers need to take corrective action, while identifying the type of discrimination yields information about where to direct this corrective action. For example, gender-related job placement differences resulting in unequal pay for women and men within firms would suggest that employers should...
monitor entry level job assignment practices. On the other hand, unequal pay to women and men in the same entry-level jobs would suggest that employers should monitor initial salary offer procedures.

To distinguish between pay, job placement, and hiring discrimination, information on individuals’ employers and their jobs or occupations is needed. Studies that omit these demand-side variables may overestimate pay discrimination because the Equal Pay Act of 1963 requires only that individual employers pay women and men in the same jobs within the same firms the same pay. These studies may also overestimate gender-related job placement discrimination prohibited by Title VII of the Civil Rights Act of 1964 and the Civil Rights Act of 1991, since again, employers are responsible for nondiscrimination in job placement only within their own firms. Similarly, comparable worth, which aims to equalize the pay of women and men across occupations, operates only within firms. So estimates of comparable worth’s efficacy may be overestimated without employer data as well.

An additional problem with many estimates of labor market discrimination is that omitted human capital variables may result in overestimates of discrimination. In particular, due to the broad scope of the data sets used in many studies of the gender earnings gap, detailed human capital information on worker quality (e.g., college grade point average, education quality) and types of skills (e.g., college major) is often not available. Hence, researchers are left to speculate whether unexplained earnings gaps between women and men are due to these omitted human capital characteristics.

Omitted data on worker qualifications may overestimate employers’ illegal actions since hiring, job placement, and pay decisions that are based upon worker qualifications are legal [Gold, 1993; Nee et al., 1997]. Moreover, specifically, the substantial occupational segregation of women and men is legal according to current law if it is based upon the levels and types of skills that workers possess, even if the male-dominated occupations pay more. Moreover, in entry-level hiring, firms are permitted to select more men than women if more men have the degrees needed by the firms (e.g., electrical engineering), or if men have higher grade point averages. To the extent that the firms hiring men (for the above reasons) pay more than those hiring women, this process will widen the gender earnings gap, but is not considered discrimination according to the Civil Rights Acts of 1964 and 1991.

The analysis presented in this paper provides a more precise estimate of potential discrimination by individual employers than previous studies, and it disentangles this estimate into types of discrimination (i.e., discrimination in pay, job placement, and hiring). A second contribution is that this study provides the first look at the reasons for between-firm gender pay differences. An estimate of the extent to which worker skills and quality are responsible for sorting women and men to different employers is provided. If worker characteristics explain a sizable portion of the earnings gap occurring between firms, one may conclude that individual employers are hiring in a legal manner. If worker characteristics do not explain a sizable portion, one may speculate that there is discrimination or omitted variables (for example, worker preferences) that prevent women’s entry into certain firms. In addition, the results will inform discussion about the efficacy of laws affecting the gender earnings gap. In particular, the Equal Pay Act of 1963 requires that employers pay women and men doing the same jobs the same pay. Title VII of the Civil Rights Act of 1964 and the Civil Rights Act of 1991 prohibit discrimination in any employment decision (for example, pay, job placement, hiring) on the basis of gender and other protected characteristics. Finally, we present standard errors for the pieces of the wage gap decompositions performed, which should increase confidence in the robustness of the conclusions drawn from those decompositions.

The approach of the analysis is as follows. First, using the names of employers with whom graduates accepted employment, pay differences occurring within employers are distinguished from pay differences occurring between employers, which is essential for estimating employers’ culpability for pay and job placement discrimination. Second, the analysis includes two important and often omitted variables in studies of gender differences in pay — graduates’ fields of study and their grade point averages in college. Field of study has the potential to explain gender-related occupational, industrial, and firm segmentation that is often attributed to employer discrimination, as well as improve the precision of estimates of unexplained earnings differences within firms.

Finally, rather than beginning with a heterogeneous sample of workers in which omitted variables, measurement error, and discrimination estimates might be quite sizable, the sample consists of a homogeneous, high quality sample of new labor market entrants from one prestigious university, among whom one would expect the unexplainable portion of any pay differences to be nearly nonexistent.

In this vein, we focus on starting pay differences so we can examine the gender earnings gap prior to the confounding influences of performance, experience, and other work-related variables. We note that gender differences in starting pay can be quite consequential over time [Gerhart, 1990; Olson et al., 1987]. This is because organizations’ merit pay raises are based upon current salary level, such that the lower the salary, the lower the raise. Further, since merit raises are added into base salary, an initial gender difference is compounded over time. Additional penalties can result as workers progress in their careers, since incentive bonuses are often paid as a percent of salary. Also, other organizations consider salary history in making offers, which would also magnify the impact of gender differences in starting salary. Therefore, pay differences identified in this study among new entrants likely understate overall labor market discrimination.

THEORETICAL FOUNDATION

Neoclassical economic theory posits that labor supply and labor demand determine employee pay. In particular, the marginal productivity theory of labor demand posits that employers set the pay for individual workers at the level of the firm’s estimated additional gain in productive output (marginal revenue product) from hiring those workers [Samuelson, 1947, ch. 4]. Workers who are equally productive will be paid the same wage.

According to human capital theory, the productivity of a worker depends, in part, on his or her level of formal education, cognitive skill, labor market experience, and
on-the-job training. It is the combination of factors such as those that comprise an individual's level of human capital. There is empirical evidence that greater amounts of these characteristics increase a worker's productivity, and are thus rewarded with higher pay (Becker, 1975; Daymont and Andrisani, 1984; Becker, 1996; Mincer, 1974).

The context in which human capital is applied to the production process is also an important determinant of the worker's productivity. Consistent with human capital theory, employers will pay less to workers in occupations that require fewer or less-specialized skills. Employers in the same industry face similar capital and product market pressures, and these pressures may influence labor demand and pay levels as well. As a result, firms in one industry (for example, manufacturing) may pay more than firms in another industry (for example, retail trade). Evidence of the importance of industry on wages can be found in Dunlop (1957), Treiman and Hartmann (1981), Cain (1986), Gerhart and Milkovich (1990), and Kaufman and Hotchkiss (2000).

Individual employers directly influence pay levels as well, beyond the effects of occupation and industry (Cain, 1986; Dunlop, 1957; Kaufman and Hotchkiss, 2000; Gerhart and Milkovich, 1990; Treiman and Hartmann, 1981). For example, the skill levels of a firm's managers help determine how effectively workers' human capital translates into the final product; the more productive workers are, the higher their pay. Alternatively, for strategic reasons, employers may decide to lead, lag, or meet market rates as compared to other firms in their industry or as compared to firms with similar occupations (Akerlof, 1984; T. Bergmann et al., 1998; Reuwer and Summers, 1988). For example, employers who lead the market in pay may be trying to attract better or more efficient workers than firms that do not.

According to human capital and labor demand theories, men may earn more than women for a number of different reasons. First, women may not be as productive as men because they possess lower levels of human capital. For example, women may not have as much formal education or specific training in areas of expertise which are in high demand. Second, women will earn less than men to the extent that they choose to work in different occupations, industries, and employers, which hinder them from being as productive as men, even when they have the same human capital. Third, women's and men's different levels or types of human capital may sort them to different occupations and employers. For example, higher-paying occupations may require the fields of study in college in which men are concentrated; higher-paying employers, because of the nature of their products or services, may need to hire from the fields of study in which men predominate.

Fourth, women may be as productive as men but suffer labor market discrimination. This labor market discrimination may stem from prejudice on the part of employers, employees, and/or customers, resulting in an underutilization of women's true productivity. Or discrimination may arise through barriers to entry to certain jobs, resulting in an "overcrowding" in jobs that women do get, and hence, lower pay in those occupations dominated by women. Theories of crowding in female-dominated occupations are formalized by B. Bergmann (1974) and Solberg and Laughlin (1995).

In addition, dual labor market theory offers an alternative characterization of the segmentation of women and men into different occupations, with women (and racial or ethnic minorities) being concentrated in low-paying, unstable jobs (Beck et al., 1997; Dickens and Lang, 1988; Doeringer and Piore, 1971). Consistent with these theories, there is a great deal of evidence that women and men work in different occupations (Baron and Bielby, 1986; Blau, 1977; Boston, 1990; Groshen, 1991a).

Another way that discrimination may arise is that certain employers may incorrectly perceive that women do not have the same productive capacity as men or overestimate the extent to which their productivity differs, and discriminate against women in hiring. Thus, labor market discrimination may be evident within or between occupations as well as within or between firms.

EVIDENCE FROM THE LITERATURE

Few of the early studies of the female-male pay gap consider the employers for whom individuals work, despite the fact that it is employers who hire workers, place them into jobs, and assign pay levels to them (for a review, see Cain, 1986). The analysis in this paper builds on four studies that do consider employers in their examination of the gender earnings gap. In a ground-breaking study that focused attention on the important influence of employers on the gender earnings gap, Blau (1977) found that between-establishment gender pay differences were substantially larger than within-establishment pay differences. Specifically, in an examination of 12 occupations from the Bureau of Labor Statistics' (BLS) Area Wage Surveys, Blau (1977) found an average 7 percent gender pay difference within occupations, with less than 1 percent of this 7 percent occurring within establishments. As a result, Blau concluded that "... earnings differentials by sex within occupations are primarily the result of differences in pay rates among firms rather than differences in pay rates within firms" (1977, 101). However, this study did not examine pay differences occurring between occupations, nor did it examine whether differences in women's and men's human capital were behind the gender gaps found.

Johnson and Solon (1986) also tried to isolate within- and between-employer differences, using data from the May 1978 Current Population Survey. They estimated that a 3 to 8 percent gender pay difference occurred within firms. However, as they note, their use of industry dummy variables as proxies for employer dummies may have overestimated within-firm pay differences between women and men. This is because pay differences between firms in the same industry were included in within-firm portion of the gender earnings gap. Moreover, the lack of human capital information on individuals' knowledge, skills, and abilities in this study may have led to an overestimation of the within-firm gender gap. Although Johnson and Solon were able to measure years of schooling and potential work experience, we would argue that measures of the type of skills and educational quality of individuals would have created more precise estimates.

Groshen (1991a) used data from the Bureau of Labor Statistics' Industry Occupational Wage Surveys (IWS) in a study of workers in 5 industries. She found an average 6 percent pay difference between women and men in the same occupations and in the same establishments. However, this figure may be overestimated since Groshen was not able to control for human capital characteristics at the individual level. Although she examined the general occupational characteristics of general education,
vocational training, and strength and physical demands as proxies for human capital, we would argue that actual human capital variables measured at the individual level are essential for precise estimates of employer culpability for discrimination.

Although their findings were similar, Johnson and Solon [1986] concluded that the policy of comparable worth would have a small impact on the gender earnings gap, while Groshen [1991a] concluded that it would have a large potential impact. The difference in their conclusions lies in Groshen’s argument that comparable worth policies would operate between firms since employers would use “reasonably consistent” job evaluation systems [Groshen, 1991a, 470]. However, we would argue that the strategic, political, and other firm-specific factors affecting job evaluation systems would make such consistency between firms unlikely [Ames, 1995; T. Bergmann et al., 1995; Madigan and Hoover, 1986; and Treiman and Hartmann, 1981]. Furthermore, neither Canadian pay equity law [Kovach, 1997] nor proposed equal pay legislation in the United States (H.R. 2023 and S. 71, 105th Congress) requires consistency across firms.

Building on these three studies, Peterson and Morgan [1995] used data from the IWS and data from the National Survey of Professional, Administrative, Technical, and Clerical (PATC) employees to confirm that between-establishment gender pay differences were larger than within-establishment pay differences. Further, they found that occupational segregation across firms provided a substantial explanation for the female-male pay gap. Finally, they estimated a 0 to 4 percent potential “equal pay” difference between women and men. As with the other studies discussed above, the lack of controls for individuals’ human capital accumulation in this study may lead to overestimates of employer discrimination.

The authors of all four of these studies note that an important question that remains unanswered is the extent to which the between-firm differences in pay between women and men is due to discrimination or due to worker qualifications. There is, however, a relevant stream of research, not focused on the gender earnings gap, that examines whether workers are sorted to different firms based upon their productivity characteristics [Bronars and Famulari, 1997; Groshen, 1991b; Krueger and Summers, 1988]. Most recently, Bronars and Famulari [1997], using data from the Bureau of Labor Statistics’ White Collar Pay Survey (WCP), found that 65 percent of between-establishment pay differences were due to worker characteristics such as years of education, highest degree attained, and potential experience. These findings suggest that the gender differences in pay that occur between employers may also be related to worker characteristics.

This paper seeks to refine prior estimates of pay discrimination and job placement discrimination, using a sample of entry-level workers. Thus, based upon the above discussion, this paper will (1) evaluate the extent to which employers pay women and men with the same qualifications in the same jobs different starting salaries (pay discrimination); (2) evaluate the extent to which employers assign similarly qualified men and women to different occupations, which pay different salaries, within firms (job placement discrimination); and (3) evaluate the extent to which employers’ decisions to hire more women or more men are based (or not based) on measured individual characteristics (hiring discrimination).
process of the university’s institutional research office and the further independent aggregating of majors by two of the study’s authors. To capture differences in work content, we measured graduates’ occupations with dummy variables (professional specialty, administrative and managerial, services, sales, and technical). These variables are based on 3-digit Standard Occupational Classification (SOC) codes initially assigned by trained individuals at the university’s office of institutional research, using job title and job duty data supplied by the graduates. To capture industry differences, we created dummy variables for industry (manufacturing, financial, services, and trades). These variables were based on 3-digit Standard Industrial Classification (SIC), also initially assigned by trained individuals at the university’s office of institutional research from information supplied by the graduates.

Job title and job duty information supplied by graduates was used to create a dichotomous variable to measure trainee status (1 = trainee), in order to differentiate individuals not yet fully integrated into their new jobs from those who were. Job titles that included words or phrases that implied that individuals were in training (for example, management trainee, or “in training”) were coded as trainees. Finally, the employer of hire was controlled for with 44 dummy variables based upon employer names provided by graduates.

Analysis

The results of ordinary least squares estimations of the determinants of starting salaries for men and women are decomposed using the formula advocated by Oaxaca and Ransom (1984). The decomposition is performed for two models, one with employer dummy variables and one without. Equation (1) is the basic estimating equation for the analyses in this paper, and corresponds to what we will call model (A):

$$\ln S_i = X_i \beta + \delta_j + \epsilon_i$$

where $\ln S_i$ is the natural logarithm of the starting salary of individual $i$ employed at firm $j$, $X_i$ are individual $i$’s personal and human capital characteristics expected to contribute to the determination of his or her starting salary, $\delta_j$ is employer $j$’s individual effect that is not expected to vary across individuals, and $\epsilon_i$ is a random error term. $X_i$ includes human capital, trainee status, occupation, and industry variables. Model (B) differs from the specification in equation (1) in that there will be no control for firm-specific determinants of the salary ($\delta_j = 0$ for all $j$). The inclusion of firm-specific regressors (i.e., employer dummy variables) in Model (A) allows us to isolate the role each individual characteristic plays in the salary determination within a firm. Thus, model (A) is important for isolating the extent to which individual employers pay women and men with the same characteristics different salaries (i.e., within-firm pay differences). In addition, one is able to glean from this specification the importance of the place of employment in explaining observed salary differences; a measure of the importance of differences across firms in the determination of starting salaries. In the absence of firm-specific determinants, the parameter estimates of model (B) capture both within- and between-firm influences on the determination of starting salaries.

Equation (1) is estimated separately for women and men, and the average log salary difference between women and men is then decomposed. Briefly, the salary decomposition technique permits the categorization of the pay difference between women and men into portions due to differences in their characteristics (for example, women and men have different fields of study), often referred to as the “endowment effect,” and portions due to differences in returns to their same characteristics for
example, women and men with the same fields of study get paid differently), often referred to the "coefficient effect."

Equation (2) describes the decomposition of the average log salary differential between males and females (where the subscript M refers to males and the subscript F refers to females):

\[
\ln S_M - \ln S_F = \hat{\alpha} + \epsilon M - \epsilon F + Z' M \hat{\beta} M + Z' F \hat{\beta} F
\]

where \( \hat{\alpha} \) is the vector of estimated coefficients for males, \( \epsilon M \) is the vector of estimated coefficients for females, \( Z_M \) is the vector of average individual and firm-specific regressors for males, \( Z_F \) is the vector of average individual and firm-specific regressors for females, and \( \hat{\beta} M \) is the constructed vector of coefficients believed to drive salary determination in the absence of any "discriminatory" behavior on the part of employers. The first term on the right-hand side of equation (2), \( \hat{\alpha} + \epsilon M - \epsilon F \), corresponds to the contribution that differences in individual and firm characteristics make to the observed difference in log starting salaries; the endowment effect. The second term \( Z' M \hat{\beta} M + Z' F \hat{\beta} F \) corresponds to the advantage men experience from an over-valuation of their characteristics in the determination of starting salaries. The third term \( Z' F \hat{\beta} F - \hat{\alpha} \) corresponds to the disadvantage females experience from an under-valuation of their characteristics in the determination of starting salaries. Together, these second and third terms represent the conventional estimate of discrimination in studies of the earnings gap — the coefficient effect. The terms are presented separately in recognition that in the absence of labor market discrimination, the equilibrium wage would be somewhere between men's wages and women's wages. Thus, we have chosen the formulation of \( \hat{\beta} \) posited by Oaxaca and Ransom [1984] because it has a general form that fits most labor market situations:

\[
\hat{\beta} = \lambda \hat{\beta} M + (1 - \lambda) \hat{\beta} F
\]

where \( \lambda = Z' Z^{-1} (Z_M Z_M + Z_F Z_F) \) and

\[
ZZ = Z_M Z_M + Z_F Z_F.
\]

**RESULTS AND DISCUSSION**

The overall starting salary difference between women and men in our sample is \$2,200. The raw median female-male salary ratio in our sample is 0.91 (not presented in tables), which is considerably higher than the current 0.72 median ratio for managerial and professional specialty jobs in the U.S. economy. We expected the ratio for our sample to be higher than the economy-wide ratio due to the homogeneity (for example, the individuals all graduated from one university) and the restricted nature of our sample (for example, only employers hiring at least 10 graduates were included) [Cain, 1986].

Table 2 presents regression results, by gender, for both models (A) and (B). While the discussion will be focused on the salary decomposition results, we note three points about the regression results. First, regression coefficients for the control variables and the employer dummy variables are not presented due to space limitations, but their presence in the model is represented by a "Yes" in the regression tables.

**Equal Pay**

The decomposition results in Table 3 also indicate that 0.0318 (36 percent) of the 0.0892 pay gap is due to employers paying lower starting salaries to women with the same qualifications and working for the same firms, and these figures translate to approximately a 3 percent difference in starting pay. This 3 percent is consistent with estimates from Peterson and Morgan [1985], and is lower than estimates found by Johnson & Solon [1986] and Groshen [1991a, b], and all of these authors considered their estimates to be small. This 3 percent is higher than that found by Blau [1977], although her analyses were limited to workers in selected occupations in three metropolitan areas.

Moreover, the 0.0318 figure represents an upper-bound estimate of illegal pay discrimination by employers in our sample for two reasons: (a) women and men may hold different jobs, even within occupations, and employers are required to pay equal pay only to those in the same job, and (b) women's lower pay might be explained by omitted productivity characteristics.

On the other hand, the fact that the equal pay portion of the gap constituted over one-third of the pay gap in our sample may be noteworthy. We expected unexplained earnings differences between women and men with the same qualifications
TABLE 2
Starting Salary (log) Regression Results for Models (A) and (B)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model (A)</th>
<th></th>
<th>Model (B)</th>
<th></th>
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<tr>
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<td>Coefficient for Women</td>
<td>Coefficient for Men</td>
<td>Coefficient for Women</td>
<td>Coefficient for Men</td>
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<td>0.0709</td>
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<td>(0.014)</td>
<td>(0.010)</td>
<td>(0.015)</td>
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<td>(0.020)</td>
<td>(0.020)</td>
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<td>(0.037)</td>
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<tr>
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<td>Services</td>
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<td>(0.035)</td>
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</tr>
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<td></td>
<td>(0.070)</td>
<td>(0.073)</td>
<td>(0.073)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>Services</td>
<td>-0.0119</td>
<td>0.0630</td>
<td>-0.135a</td>
<td>-0.1301a</td>
</tr>
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<td></td>
<td>(0.067)</td>
<td>(0.064)</td>
<td>(0.064)</td>
<td>(0.064)</td>
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<tr>
<td>Trade</td>
<td>-0.0026</td>
<td>-0.0117</td>
<td>-0.1204a</td>
<td>-0.1205a</td>
</tr>
<tr>
<td></td>
<td>(0.118)</td>
<td>(0.074)</td>
<td>(0.074)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Employer dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>variables included</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>10.162a</td>
<td>10.146a</td>
<td>10.013a</td>
<td>10.013a</td>
</tr>
<tr>
<td></td>
<td>(0.127)</td>
<td>(0.120)</td>
<td>(0.120)</td>
<td>(0.120)</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.716</td>
<td>0.643</td>
<td>0.848</td>
<td>0.524</td>
</tr>
<tr>
<td>No. Of Observations</td>
<td>443</td>
<td>500</td>
<td>442</td>
<td>500</td>
</tr>
</tbody>
</table>

Omitted college major is engineering. Omitted occupation is professional specialty. Omitted industry is manufacturing. Additional control variables included in the regression are number of job offers, race/ethnicity, job region, and year of graduation. Standard errors are in parentheses.

a. Significant at the 10 percent level.
b. Significant at the 5 percent level.
c. Significant at the 10 percent level.

TABLE 3
Decomposition Results for Models (A) and (B)

<table>
<thead>
<tr>
<th>Components of Pay Gap</th>
<th>Model (A)</th>
<th>Model (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Pay Gap*</td>
<td>0.0833 ($32,800 10%)</td>
<td>0.0832 ($32,800 10%)</td>
</tr>
<tr>
<td>Endowment Effect</td>
<td>0.0574*($1,406 64%)</td>
<td>0.0469*($1,325 59%)</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>GPA</td>
<td>0.0005</td>
<td>0.0011</td>
</tr>
<tr>
<td>Field of Study</td>
<td>0.0171</td>
<td>0.0037</td>
</tr>
<tr>
<td>Occupation</td>
<td>0.0069</td>
<td>0.0074</td>
</tr>
<tr>
<td>Trainer Status</td>
<td>-0.0007</td>
<td>0.0037</td>
</tr>
<tr>
<td>Industry</td>
<td>-0.0033</td>
<td>0.0055</td>
</tr>
<tr>
<td>Employers Dummies</td>
<td>0.0294</td>
<td>NA</td>
</tr>
<tr>
<td>Other Characteristics</td>
<td>-0.0010</td>
<td>-0.0007</td>
</tr>
<tr>
<td>Coefficients Effect</td>
<td>0.0218 ($702 30%)</td>
<td>0.0320 ($906 44%)</td>
</tr>
<tr>
<td>Male Advantage</td>
<td>0.014b</td>
<td>0.015b</td>
</tr>
<tr>
<td></td>
<td>(0.0068)</td>
<td>(0.0078)</td>
</tr>
<tr>
<td>Female Disadvantage</td>
<td>0.017b</td>
<td>0.031b</td>
</tr>
<tr>
<td></td>
<td>(0.0073)</td>
<td>(0.0086)</td>
</tr>
</tbody>
</table>

See equation (2) for the decomposition formulas used. Model (A) includes employer fixed-effects, Model (B) does not. Standard errors for each of the three pieces in equation (2) are in parentheses.

a. Significant at the 1 percent level.
b. Significant at the 5 percent level.
c. Observed difference in log annual salary between women and men.

(grade point average, college major, university quality) who were working in the same occupations within firms. Moreover, consistent with Greshen's [1991a] study, within-employer differentials fail to disappear as Johnson and Solon [1986] speculate might happen with employer-level data.

Job Placement

The decomposition results for model (A) also indicate that occupation accounted for only 0.0069 (8 percent) of the 0.0822 overall pay difference between women and men. (See the first column of numbers in the occupation row in Table 3.) This small differential indicates that for the most part, employers were not assigning women and men with the same qualifications to different occupations within their firms. If this were the case, this would be considered pay discrimination resulting from gender-biased job placement decisions. We note as well that individual employers were not assigning similarly qualified women to be trainees at a greater rate than their male counterparts. Thus, this 0.0069 figure, which translates to less than a 1 percent gender pay difference, represents an upper-bound estimate of job placement discrimination on the part of individual employers, because women and men may differ in their
preferences to work in various occupations, and because employers may have placed individuals in different occupations due to unmeasured productivity characteristics. It also represents an upper estimate of the potential of a comparable worth policy, if it were implemented, to equalize the starting pay of women and men college graduates. In other words, if only a small portion of the pay differential originates from differences in job placement, then there is little room for a policy focused on job placement (for example, comparable worth) to equalize pay differences.

Our estimate for the efficacy of comparable worth is lower than in previous studies, which estimated that comparable worth could equalize women's and men's pay in the amount of 3 to 5 percent in pay (Johnson and Solon, 1980) and 17 to 52 percent in pay (Gruber, 1991a). Even though we adopt Johnson and Solon's (1980) view that comparable worth's efficacy can only be estimated within firms, our estimates are even lower than theirs. That we found such a negligible potential role for comparable worth highlights the importance of detailed human capital variables and employer variables in estimates of discrimination and the potential efficacy of public policies. We note, however, that our estimates are small in part because we are examining starting salaries only.

Hiring

A comparison of the decomposition results from model (A) and model (B) (see Table 3) indicates that part of the reason women work for lower-paying employers than men is that they major in different fields of study than men. In particular, we calculate that 42 percent of the employer contribution to the pay gap results from employers hiring workers with different fields of study. This field of study hiring contribution (FSHC) is calculated as follows:

$$\text{FSHC} = (X - YZ) = (0.0337 - 0.0171)/0.0394 = 0.42$$

where,

- $X$ = portion of the pay gap accounted for by differences in field of study within and across employers. (See Table 3, model (B) endowment for field of study; 0.0337.)
- $Y$ = portion of the pay gap accounted for by differences in field of study across employers only. (See Table 3, model (A) endowment for field of study; 0.0171.)
- $Z$ = portion of the pay gap accounted for by wage differences across employers. (See Table 3, model (A) endowment for employer; 0.0394.)

Calculation of FSHC is important because it indicates how much of the gender-related, between-employer pay gap can be excluded from our estimate of hiring discrimination. Unlike field of study, grade point average was not an explanation for women and men working for employers, primarily because it had a negligible effect on the gender earnings gap.

A pay gap contributed by employers of 0.0228 remains that could not be explained by workers' human capital characteristics. Given the possibility of unmeasured, legitimate reasons for different employers to hire women and men at different rates,

The Overall Picture

Overall, the results indicate that, as legislatively defined, employers are not discriminating against their women hires to a large extent. The 44 employers in our sample appear to be complying with the Civil Rights Acts of 1964 and the Civil Rights Act of 1991 when it comes to hiring and placing women and men college graduates. However, they may be violating the equal pay provisions of anti-discrimination laws, as evidenced by the 8 percent difference in pay for similarly qualified and situated women and men in the same firms. Nevertheless, all of the estimates of pay, job placement, and hiring discrimination are small.

When aggregated, however, the three types of discrimination provide a more substantial explanation for the gender earnings gap. Adding the pay (3 percent difference in pay between women and men), job placement (1 percent pay difference), and hiring discrimination (2 percent pay difference) estimates together yields an overall upper discrimination estimate of a 6 percent gap in pay between women and men, or a majority of our initial earnings gap of 9 percent. In addition, small starting salary differences can become substantial over time, since employers base merit pay raises and other forms of pay on current salary levels. For example, our 3 percent ($792) starting salary difference for similarly qualified women and men in the same occupations and in the same firms could multiply to $7,543 over 10 years and $22,629 over a 30-year career. Similarly, the 6 percent ($1,408) unexplained gender gap in starting pay comprised of different types of discrimination, could increase to $15,410 and $40,229, over 10 and 30 years, respectively.

Thus, a more holistic or comprehensive approach to addressing starting salary differences between women and men may be called for. That is, employers who truly want to minimize differential outcomes for women and men from their employment practices should examine the component and generate aggregate gender-related effects of their pay, job placement, and hiring decisions. Similarly, policy makers may want to evaluate component and aggregated efforts and results when monitoring employers' compliance with the Equal Pay Act of 1963 and the Civil Rights Acts of 1964 and 1991. The gender earnings gap will be most effectively remedied when pay, job placement, and hiring efforts are considered together, because when discrimination occurs, women experience it in the aggregate.

The estimation and aggregation of the three types of discrimination presented in this paper differs from conventional economic estimates of labor market discrimination. First, conventional estimates often attribute the entire unexplained earnings difference to discrimination, whereas we exclude from discrimination that portion of the between-employer pay difference that is explained by human capital characteristics. Moreover, controlling for detailed human capital information as we have done improves the accuracy of the unexplained gender earnings gap within firms. The
precision of discrimination estimates is essential for assessing the need for employers or policy makers to address the gender earnings gap. Second, unlike the approach taken in our study, conventional estimates do not distinguish pay, job placement, and hiring discrimination, primarily because they do not isolate within- and between-employer pay differences. Distinguishing the different types of discrimination is essential for targeting corrective actions. In sum, the estimates presented here are an improvement over conventional estimates because employer-level data and human capital information provide more precise estimates of employers’ culpability for discrimination and information on the ways in which employers discriminate.

CONCLUDING COMMENTS

This research represents an improvement in establishing the culpability of employers for discriminating against female workers. Detailed, individual-level human capital measures were combined with identification of employers to allow a precise estimation of salary determination both within and across employers.

We provide evidence that employers appear to be adhering to the letter of the law regarding job placement and hiring of women, and are making efforts comparable to other employers in equal pay compliance. Nevertheless, a more comprehensive approach in evaluating the overall labor market experience of women may be warranted. Evaluation of salary determination for men and women suggests that, at most, only 1 to 3 percent of the observed difference in starting salaries between men and women results from the violation of any single anti-discriminatory legislation. Taken together, however, discriminatory behavior may account for as much as a 6 percent salary difference between men and women; this amounts to two-thirds of the overall salary difference of 9 percent.

While we consider the homogeneity of the sample (all employees graduating from the same university) to be a strength of the study, it is possible that discriminatory experiences may be more likely for students from universities perceived to have more variability in graduate qualifications or among individuals without college degrees. Similarly, one may expect to observe more employer discrimination in a sample of workers from many schools, as employers struggle to assess individuals’ potential productivity based upon their quality of education, or other readily observable characteristics. In addition, it is possible that the women in our sample receive premiums (for the quality of their schooling) that are not offered to women in lower-ranked universities.

Future research should focus on discrimination at various stages of individuals’ careers. The pay of recent college graduates may be more directly tied to market pay rates than the pay of workers employed by one firm for a number of years, who may be more susceptible to non-market or discriminatory forces (Blau, 1977; Doeringer and Piore, 1971). In addition, women may have fewer employment alternatives at other firms several years into their careers, due to spousal constraints, or household or caregiving responsibilities (Bielby and Bielby, 1992; Hochschild, 1989). To most effectively build upon our study, we suggest that researchers focus on the pay of workers one year beyond college, two years beyond college, and so on so that the point at which women’s and men’s salaries diverge further (if at all) can be pinpointed and examined.

REFERENCES


Discrimination by Parity

at which women’s and men’s salaries diverge further (if at all) can be pinpointed and examined.

NOTES

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2. The 1971 U.S. Supreme Court case Griggs v. Duke Power Co. established that firms’ selection practices must be job related and consistent with business necessity (Betchstein et al., 1984).

3. These requirements were reinforced by language in the Civil Rights Act of 1991.

4. One referee raised a concern about the accuracy of self-reported salary. Bollinger (1968), and others, have shown that most of the measurement error in self-reported income occurs among low-income workers. And, while high-income women tend to under-report their income slightly more than do high-income men, the practical difference in reporting behavior is small and it is not expected to appreciably affect the accuracy of the results of this analysis.

5. We also performed the analyses on a sample requiring employers to have hired only 4 graduates (2 men and 2 women). This relaxed restriction resulted in 1,189 observations and 85 employers. The results were almost identical, but we prefer to report the results obtained under the more restrictive sample construction guidelines.

6. We did not have access to data on individuals’ labor market experience, with one exception. For 1985 graduates, we were able to construct a proxy for experience (age-schooling). According to this proxy, both men and women had less than one year of work experience and did not differ in their amounts of experience (p<.05).

7. The authors categorizing the majors agreed 90 percent of the time, and this is considered to be sufficiently reliable (see Nunnally and Bernstein, 1964).

8. The term “discriminatory” is used tentatively to reflect the typical, but controversial, interpretation of differences in the male and female coefficients as total labor market discrimination.

9. Other formulations of include: >0 and /<1 (Ozawa, 1978), >1 and /<0 (Deacon and Feather, 1990; Koizumi, 1983), and >Males/Males+ Females (Cotten, 1988).

10. The F-statistic on the employer dummy for men is 4.69(Pr=0.034) and 1.64 and the F-statistic on the employer dummies for the women is 5.48(Pr=0.037)=1.64.

11. These figures reflect net present values, assuming a 5 percent average annual merit pay increase and a 5 percent discount rate.