Gender Composition of Occupations and Earnings: Why Enter a Female Dominated Occupation?

Peter G. Toumanoff
College of Business Administration
Marquette University
Milwaukee, WI 53201-1881, USA

Timothy J. Keaveny
College of Business Administration
Marquette University
Milwaukee, WI 53201-1881, USA

Abstract

Given the inverse relationship between the proportion of females employed in an occupation and earnings, why enter a female-dominated occupation? It has been argued that an individual's total compensation from work is a combination of wage compensation plus non-pecuniary compensation associated with job characteristics, and when choosing an occupation, one selects the utility-maximizing combination of wages and job characteristics. Our findings support the theory that employee and job characteristics are rewarded differently in non-female dominated (NFD) and female dominated (FD) occupations, and that people choose occupations that reward their attributes more or penalize them less. Comparison of the variables significantly related to salary among FD occupations, NFD occupations and the full sample reveals that 9 of 13 variables significantly related to salary among NFD occupations are also significantly related to salary, with the same sign, among the full sample. However, none of these 13 variables is related to salary among FD occupations. This suggests that an individual's labor force attributes are rewarded differently in FD occupations compared to NFD occupations and therefore any individual with a particular set of attributes can expect to be rewarded differently in a NFD occupation than in a FD occupation.

Key Words: gender differences in earnings; gender pay gap; gender composition of occupations and earnings; human capital theory and gender differences in earnings; human capital theory and occupational choice.

1. Introduction

This project investigates the Human Capital Theory proposition that people choose to enter occupations that are in their best interest. The inverse relationship between the proportion of females employed in an occupation and earnings is well documented (Blau and Beller, 1988; Groshen, 1991; Kilbourne et al., 1994; MacPherson & Hirsch, 1995; Sorenson, 1990). Given this inverse relationship, why would anyone choose to enter a female-dominated occupation?

Pitts (2003) argues that earlier studies of the relationship between gender composition of occupations and earnings which conclude that women in female-dominated occupations are at an earnings disadvantage relative to men are flawed because occupational choice is treated as an exogenous variable. As a consequence, there is no control for self-selection of individuals into alternative occupations. Pitts' approach builds on research of Atrostic (1982), who argues that an individual's total compensation from a job is the sum of money wages plus non-pecuniary compensation from job characteristics. Career choices will vary depending on individual differences in preferences regarding job characteristics.

Some non-pecuniary job characteristics (e.g. shorter hours of work per week, and interruptions in labor force participation) typically have a negative relationship with earnings. If one attaches high utility to such characteristics and selects a job with them, one "pays" for such job characteristics with reduced wages.

On the other hand, some non-pecuniary job characteristics (e. g., responsibility for budgets) are positively related to earnings. If one enters an occupation or career path with these characteristics, one receives higher wages, given ability to perform such aspects of the job. Thus an individual may buy desirable job characteristics e.g., schedule flexibility, by accepting lower wages or one may agree to challenging or demanding job characteristics in return for higher wages.

Pitts argues that treating occupational choice as an endogenous variable is important if men and women have different preferences regarding job characteristics, because gender differences in preferences lead to gender differences in occupations selected. Specifically, if the job characteristics valued and purchased by women are more costly than the characteristics valued and purchased by men, it follows that average earnings for women would be lower. Our findings support the theory that employee and job characteristics are rewarded differently in NFD and FD occupations, and that people choose occupations that reward their attributes more or penalize them less.

2. Literature Review

This section identifies "non-pecuniary" forms of compensation that may potentially be part of individuals' total compensation and influence occupational choices.

2.1 Traditional Family Roles

Polachek (1981) asserts that women who display labor force participation patterns consistent with traditional family roles are acting in their best interest by entering FD occupations. Human Capital Theory suggests that labor force experience contributes to the development of employee skills and competencies which impact earnings. Several studies conclude that labor force experience is among the most important determinants of earnings (Loury, 1997; Mitra, 2002; O'Neill and Polachek, 1993; Weinberger, 1998; Wellington, 1994). Gender differences in full-time work experience account for a large part of gender differences in pay (Frieze, et al., 1990; Olson and Frieze, 1989; Schneer and Reitman, 1990). However research investigating the relationship among gender, labor force participation and earnings is not consistent (Brown and Corcoran, 1997; Murrell et al., 1996; Olson and Frieze, 1989; and Schneer and Reitman, 1994). Some research suggests the returns to experience are the same for men and women, while other research suggests the returns for men exceed the returns for women. It is possible that differences in the gender composition of occupations of the subjects studied may be responsible for these inconsistent findings.

2.2 Interruptions in Labor Force Participation, Choice of Occupation and Skill Atrophy

When labor force participation is expected to be continuous throughout one's lifetime, greater investment in formal education and job training takes place early in life (Polachek, 1981). As years in the labor force advance, on-the-job training declines and a concave age-earnings profile is observed. Alternatively, for those who prefer or expect discontinuous and shorter labor force participation, there is less investment in formal education and job training, and a lower and flatter age-earnings profile is observed (Blau et al., 2006).

Polachek (1981) suggests that, in addition to the amount of investment in human capital, one makes a choice with regard to the kind of human capital (occupation) in which to invest. These choices are made with the goal of maximizing lifetime income. In explaining decisions regarding the kind of human capital (occupational choice), Polachek (1981) introduces the concept of skill atrophy. He suggests that skills deteriorate or waste away when not used continuously, which leads to a loss in earnings potential. If earnings and earnings potential increase continuously over one's work life as one accumulates on-the-job experience, then dropping out of the labor force reduces one's earnings potential because of skill atrophy. Especially in fields like engineering in which the body of knowledge changes rapidly, interruptions in labor force participation would be associated not only with extensive skill atrophy, but with failure to keep pace with changes in the body of knowledge of the occupation. Those occupations in which the loss of earnings potential due to atrophy is smallest would be relatively more attractive to those who anticipate intermittent labor force participation (Polachek, 1981).

Findings with regard to gender composition of occupations, atrophy and impact on male and female earnings are not consistent. Some report findings which agree with the Human Capital Theory predictions (Polacek, 1981; Robst and VanGilder, 2000), and some conclude there are not significant earnings differences between female and male occupations following gaps in employment (England, 1982; England et al., 1988).

2.3 Verbal Ability, Quantitative Ability, and College Major

Several investigations have reported that the choice of college major is a significant factor in explaining gender differences in earnings (Brown and Corcoran, 1997; Gerhart, 1990; Joy, 2003; Loury, 1997). It is argued that women tend to be guided towards certain occupations and away from other occupations because of a perception that men have greater mathematical skills and thus are better suited to work in certain occupations (Entwisle et al., 1994). Paglin and Rufolo (1990) presented data suggesting that differences in earnings for occupations with high proportions of men, relative to occupations with high proportions of women, are related to the occupation's mathematical and quantitative ability requirements. In addition, they reported that the earnings differences associated with college majors are also related to the level of math and quantitative ability required. On the other hand, they reported that verbal ability scores are unrelated to earnings. Mitra (2002) reported similar findings, i.e., mathematical ability is positively related to earnings, but verbal ability is not related. Alternatively, Brown and Corcoran (1997) found that Scholastic Aptitude Test (SAT) verbal ability scores were significantly related to earnings, but SAT quantitative ability scores had statistically insignificant effects. It should be noted that Brown and Corcoran's multivariate analysis included measures of enrollment in mathematics courses, which were significantly related to earnings. Inclusion of the latter measures may explain why SAT quantitative ability scores were not significant in this investigation. Our study examines how college major, verbal ability and quantitative ability are rewarded among occupations with high and low concentrations of women.

2.4 Employer Investment in Employee Development

Human Capital Theory seeks to explain choices made by members of the population regarding investment in education and training that result in the development of skills and capabilities (human capital) which can be rented to employers in exchange for wages. Becker (1964) distinguishes between general and specific human capital. General human capital has value for a wide array of employers, while specific human capital has value only for a limited number of employers, perhaps only one. Because employees own their human capital, an employer is reluctant to incur the cost of developing general human capital because the employee may quit after developing such skills and secure a job using these skills with another employer. Consequently individuals typically incur the cost of developing their own general human capital. On the other hand, an employer may pay for development of skills that have value only for that employer, given the employer believes the employee is not likely to quit after development of specific human capital is complete. The employer has an incentive to pay a wage premium to recipients of employer-sponsored specific human capital development so that those employees do not quit after development is completed. Employee turnover would deprive the employer of the potential value associated with development of employees' specific human capital.

There is evidence that women are perceived to be twice as likely as men to quit voluntarily (Schwartz, 1989; Stroh et al., 1996). Because of this perception we expect employers to provide more training and development opportunities for those in male-dominated occupations. Consistent with this research, Wellington (1994) reported that employer-provided training was significantly related to earnings for both genders, but that men had significantly more training than women.

2.5 Job and Organization Variables Relevant to Gender Differences in Earnings

Previous research regarding length of service (tenure) with an employer generally finds a significant positive relationship with earnings (Brett and Stroh, 1997; Brown and Corcoran, 1997; Topel, 1991; Wellington, 1994). The discussion of general and specific human capital suggests a stronger positive relationship between length of service and earnings will be observed among occupations with low concentrations of women than among occupations with high concentrations of women.

Job responsibilities, hours worked and company size influence earnings levels. Joy (2003) found that job responsibilities and hours worked, accounted for a significant portion of the wage gap between men and women. Gender differences in the association between earnings and supervisory, as well as, budgetary responsibility have been reported (Ferber and Spaeth, 1984; Spaeth, 1985; and Ferber et al., 1986). Company size appears to be positively related to pay level (Cox and Harquail, 1991; Mitra, 2002; and Schneer and Reitman, 1995). Hours worked is positively related to compensation (Judge et al., 1995; Schneer and Reitman, 1995; Wellington, 1994), and women appear to work fewer hours than men (Schneer and Reitman, 1995). Several studies have also reported that women progress more slowly in their careers, i.e., fewer promotions, and, consequently, lower salaries (Cox and Harquail, 1991; Murrell et al., 1996; Schneer and Reitman, 1990).

2.6 Demographic Variables

Marital status appears to be related to compensation (Joy, 2003; Judge et al., 1995; Kilbourne et al., 1994; Landau and Arthur, 1992; Mitra, 2002). Married employees receive higher salaries, presumably because married individuals are perceived as more stable. Studies which investigate gender differences in the relationship between marital status and salary do not provide consistent results. Landau and Arthur (1992) report that both married men and women have higher salaries, while Kilbourne et al. (1994) report a significant association between marriage and compensation among men. Alternatively, Mitra (2002) reported that among white-collar, professional, and highly skilled workers, being married has a significant negative association with hourly wages for females and a significant positive association with hourly wages for men. Race differences in earnings have frequently been reported (Blau et al, 2006; Weinberger, 1998), and are included in our analysis. Finally, it is important to note that age is highly correlated with years of labor force experience. Stanley and Jarrell (1998) conclude that in studies of gender wage discrimination, age makes a material difference in wage equations, and excluding age may result in omitted variable bias.

3. Sample

This project makes use of data from a survey of young working professionals who registered to take the Graduate Management Admissions Test (GMAT). The survey was sponsored by the Graduate Management Admissions Council (GMAC). Data collection was conducted by Battelle Memorial Institute for the GMAC. Approximately 250,000 individuals register to take the test every year. Based on a stratified random sample of test registrants, questionnaires were sent to 7,006 individuals who signed up to take the test between June 1990 and March 1991. Completed questionnaires were received from 5,790 individuals (82.6 percent response rate). We focused on those who were employed 35 hours or more per week and responded to the items relevant to this investigation. The number of respondents who met these criteria is 2,052. The profile of these subjects was: 40 percent female, 29 years of age, with just over 6 years of work experience beyond their bachelor degree.

4. Measures, Expected Relationships and Gender Difference

Table 1: Variable Definitions

SALARY	annual salary in $
NFD	occupation employs 40% or fewer females: binary variable
FD	occupation employs more than 50% female: binary variable
LABORFRC	years in labor force
GAP	years not in labor force after age 21
TENURE	weeks with current employer
QUANTSC	GMAT quantitative test score
VERBSC	GMAT verbal test score
BUSINESS	UG business major: binary variable
ENGINEER	UG engineering major: binary variable
PHYSCI	UG physical science major: binary variable
REIMBURSE	Graduate education paid by employer: 1=none through 5=all
HOURS	hours worked per week
PROMOTE	1 equals has been promoted, 0 equals has not been promoted
SUPERVISOR	number of people directly supervised
BUDGET	total annual budget responsibility
SIZE	number of employees in firm: 1– 13 scale (smallest to largest)
ASIAN	equals 1 if ethnicity is Asian, 0 otherwise
AFRICAN	equals 1 if ethnicity is African-American, 0 otherwise
HISPANIC	equals 1 if ethnicity is Hispanic, 0 otherwise
AGE	age in years
CHILDREN	number of children
MARRIED	equals 1 if married, 0 otherwise
MALE	equals 1 if male, 0 if female
SALARYDIFF	predicted salary differential: ln (FD salary) - ln (NFD salary)

Table 2: Variable Means[1]

	Full Sample		NFD Occupations[2]		FD Occupations[3]	
	Male	Female	Male	Female	Male	Female
SALARY	**37561**	**30516**	**39453**	**33047**	**31038**	**27385**
NFD	**0.62**	**0.46**				
FD	**0.23**	**0.38**				
LABORFRC	**7.19**	**6.03**	**7.14**	**5.70**	6.67	6.03
GAP	1.63	1.56	**1.71**	**1.35**	**1.36**	**1.76**
TENURE	**43.8**	**35.5**	**44.4**	**35.0**	39.8	36.6
QUANTSC	**30.7**	**26.5**	**32.0**	**27.8**	**28.0**	**25.0**
VERBSC	**29.1**	**27.6**	**29.4**	**28.2**	**28.0**	**26.3**
BUSINESS	**0.23**	**0.29**	**0.15**	**0.26**	0.43	0.37
ENGINEER	**0.31**	**0.13**	**0.44**	**0.22**	0.08	0.05
PHYSCI	0.04	0.06	0.06	0.07	**0.01**	**0.04**
REIMBURSE	2.79	2.72	2.94	2.99	**2.65**	**2.37**
HOURS	**46.7**	**44.2**	**46.9**	**44.4**	**45.1**	**43.4**
PROMOTE	0.54	0.52	0.54	0.53	0.53	0.52
SUPERVISOR	**1.17**	**0.74**	**1.04**	**0.63**	**1.13**	**0.67**
BUDGET	**4.43**	**2.83**	**4.15**	**2.54**	**3.60**	**2.29**
SIZE	9.53	9.28	9.86	9.79	**9.35**	**8.74**
ASIAN	0.14	0.15	0.36	0.36	0.11	0.16
AFRICAN	**0.09**	**0.18**	**0.08**	**18.4**	**0.13**	**0.19**
HISPANIC	0.18	0.16	0.18	0.16	0.17	0.16
AGE	**29.4**	**28.1**	**29.4**	**27.6**	28.7	28.4
CHILDREN	**0.56**	**0.34**	**0.57**	**0.25**	0.48	0.40
MARRIED	**0.49**	**0.36**	**0.50**	**0.31**	**0.48**	**0.40**
SALARYDIFF	**- 0.15**	**- 0.11**	**- 0.19**	**- 0.14**	- 0.05	- 0.08
MALE	0.60		0.67		0.47	
N	2052		1138		596	

[1]bold-face indicates significant difference between means (5% level)
[2]Non female-dominated occupations have 40% or fewer females.
[3]Female-dominated occupations have more than 50% females.

Data were gathered representing each group of variables discussed above. Table 1 provides variable definitions, and Table 2 provides sample means, broken down by gender, for the full sample, and for the sub-samples of individuals who choose NFD occupations and those who choose FD occupations. We measured gender composition as the proportion of women employed in a particular occupation, reported on a .00 to 1.0 scale. These data were obtained from the Department of Labor for 1989 (U.S. Department of Labor, 1989). Our definition of NFD as 40% or less female, and FD as more than 50% female is somewhat arbitrary, however our results are not sensitive to alternative definitions. Out of 2052 individuals in the full sample, 1138 chose NFD occupations whereas 596 chose FD occupations, with the remaining 318 individuals choosing occupations which were neither NFD nor FD. The dependent variable for the salary estimates is the natural logarithm of SALARY, and the dependent variables for the probit estimates of occupational choice are NFD and FD. In the full sample men earn an average of $7,045 more than women. That differential is $6,406 in NFD occupations and only $3,653 in FD occupations

Labor force experience is captured by three variables, LABORFRC, GAP, and TENURE. We expect LABORFRC and TENURE to affect salary positively, whereas GAP is expected to have a negative effect. Overall men have significantly more labor force experience and tenure with their present employer. Although women in the full sample have smaller gaps in labor force experience, that difference is not significant, and women's gaps are larger relative to their years in the labor force. It is interesting to note that women with significantly smaller gaps than men tend to choose NFD occupations, whereas women with significantly larger gaps than men tend to choose FD occupations.

Cognitive skills are measured by QUANTSC and VERBSC. Both are expected to have a positive effect on salary among NFD occupations, whereas only VERBSC is expected to have a positive effect among FD occupations. Men have significantly higher scores than women in both tests, although the difference is smaller in the verbal than in the quantitative scores. College major is measured by the dummy variables BUSINESS, ENGINEER, PHYSCI, with Social Sciences, Humanities, and other being the omitted category. We expect college major to affect salary, but theory does not predict the direction of the effect. The percentage of women who major in business is significantly higher than men, whereas the opposite is true for an engineering major. These differences are insignificant among those who choose FD occupations.

Job and organizational variables are measured by REIMBURSE, HOURS, PROMOTE, SUPERVISOR, BUDGET, and SIZE. We expect each of these variables to have a positive effect on salary. Differences in anticipated employer tuition reimbursement are insignificant except in FD occupations, in which men expect significantly more support. Men work significantly more hours, supervise significantly more subordinates, and control significantly larger budgets than women in the full sample and both sub-samples. There are no significant differences in promotions, and men work for significantly larger firms only when they choose FD occupations.

Demographic variables include ethnicity, measured by the dummy variables AFRICAN, ASIAN, and HISPANIC, with Caucasian the omitted condition. We expect minority ethnic background to have a negative effect on salary. The only significant difference between female and male means is in the AFRICAN category, in which the percentage of women is significantly higher than the percentage of men. We also measure the demographic variables AGE, CHILDREN, MARRIED, and MALE. We follow the customary practice of using the natural logarithm of age to account for a non-linear relationship between age and salary. We expect AGE and MARRIED to positively affect salary, and we also include MALE and CHILDREN to account for possible gender differences. Women in the full sample and in the sample choosing NFD occupations are significantly younger, have significantly fewer children, and are significantly less likely to be married than men. These differences in means are insignificant in the FD sample, except that women are significantly less likely to be married.

The predicted salary differential, SALARYDIFF is defined as predicted FD salary minus predicted NFD salary (measured as natural logs). It is significantly more negative for men than for women in the full sample and in NFD occupations, and insignificantly different in the FD occupations. For both men and women SALARYDIFF is the least negative for those in FD occupations. This means that, on average, both men and women can expect a lower salary in FD occupations than in NFD occupations, but that the men and women who choose a FD occupation are those for whom this salary differential is the smallest in absolute value. This is consistent with the notion that those who choose FD occupations do so in part because their job market characteristics are rewarded more or penalized less in FD occupations than in NFD occupations.

5. Estimation

Our empirical investigation utilizes the research methodology suggested by Pitts (2003). This involves estimating earnings equations including variables to account for the various influences described above: labor force experience, education and cognitive ability, employee development, job and organization characteristics, and demographic variables. The earnings equations are corrected for the selection bias associated with the decision to choose a NFD or a FD occupation. This correction was made using Heckman's two equation sample selection method. The first equation, a probit estimate of the choice to enter a FD occupation, is used to generate a variable (LAMBDAFD) that represents a decreasing function of the probability that an individual chooses a FD occupation (Heckman, 1979, p.156). This variable is then included in the earnings equations to account for selection bias. A similar process is followed to generate LAMBDANFD, representing a decreasing function of the probability that an individual chooses a NFD occupation. Like Pitts (2003, p. 430) we expect LAMBDAFD to have a positive coefficient and LAMBDANFD to have a negative coefficient in the earnings equations. Both the corrected and uncorrected earnings estimates are presented in Table 3.

The earnings equations are used to calculate a predicted salary for every individual for both FD and NFD occupations. The salary differential between FD and NFD occupations is calculated and included in probit models that explain occupational choice in both FD and NFD occupations. The probit models are used to investigate how salary differentials, demographic characteristics, human capital variables, and cognitive skills explain women's and men's occupational choices. The probit estimates of occupational choice are presented in Table 4.

6. Results

Table 3: Salary Estimates [1]

Dependent Variable: Ln (Salary)[2]

	Corrected for Selection Bias		Not Corrected		
Variables	NFD[3]	FD[4]	NFD[3]	FD[4]	Full Sample
CONSTANT	4.794*	8.67*	4.729*	9.79*	6.07*
LABORFRC	- 0.025*	0.025	- 0.017	0.035*	0.002
GAP	- 0.036*	- 0.006	- 0.032*	- 0.006	- 0.023*
TENURE	0.0007*	- 0.0002	0.0007*	- 0.0002	0.0005*
QUANTSC	0.005*	0.001	0.008*	0.003	0.007*
VERBSC	0.006*	0.008	0.006*	0.008*	0.007*
BUSINESS	- 0.028	0.134*	- 0.064*	0.087*	- 0.015
ENGINEER	- 0.037	0.012	0.123*	0.076	0.156*
PHYSCI	- 0.106	0.070	0.003	0.105	0.046
REIMBURSE	0.016*	0.003	0.023*	0.024*	0.026*
HOURS	0.009*	0.003	0.012*	0.003	0.009*
PROMOTE	0.00007	0.049	0.006	0.049	0.019
SUPERVISOR	0.011	0.062*	- 0.004	0.062*	0.012*
BUDGET	0.006*	- 0.003	0.005*	- 0.003	0.006*
SIZE	0.007*	0.007	0.009*	0.007	0.008*
ASIAN	0.062*	- 0.011	0.050	- 0.019	0.010
AFRICAN	0.013	0.041	0.012	0.046	0.019
HISPANIC	0.004	0.017	0.031	0.036	0.005
Ln (AGE)	1.659*	0.117	1.408*	- 0.175	0.985*
CHILDREN	-0.007	- 0.010	- 0.008	- 0.009	- 0.011
MARRIED	0.054*	0.037	0.040*	0.021	0.021
MALE	-0.057*	- 0.021	- 0.010	0.006	0.025
LAMBDAFD		0.58			
LAMBDANFD	-1.349*				
Adj R^2	0.479	0.258	0.456	0.258	0.397
N	1138	596	1138	596	2052

*significant at .05 level

[1] All estimates with heteroskedasticity-consistent standard errors.

[2] Estimates also include dummy variables accounting for industrial classification of job, including construction, finance, agriculture, manufacturing, mining, public administration, services trade, and transport.

[3]Non female-dominated occupations have 40% or fewer females.

[4]Female-dominated occupations have more than 50% females.

6.1 Salary Models: Labor Force Variables

Length of labor force participation, tenure and gaps in labor force participation are all significant in NFD occupations but insignificant in FD occupations, although the coefficient on the LABORFRC variable has an unexpected sign. This could be the result of multicollinearity among these age-related variables. The correlation coefficient between ln(AGE) and LABORFRC is 0.94. The negative coefficient on LABORFRC, given that age, tenure and labor force gaps are held constant, means that there is a penalty for entering the labor force at an earlier age. This could reflect interruptions in secondary and post-secondary education, and be responsible for a salary penalty. Labor force gaps have a significant and negative effect on salary in NFD occupations but have a smaller and insignificant effect in FD occupations. Because women who choose NFD occupations have significantly shorter gaps than men, and women who choose FD occupations have significantly longer gaps, this lends support to the notion that, on the margin, women who choose FD occupations may do so because their labor force gaps are penalized less. TENURE has a positive and significant coefficient in the NFD estimate and a negative and insignificant coefficient in the FD estimate. The finding that tenure is not rewarded in FD occupations may contribute to women choosing FD occupations, because, on average, they have shorter tenures with their current employers.

In addition, if tenure is not rewarded and if gaps are not penalized, one can withdraw for a time and reenter the labor force without concern for which employer is hiring since there is neither a penalty for a gap in employment nor is there a penalty for changing employers.

6.2 Cognitive Skills and Major Variables

Cognitive skills significantly and positively affect salary in NFD occupations, but are insignificant in FD occupations. We see in Table 2 that women have significantly lower verbal and quantitative test scores, although women who choose NFD occupations have higher average scores than women who choose FD occupations. Lower premiums, especially for quantitative skills, may contribute to women choosing FD occupations. The only undergraduate major that has a significant effect on salary is a business degree, which provides a positive and significant salary premium in FD occupations, but is insignificant and negative for NFD occupations. Not only are women more likely to hold business degrees in our full sample, the percentages of both men and women with business degrees who choose FD occupations are larger than for those who choose NFD occupations

6.3 Job and Organization Variables

Among the job-related variables, hours worked, budget controlled, reimbursement for graduate education expenses and size of firm all provide positive and significant salary premiums in NFD occupations but are insignificant in FD occupations. Women on average work fewer hours and control smaller budgets than men, and they are more likely to choose FD occupations in which these attributes are not significantly related to salary. Employers are expected to provide more support for development to both men and women in NFD occupations than in FD occupations, and development is rewarded better in NFD occupations. This is consistent with Becker's discussion of human capital, and the observation that women with significantly lower gaps in labor force experience choose NFD occupations, whereas women with significantly longer gaps than men choose FD occupations. Note that the experience of men is different, in that men in FD occupations have shorter gaps than men in NFD occupations. The fact that they have shorter gaps than women in FD occupations and anticipate receiving more employer support for development than women in those occupations does support the notion that employers are more willing to invest in development of employees they expect to retain. Finally, having a supervisory position has a positive and significant effect in FD occupations but is not significant in NFD occupations.

6.4 Demographic Variables

The coefficients estimated for the ethnicity variables are generally insignificant in both the NFD and FD equations, except that ASIAN has a positive and significant coefficient in the NFD equation. Age has, as expected, a positive and significant effect on salary in NFD occupations, although it is positive but insignificant in FD occupations. CHILDREN has a negative and insignificant coefficient in both NFD and FD occupations. MARRIED has a positive coefficient in both NFD and FD equations, but is significant only in the NFD equation. In a separate analysis we tested for an interaction between marital status and gender, and found it was not significant.

We find no estimated salary premium for men compared to women, among the Full Sample and among both the uncorrected NFD and FD occupations. When the equation is corrected for the selection bias associated with the decision to choose a FD or NFD occupation, the estimated coefficient decreases and in fact becomes negative and significant in the NFD estimate. This suggests that women who choose NFD occupations receive a salary premium relative to men. This finding underscores the importance of correcting for selection bias in earnings equations that investigate the effect of gender on salary.

6.5 Occupational Choice Models

Table 4: Estimates of Occupational Choice [1]

Variables	NFD[2]	FD[3]
CONSTANT	9.192*	- 11.29*
LABORFRC	0.099*	- 0.136*
GAP	0.067*	- 0.110*
TENURE	0.00008	0.0008
QUANTSC	0.007	- 0.010*
VERBSC	0.0003	- 0.007
BUSINESS	0.107	0.215*
ENGINEER	1.042*	- 0.687*
PHYSCI	0.648*	- 0.468*
ASIAN	- 0.183	0.163
AFRICAN	0.030	- 0.043
HISPANIC	0.063	- 0.126
AGE	- 3.164*	3.781*
CHILDREN	- 0.001	- 0.011
MARRIED	- 0.063	0.087
MALE	0.224*	- 0.314*
SALARYDIFF	-1.357*	1.282*
McFadden R^2	0.134	0.122
n	2052	2052

*significant at .05 level

[1] Probit estimates

[2] Dependent variable is binary, equals one if occupation has less than 40% females, zero otherwise.

[3] Dependent variable is binary, equals one if occupation has 50% or more females, zero otherwise.

As expected, salary differentials have a significant and negative effect on the decision to enter an NFD occupation, and a significant and positive effect on the decision to enter an FD occupation. This result is consistent with the notion that individuals whose expected salary in FD occupations is larger relative to NFD occupations are more likely to choose FD occupations.

When interpreting the estimated coefficients for the other variables in the equations, it is important to note that their effect on salary differential is accounted for by the SALARYDIFF variable. LABORFRC and GAP make one significantly more likely to choose a NFD occupations, and significantly less likely to choose a FD occupation. The finding for GAP is counter-intuitive, and may be explainable by multicollinearity among age, labor force experience, and gaps in employment. When age is left out of the equation, the GAP coefficients have the expected negative sign in the NFD equation and positive sign in the FD equation, although insignificant.

The coefficients estimated for the cognitive skill variables have the expected signs, but are insignificant in the NFD model. QUANTSC has a negative and significant coefficient in the FD model, as expected. Degrees in engineering and physical sciences make one less likely to choose a FD occupation and more likely to choose a NFD occupation. Having a business degree makes one more likely to choose an FD occupation.

Age has a negative and significant effect on the decision to enter a NFD occupation, whereas its effect is positive and significant in choosing a FD occupation. Otherwise, the coefficients estimated for the demographic variables are insignificant in both equations, except for the coefficient on MALE, which is unsurprisingly positive and significant in the NFD equation, and negative and significant in the FD equation. The positive coefficient for age in the FD estimate, and the negative coefficient for age in the NFD estimate may reflect significant changes taking place in the US labor force during the 1980s. For example between 1983 and 1988, the proportion of engineers who were women increased 20.5 percent and the proportion of physicians who were women increased by 15.8 percent (US Department of Labor, 1989, Table 18).

7. Conclusions

Our conclusions are tempered by an understanding of the relative strengths and weaknesses of our sample. Its strengths include the fact that we measure cognitive skills and job characteristics for each individual in the sample. Its primary weakness is that all of the individuals are working full-time and are of similar age, labor force experience, and education. This means that we have relatively less variation in the variables that measure these characteristics than would be the case for a sample that includes a wider spectrum of the labor force. Nonetheless, our findings support the theory that employee and job characteristics are rewarded differently in NFD and FD occupations, and that people choose occupations that reward their attributes more or penalize them less.

The results suggest that uninterrupted labor force experience, cognitive skills, and employer investment in employee development have a significant positive influence on earning potential among NFD occupations, but do not have a significant influence on earnings potential among FD occupations. Job characteristics, particularly hours, budget responsibility, and company size are also important influences among NFD occupations, as are the demographic characteristics, age and marital status. Alternatively, these characteristics are not significantly associated with salary among FD occupations. When these variables are taken into account, and when the selection bias associated with the decision to choose a NFD or a FD occupation is corrected, gender differences in salary disappear among FD occupations and are reversed among NFD occupations (see Table 3). The latter is consistent with trends in median real earnings, by gender during the 1980s. In that decade, real earnings for women increased by 11.3 percent, while real earnings for men decreased by 2.5 percent. The sharpest decline in men's earnings took place in the last few years of the 1980s (Blau et al., 2006, pp. 257-258).

We also find that for those in FD occupations, the only statistically significant influences on earnings are a business degree and employment as a supervisor. This suggests that an individual's labor force attributes are rewarded differently in occupations dominated by women compared to occupations dominated by men. Any individual with a particular set of attributes can expect to be rewarded differently in a NFD occupation than in a FD occupation.

The findings reported in Table 3 highlight the importance of controlling for the gender composition of occupations when studying gender differences in earnings. Comparison of the coefficients listed in the columns headed FD and NFD, Corrected for Selection Bias, and the coefficients listed in the Full Sample column shows that 9 of 13 variables in the NFD column that are significantly related to salary are also significantly related to salary, with the same sign, among the Full Sample. Further, none of these 13 variables are related to salary among FD occupations. These results provide evidence that an investigation of explanations for gender differences in salary which does not conduct separate analyses for male and female occupations is likely to reach conclusions that are not applicable to those who choose FD occupations.

With regard to ability to predict salary, note the substantial differences in adjusted R^2 among NFD occupations, FD occupations and the Full Sample: .479; .258; and .397, respectively (see Table 3). This suggests that Human Capital Theory explains variation in salary better in NFD than in FD occupations. One may infer that human capital is less important in FD occupations.

Pitts (2003) argues that, when selecting an occupation, one considers total compensation from work (wage compensation plus non-pecuniary compensation) and selects the occupation that maximizes utility. Table 4 reports that the expected salary differential, SALARYDIFF, has an important effect on the type of occupation one chooses. These results lead us to conclude that, on the margin, individuals choose occupations that reward their particular attributes better (or penalize them less), compared to other occupations. This finding is consistent with Pitts' hypothesis regarding occupational choice, especially for those with some college education, like our sample.

References

Atrostic, B. K. (1982). The demand for leisure and non-pecuniary job characteristics, *American Economic Review,* 72, 428-440.

Becker, G. S. (1964). *Human Capital*, Columbia University Press, New York.

Blau, F. D. & Beller, A. H. (1988). Trends in earnings differentials by gender, 1971-1981, *Industrial and Labor Relations Review*, 41, 513-529.

Blau, F. D. Ferber, M. A. and Winkler, A. E. (2006). *The Economics of Women, Men and Work,* 5th edition, Prentice Hall, Upper Saddle River, New Jersey.

Brett, J. M. and Stroh, L. K. (1997). Jumping ship: Who benefits from an external labor market career strategy? *Journal of Applied Psychology* 82, 331-341.

Brown, C. and Corcoran, M. (1997). Sex-based differences in school content and
the male female wage gap, *Journal of Labor Economics,* 15, 431-465.

Cox, T. H. and Harquail, C. V. (1991). Career paths and career success in the early career stages of male and female MBA's, *Journal of Vocational Behavior,* 39, 54-75

England, P. (1982). The failure of human capital theory to explain occupational segregation, Journal of Human Resources, 17, 358-370.

England, P., Farkas, G. Kilbourne, B. S. and Dou T. (1988). Explaining occupational sex segregation and wages: Findings from a model with fixed effects, *American Sociological Review*, 53, 544-458.

Entwisle, D. R., Alexander, K. L. and Olson, L. S. (1994). The gender gap in math: Its possible origins in neighborhood effects, *American Sociological Review,* 59, 822-838.

Ferber, M. A., Green, C. A. and Spaeth, J. L. (1986). Work power and earnings of women and men, *American Economic Review*, 72, 53-55.

Ferber, M. A. and Spaeth, J. L. (1984). Work characteristics and the male-female earnings gap, *American Economic Review Proceedings*, 74, 260-264.

Frieze, I. H., Olson, J. E. and Good, D. C. (1990). Perceived and actual discrimination in the salaries of male and female managers, *Journal of Applied Social Psychology* 20, 46-67.

Gerhart, B. (1990). Gender differences in current and starting salaries: The role of performance, college major and job title. *Industrial and Labor Relations Review* 43, 418-433.

Groshen, E. L. (1991). The structure of the female/male wage differential: Is it who you are, what you do, or where you work*? Journal of Human Resources,* 26, 457-492.

Heckman, J. J. (1979) Sample selection bias as a specification error, *Econometrica*, 47, 153-161.

Joy, L. (2003). Salaries of recent male and female college graduates: Educational and labor market effects, Industrial *and Labor Relations Review*, 56, 606-621.

Judge, T. A., Cable, D. M., Boudreau, J. W. and Bretz, Jr., R. D. (1995). An empirical investigation of the predictors of executive career success, *Personnel Psychology,* 48, 485-519.

Kilbourne, B. S., Farkas, G., England, P., Weir, D., and Beron, K. (1994). Returns to skill, compensating differentials, and gender bias: Effects of occupational characteristics on the wages of white women and men, *American Journal of Sociology,* 100, 689-719.

Landau, J. and Arthur. M. B. (1992). The relationship of marital status, spouse's career status, and gender to salary level. *Sex Roles,* 27, 665-681.

Loury, L. D. (1997). The gender earnings gap among college-educated workers, Industrial *and Labor Relations Review,* 50, 580-593.

Macpherson, D. A. and Hirsch B. T. (1995) Wages and gender composition: Why do women's jobs pay less? *Journal of Labor Economics,* 13, 426-471.

Mitra, A. (2002). Mathematics skill and male-female wages, *Journal of Socio-Economics,* 31, 443-456.

Murrell, A. J., Frieze, I. H. and Olson, J. E. (1996) Mobility strategies and career outcomes: A longitudinal study of MBAs, *Journal of Vocational Behavior,* 49, 324-335.

Olson, J. E. and Frieze, I. H. (1989). Job interruptions and part-time work: Their effect on MBA's income, *Industrial Relations,* 28, 373-386.

O'Neill, J. and Polachek, S. (1993). Why the gender gap in wages narrowed in the 1980s. *Journal of Labor Economics,* 11, 205-228.

Paglin, M. and Rufolo, A. M. (1990). Heterogeneous human capital, occupational choice, and male-female earnings differences, Journal *of Labor Economics*, 8, 123-144.

Polachek, S. W. (1981). Occupational self-selection: A human capital approach to sex differences in occupational structure, *Review of Economics and Statistics*, 63, 60-69.

Pitts, M. M. (2003). Why choose women's work if it pays less? A structural model of occupational choice, *Worker Well-being and Public Policy Research in Labor Economics*, 22, 415-445.

Robst, J. and VanGilder, J. (2000). Atrophy rates in male and female occupations, *Economic Letters*, 69, 407-413.

Schneer, J. A. and Reitman, F. (1990) Effects of employment gaps on the careers of M.B.A.'s: More damaging for men than women, *Academy of Management Journal,* 33, 391-406.

Schneer, J. A. and Reitman, F. (1994). The impact of gender as managerial careers unfold, *Journal of Vocational Behavior,* 47, 290-315.

Schwartz, F. N. (1989) Management women and the new facts of life, *Harvard Business Review,* 67, 65-76.

Sorensen, E. (1990). The crowding hypothesis and comparable worth issue: A survey and new results, *Journal of Human Resources,* 25, 55-89.

Spaeth, J. L. (1985) Job power and earnings, *American Sociological Review*, 50, 603-617.

Stanley, T.D. and Jarrell. S. B. (1998). Gender wage discrimination bias? A meta-regression analysis, *Journal of Human Resources,* 33, 947-973.

Stroh, L. M., Brett, J. M. and Reilly, A. H. (1996). Family structure, glass ceiling, and traditional explanations for the differential rate of turnover of female and male managers, *Journal of Vocational Behavior,* 49, 99-118.

Topel, R. (1991). Specific capital, mobility and wages: Wages use with job seniority, *Journal of Political Economy,* 99, 145-176.

US Department of Labor, Bureau of Labor Statistics, (August 1989). *Handbook of Labor Statistics*, Bulletin 2340, US Government Printing Office, Washington DC.

Wellington, A. J. (1994). Accounting for the male/female wage gap among whites: 1976 and 1985, *American Sociological Review,* 59, 839-848.

Weinberger, C. J. (1998). Race and gender wage gaps in the market for recent college graduates, *Industrial Relations,* 37, 67-84.