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GENDER, OCCUPATION CHOICE AND THE RISK OF DEATH AT WORK

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ABSTRACT

Women and men tend to work in different occupations. Although a great deal of research has been devoted to the measurement of trends in occupation segregation by gender, very little work has focused on the underlying job choice process that generates this segregation. What makes men and women choose the jobs they do? Using employment data from the 1995 - 1998 Current Population Surveys and data on occupational injuries and deaths from the Bureau of Labor Statistics, we estimate conditional logit models of occupation choice as a function of the risk of work-related death and other job characteristics. Our results suggest that women choose safer jobs than men. Within gender, we find that single moms or dads are most averse to fatal risk, presumably because they have the most to lose. The effect of parenthood on married women is larger than its effect on married men, which is consistent with the idea that men's contributions to raising children are more fully insured than women's. Overall, men and women's different preferences for risk can explain about one-quarter of the fact that men and women choose different occupations.

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1. Introduction

Women and men tend to work in different occupations. There has been substantial movement over the last forty years toward a more even distribution of men and women across occupations, but differences persist (Weeden [1998]; Wells [1998]; King [1992]; Beller [1982]). Although a great deal of research has been devoted to the measurement of trends in occupation segregation by gender, very little work has focused on the underlying job choice process that generates this segregation. What makes men and women choose the jobs they do?

One way to think about job choice is that a job is a bundle of attributes including a wage as well as benefits and working conditions. For the most part, the literature has cataloged the attributes of men's jobs compared with women's jobs, but this exercise does little to explain *why* men and women are in different jobs. These differences may be explained by men and women having different preferences for job attributes and amenities. Alternatively, these differences may be the result of discrimination that discourages women from performing certain types of jobs. In reality the observed distribution could be due both to discrimination and to differences in preferences; in either case, men's and women's jobs will have different attributes.

Economic theory offers some predictions about why men and women might, even in the absence of discrimination, have different preferences for job attributes. For example, theory predicts that women would prefer flatter wage profiles to the extent that they anticipate spending time out of the labor market. There is an extensive empirical debate as to whether this prediction is borne out in the data. We propose an additional explanation as to why men's and women's preferences for job attributes might differ from one another. Specifically, we focus on the risk of being killed or injured on the job. We posit that women will avoid risky jobs; the basic idea is that people with children need to be more careful because they have people who depend on them, and that women are more likely to have such dependents. Moreover, even for married individuals with children, men and women will still have different preferences for risk to the extent that formal and informal insurance mechanisms work better to compensate for the loss of a father than the loss of a mother. Other research suggests that women's contributions to raising their own children cannot be replaced; men's contributions, however, may be more likely to be insurable (Case and Paxson 2001).[1]

In this paper, we empirically test the predictions of this theory. Specifically, we estimate conditional logit models of men's and women's occupation choices as functions of injury risk and other job attributes. The theory predicts that single moms and dads should have the highest aversion to risk of death on the job, followed by married women with children, married men with children, then people without children (men or women, single or married). We find results that generally support the predictions of this theory; within gender, single moms and dads are the most averse to risk. The effect of parenthood for those who are married is much larger for women than for men, which is consistent with the idea that mothers' contributions to raising children are not insurable. Differences in family responsibilities cannot explain all of the differences between men's and women's occupation choices, however; the results indicate a consistent difference in men's and women's preferences that is independent of family structure. The most safety-oriented group of men (single dads) have the same level of aversion to risk as the *least* safety-oriented group of women (married women without children). So, gender exerts a strong effect on tastes toward occupational risk that is only partially explained by differences in family structure. The remaining gender

[1]Case and Paxson (2001) find that investments in children's health are significantly lower for children living without their birth mothers, regardless of whether or not a stepmother is present. The same is not true for children living without birth fathers.

difference could be due either to discrimination or to inherent differences in men's and women's preferences.

We proceed as follows. In Section 2, we present an overview of the literature on gender differences in occupation choice. In Section 3, we describe the data used for our empirical analysis and present summary statistics. In Section 4, we present a model of occupation choice that allows the risk of injury to differ across occupations and allows men and women to have different preferences for safety. We also discuss the implications of our model for occupation segregation. In Section 5, we show the results of our empirical model of occupation choice and show how much of occupational segregation can be explained by male-female differences in preferences for risk. Section 6 concludes.

2. A Review of the Literature on Gender Differences in Occupations

Many studies have documented the fact that men and women work in different occupations, focusing primarily on how the extent of this segregation has changed over time. There are many different ways to measure the extent of such segregation[2]. A common measure of occupational segregation is the Duncan index of dissimilarity (also sometimes called the index of segregation), defined as:

(1) $$D = .5 \cdot \sum_j \left| \frac{f_j}{F} - \frac{m_j}{M} \right|$$

where j indexes occupations and

[2]For a discussion of the Duncan index and other measures of segregation, see Watts 1998; Grusky and Charles 1998; Boisso et al. 1994; and Deutsch et al. 1994.

f_j = number of women in occupation j

m_j = number of men in occupation j

F = total number of women in all occupations

M = total number of men in all occupations

The Duncan index, *D*, can be interpreted as the fraction of men (or women) who would have to change jobs in order for each occupation to have the same percentage of women. If *D* is equal to zero, then men and women have the same occupational distribution. If *D* is equal to 1, the men and women are completely segregated into different occupations. Several studies have documented a decline in this index over time, including Weeden (1998), Wells (1999), King (1992), and Beller (1982). In our data (which we describe in more detail in Section 3), the Duncan index of dissimilarity between the occupational distributions of men and women is 0.425.[3]

Few studies, however, have looked at the underlying determinants of individual occupation choice. Those that do focus primarily on the role of pecuniary factors like wages and training costs on occupation choice (Boskin 1972; Siow 1984; Robertson and Symons 1990). Since we are interested primarily in how non-pecuniary job attributes affect occupation choice, in this section we review the very small branch of the literature relevant to this issue.

In a series of papers, Polacheck tests the hypothesis that women, anticipating time spent out of the labor force to have children, rationally choose occupations with lower wage penalties for

[3]This estimate differs from those in the literature in two ways: first, we have calculated the Duncan index using two-digit occupation codes while most studies use three-digit. Second, our sample is restricted to young workers. The Duncan index calculated using three-digit codes without the age restriction is 0.471.

intermittent labor force participation. Polachek (1981) is a good example of this approach. Using data from the National Longitudinal Survey of Women, he groups women into eight occupational categories and uses seven separate logit models to determine the effect of "home time" (years spent out of the labor force) on the log odds of being in each occupation relative to a reference category ("professional"). He finds that there is a significant relationship between "home time"and occupation choice. In order to be able to characterize this relationship (since the sequence of logit models just described has, as he points out, no natural ordering), he calculates the "atrophy rate" of each occupation. The atrophy rate is defined as the wage penalty in panel data for each year spent out of the labor force. He then estimates an individual-level OLS regression with the atrophy rate in a woman's occupation as the dependent variable and human capital variables (education, marital status) plus "home time" as explanatory variables. He finds a negative and significant relationship between "home time" and the atrophy rate: that is, women who spend more time out of the labor force are in occupations with lower atrophy rates. This result is interpreted as saying that some of the concentration of women into particular occupations can be explained by rational economic choice based on the characteristics of those occupations.

England, in a series of papers in response to Polachek's, rejects his hypothesis and proposes a counter-argument focusing on the role of social and cultural factors, rather than individual choice, in determining the distribution of women across occupations (England 1982, 1985). England's primary empirical reason for rejecting Polachek's hypothesis is that she finds no correlation between the wage penalty for intermittency in an occupation and the fraction of workers in the occupation who are female, an empirical hypothesis she derives from Polachek's behavioral model. The Polachek-England debate has led to several other studies analyzing the question of whether women systematically choose jobs that will more easily accomodate childbearing. Glass and Camarigg (1992) use data from the 1977 Quality of Employment Survey to test the hypothesis that women are in jobs that provide more "flexibility"and find that, in fact, self-reported "flexibility" is higher for men. The self-reported nature of this variable makes their result difficult to interpret, but taken at face value it suggests that women do not or cannot choose jobs that will best accommodate childbearing as Polachek's hypothesis predicts. Desai and Waite (1991) use the NLSY to estimate hazard models of women's decision to leave work during a first pregnancy and to return to work following first birth. They find that some job attributes do affect these hazards; for example, pregnant women's job-leaving hazard is higher if they are in physically demanding jobs. They find no effect of the fraction of workers in the woman's occupation who are female on the hazard of her return to work following birth. This result is, as they acknowledge, difficult to interpret. It is not entirely clear, based on England's work discussed above, whether fraction female serves as a good proxy for occupations that flexibly accommodate maternity leaves; so that the Desai and Waite result may reflect the lack of correlation between percent female and flexibility or it may reflect the absence of an underlying relationship between job flexibility and women's return-to-work decisions.

The paper that is most directly relevant to our work is Reed and Dahlquist (1994). The title of their paper – "Do Women Prefer Women's Work?" – conveys their main analytic objective, which like ours is to determine whether men and women systematically choose jobs with different attributes. They estimate the values that men and women place on various different job attributes using a hazard model and data from the NLSY, on the assumption that workers will be more likely to remain in jobs with attributes that they like. The interpretation of results is therefore that job attributes that increase the hazard of leaving are "undesirable", while those that decrease the hazard are "desirable." Information on job attributes was gathered in 1982 by asking NLSY respondents to evaluate separately on a scale of one to four whether their jobs offer safe and healthy working conditions, are people-oriented, have pleasant work surroundings, offer opportunities for promotion, and offer variety. Respondents were also asked whether jobs gave them a chance to "do the things you do best" and whether they developed close friendships on the job. Perhaps surprisingly, among the nonpecuniary job characteristics studied, only the last two significantly affected job quitting hazards, and did so differently for men and women: the "do the things you do best" measure reduced quit hazards for women and the "friendships" variable reduced quit hazards for men. Taken at face value, Reed and Dahlquist's results suggest that men greatly value having close friendships on the job, while women greatly value jobs in their area of comparative advantage. Since this result is not consistent with their stated prior beliefs about men's and women's preference for nonpecuniary job characteristics – that women would prefer safe, people-oriented jobs with pleasant surroundings – Reed and Dahlquist interpret this result as evidence against voluntary sorting as an explanation for occupational gender segregation.

Summarizing even this small literature on nonpecuniary job characteristics and occupation choice is difficult because there is very little consensus on methods, results, or interpretation. While there seems to be general agreement that men and women have different preferences for different job attributes, there is general disagreement about whether these preferences are expressed in their choices of occupations. And there is no evidence on the extent to which differences in choices, which may or may not reflect preferences, translate into the observed pattern of occupational segregation by gender.

3. The Data

In order to determine whether women systematically choose safer occupations than men, we use data from three different sources. First, we use data on male and female employment by occupation from the March Current Population Surveys (CPS). Second, we use data on the fatal and non-fatal risks associated with each occupation that we construct by merging Bureau of Labor Statistics data on injuries and deaths with CPS data in a way that we describe in more detail below. Third, we use data on the occupational characteristics of each occupation other than injury risks from the Dictionary of Occupational Titles (DOT).

We calculate male and female employment by occupation using the March CPS surveys from 1995 through 1998. We use responses to March supplement questions about the longest job held in the previous calendar year prior to the survey. We restrict the sample to individuals who worked full-time full-year in the calendar year prior to the survey year and use the 2-digit "detailed occupation recode" (46 codes in all) of the longest job held in the previous calendar year. To avoid counting people twice, for the 1995 through 1997 surveys, we restrict our sample to rotation groups 5 through 8 while for the 1998 survey we use all rotation groups. In addition, we restrict our sample to young workers (ages greater than or equal to 25 and less than or equal to 34). Looking at young workers only minimizes the possibility that the injury and deaths risks we observe in the data from the 1990s are the same as those observed by the workers in choosing their occupations.[4] This gives us approximately 24,000 workers (approximately 5,000 in each year from 1995 - 1997 and 9,000 in

[4]Older workers made their initial occupation choices in an earlier period; if occupations were (differentially) safer then and if workers accumulate occupation-specific human capital over time that prevents costless mobility across occupations, current risks are not necessarily a good measure of what affects older workers' current occupation choices.

1998).

We assign fatal and non-fatal injury risks to each occupation using data from the BLS Survey of Occupational Injuries and Illnesses and Census of Fatal Occupational Injuries. These data provide counts of injuries and fatalities at the 3-digit occupation level from 1992 to 1999; there is also information on the severity of non-fatal injuries, including the median number of days missed from work per injury within an occupation. In some cases the data are aggregated across 3-digit occupations; we aggregate all data to correspond to the 2-digit detailed occupation recodes in the CPS[5]. We use monthly CPS data to calculate hours worked over this period in each category to transform the counts into risks (the number of injuries per 100 full-time workers[6]). We also calculated "anticipated" days of work lost due to nonfatal injury by multiplying the risk of nonfatal injury by the median days lost per injury within an occupation.

Table 1 presents published data from the Bureau of Labor Statistics on employment, non-fatal occupational injuries, and work-related deaths for men and women from 1993 through 1998. Overall during this period, men made up 54 percent of all workers, but 92 percent of workers killed on the job. In Table 2, we report the occupations with the highest and the lowest risk of fatal injury based on the BLS data from 1992 to 1999. In addition, the table reports the fraction of hours worked in the occupation that are worked by women ("fraction female"). The occupation with highest risk of death is forestry and fishing, with .0869 deaths per 100 full-time workers, or a risk of death that is

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[5]The categories do not correspond perfectly to the Census detailed occupation recodes; we collapse codes 40, 41, and 42 into a single category since the fatality data are not available for these categories in a way that can be disaggregated.

[6]A full-time worker is assumed to work 2000 hours/year, so that the risks we calculate are per 200,000 hours worked.

approximately 1 in 1,100 workers. The fraction female is 4.4 percent. With the exception of "Technicians, except health, engineering and science," which is 36.6 percent female, all of these occupations are almost completely male. The ten safest occupations, by contrast, which are also listed in table 2, are heavily female.

Another way to represent the association between risk and "women's work" is to plot the fraction female in each occupation against the natural log of fatal risk, as we have done in figure 1. This figure shows the strong negative correlation between fraction female and log risk; the regression coefficient is -0.174 ($p<0.001$).

Other occupational characteristics are available from the DOT. The DOT is a reference manual complied by the U.S. Department of Labor that provides information about occupations. The DOT attempts both to define occupations in a uniform way across industries and to assess the characteristics of occupations. The occupational characteristics in the DOT were not collected from a nationally representative survey of firms; little detail on sampling or response rates is available. However, they are the best data available on the characteristics of occupations. The analysis of occupational characteristics was conducted through on-site observation and interviews with employees. The DOT data were constructed by analysts assigning numerical codes to 43 job traits. We create five aggregate variables from the underlying DOT variables to describe occupational characteristics: substantive complexity, motor skills, physical demands, working conditions, and creative skills. Details on how these five variables were constructed are provided in the Appendix (Section 7). Table 3 reports the correlations between our job characteristics and our measures of fatal and non-fatal injury risks, the percent of hours worked in an occupation by unionized workers, and the fraction female at the occupation level.

In Table 4, we report the job attributes of our CPS sample by gender, marital status, and whether or not the individual has children at home. Fifty-eight percent of our sample of young workers are men. The largest single group of these men -- 43 percent -- are married with children. Another 16 percent of men are married without children; 36 percent are single and have no kids, while 5 percent are single dads. Most women workers in our sample (34 percent) are married and have children; almost as many (31 percent) are single women without kids. Nineteen percent are married women without children and 16 percent are single moms.

Average risk of death on the job is 0.004 for all men (or one for every 25,000 men) and 0.002 (or one for every 50,000 women). Fatal risk does not differ by family structure within gender. Non-fatal risk is higher on average for men; within gender, non-fatal risk is highest for single parents. Men are in much more physically demanding jobs than are women and are more likely to experience hot, wet or cold conditions on the job. On other dimensions (as measured by the other DOT variables), men's and women's jobs do not differ systematically.

4. A Model of Occupational Choice with Different Preferences for Safety by Gender

We assume a random utility model of occupation choice in which women and men are able to choose from a variety of occupations. The utility an individual derives from a particular occupation depends upon that individual's characteristics, the wage he or she can receive on the job, and the characteristics of the job:

$$U^*_{ij} = U(X_i, W_{ij}, Z_j) \tag{2}$$

where i indexes individuals and j indexes occupations. The wage an individual receives in occupation j is a function of the same (or a subset of) individual (X_i) and job (Z_j) characteristics as

(3) $$W_{ij} = f(X_i, Z_j)$$

in equation (2):

Substituting the wage equation into equation (2), assuming a linear functional form, and adding an independently and identically distributed with type I extreme value distribution disturbance term yields:

(4) $$U_{ij}^* = \beta X_i + \alpha Z_j + \epsilon_{ij}$$

An individual will choose among J occupations the one that yields the highest utility.An individual will choose occupation j if

(5) $$U_{ij}^* > U_{ik}^* \ \forall \ k \neq j$$

Define $U_{ij} = 1$ if individual i chooses occupation j and $U_{ij} = 0$ otherwise. Given our assumption on the distribution of the error term, we can estimate the parameters of the random utility model by McFadden's conditional logit (for a description, see Maddala 1983):

(6) $$Prob(U_{ij} = 1) = \frac{\exp\{\beta X_i + \alpha Z_j\}}{\sum_{j=1}^{J} \exp\{\beta X_i + \alpha Z_j\}}$$

Note that $\$$ cannot be estimated because $\$X_i$ will drop out of equation (6).

The vector of parameters " reflect the weights individuals place on different job characteristics Z. We are interested in how the influence of fatal risk and other job characteristics on occupational choice differs for women and men, with and without spouses and/or children. Therefore we estimate this model separately for these groups (eight categories in all) to obtain different " vectors for each of the eight groups.

5. Results

Tables 5 and 6 present the parameter estimates from conditional logit models estimated separately for men and women (table 5) and also for the eight disaggregated categories defined by gender, marital status, and presence of children (table 6). All specifications except the first two (columns 1 and 2 of table 5) include a full set of DOT occupational characteristics plus the fraction unionized as controls.

Table 5 shows that both men and women dislike fatal risk in the sense that the coefficient " on fatal risk is estimated to be negative; however, women dislike it more than men do. This result persists even when we control for other occupational characteristics. Surprisingly, both men and women like (i.e. place positive utility weight on) nonfatal injury risk. This is less surprising in light of the fact that we are controlling for fatal risk and a host of other job characteristics; moreover, as we will discuss later, this result may be due to the fact that workers are more likely to miss work when they have generous disability insurance, a feature of "good" jobs. This confirms what we already suspected from table 2: women avoid occupations where they have a high risk of being killed.

In order to determine whether men's and women's different preferences are due to differences in their family structure, we turn to the completely disaggregated results in table 6. All four groups of women (single childless, single with kids, married childless and married with kids) dislike fatal risk more than all any group of men. Within gender, we find that as expected, single dads and single moms dislike risk more than their married or childless counterparts. Married women with children dislike fatal risk significantly more than either single or married women who have no children, whose preferences are similar to one another. Except for the “single dad” result noted above, men’s preferences toward fatal risk are not affected by their family structure; single men without children and married men either with or without children have about the same ". These results suggest that while family structure offers a partial explanation for the male/female differences observed in table 5, it does not explain it completely. All women dislike risk at least as much as any group of men; the most risk-loving women dislike risk to the same degree as the most cautious men.

One concern about these results is that our measure of fatal risk may be correlated with other job attributes -- such as strength requirements -- that women may avoid not because of differences in preferences but because of differences in abilities. We control for this by including control variables measuring other attributes of a job (including the job’s physical demands); all of the control variables are statistically significant in explaining men’s and women’s choices. Interpreting most of these coefficients is difficult since they are, as discussed above, composite variables that capture aspects of jobs which would appeal to some individuals and not to others (e.g.,. does a job require motor skills). But we do find that women uniformly avoid physically demanding jobs, while men do not, and the coefficient on fatal risk remains significant and negative even once we have controlled for this fact.

Our results suggest that family responsibilities do help determine preferences toward risk, and that they affect men and women differently. In addition, men and women's preferences differ in ways that we cannot explain by looking at differences in family structure: women simply dislike physical risk.

How much of the observed pattern of occupational gender segregation – that is, the fact that there are "men's jobs" and "women's jobs" – can be explained by differences in men's and women's preferences for risk? In order to answer this question we use the results from our conditional logit models to estimate out-of-sample predictions about the fraction female in each occupation under the assumption that men and women have the same preference for risk, and compare them to the actual distribution by recalculating the Duncan index using the predicted distribution. We find that if men's and women's preferences for risk were the same, the Duncan index would be 0.324; that is, only 33 percent of women would have to change jobs in order to achieve a uniform distribution of women and men across occupations. Recall that in the actual data, this fraction is 42.5 percent.

Another way to interpret the magnitude of the coefficients on risk from our conditional logit models is to re-draw figure 1 using the predicted fraction female based on the models. This exercise answer the question: how much of the relationship between risk and percent female in an occupation is the result of risk as opposed to other occupational characteristics such as physical strength. Figure 2 displays the result of this exercise. The slope of the regression in this figure is -0.105, compared to -0.174 in the actual data, suggesting that risk actually accounts for about four-tenths of the observed correlation between risk and percent female.

6. Discussion

Our results suggest that women, in general, are in safer jobs than men. Within gender, we find that single moms or dads are most averse to fatal risk, presumably because they have the most to lose. The effect of parenthood on married women is larger than its effect on married men, which is consistent with the idea that men's contributions to raising children are more fully insured than women's. Overall, men and women's different preferences for risk can explain about one-quarter of the fact that men and women choose different occupations.

A question that remains unanswered is whether women's apparent avoidance of risky jobs reflects labor supply or demand. That is, do women *choose* safer jobs, or are they constrained to choose safe jobs by demand-side constraints? There are two ways in which demand constraints could result in the patterns we observe in the data. One is a "pure discrimination" story, in which women are barred from certain occupations. For example, risky jobs may be considered "unsuitable" for women. A different reason why labor demand would keep women out of risky jobs is a "job requirements" story, where risky jobs are also jobs that require physical strength. We believe that we have controlled for this possibility by including the job strength requirements measured by the DOT data in our models. But we cannot distinguish between supply and demand factors that may be driving the differences between men's and women's occupation choices.

Another question that remains unanswered is how much of the historical trend in women's labor force participation, and women's entry into previously male-dominated occupations, can be explained by secular changes in the riskiness of work outside the home. We know that all kinds of work have been getting safer over time (Kniesner, 1995); do women enter occupations only once they become safer? Our work suggests a significant role for risk in determining men's and women's occupation choices.

6. Appendix

We create five occupational characteristics (substantive complexity, motor skills, physical demands, working conditions, and creative skills) from the Dictionary of Occupational Titles (DOT) in the following manner. We use the data set created by England and Kilbourne (1988) which aggregated 503 1980 Census detailed occupations and the variables from the 4th edition DOT (Inter-university Consortium for Political and Social Research Study 8942). We match the 1980 Census detailed occupations with their 1990 analogues and create a variable that contains the 1990 occupation codes.

To determine how to group the disaggregated occupation traits, we conducted a factor analysis of the disaggregated worker traits and worker functions by using the above data for 503 census occupational categories. Five interpretable factors emerged which we label substantive complexity, motor skills, physical demands, working conditions, and creative skills. The first four factors correspond to the factors found the by authors of *Work, Jobs and Occupations: A Critical Review of the Dictionary of Occupational Titles* (Miller et al. 1980). The results of this analysis are presented in tables A1 and A2.

Next we chose for each factor that set of items that loaded strongly on the factor and only weakly or not at all on all other factors. The rule used was that items should be loaded at least 0.4 on the primary factor and less than 0.3 on the remaining factors. Items chosen in this way were then standardized and summed to form each scale.

We then calculate the factor scores for each aggregated occupation used in our analysis by calculating the weighted mean of that factor for detailed occupations in that aggregated occupation, weighting by the yearly hours worked in each detailed occupation. We standardize each of these variables (so that the mean of the attribute in the sample of workers is 0 and the variance is 1) to yield a set of occupational attributes that can be merged to the data on occupation-level risks and then to individual-level data on occupation choice from the March CPSs.

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Figure 1: Fraction female by fatal risk

Figure 2: Risk-adjusted fraction female by fatal risk

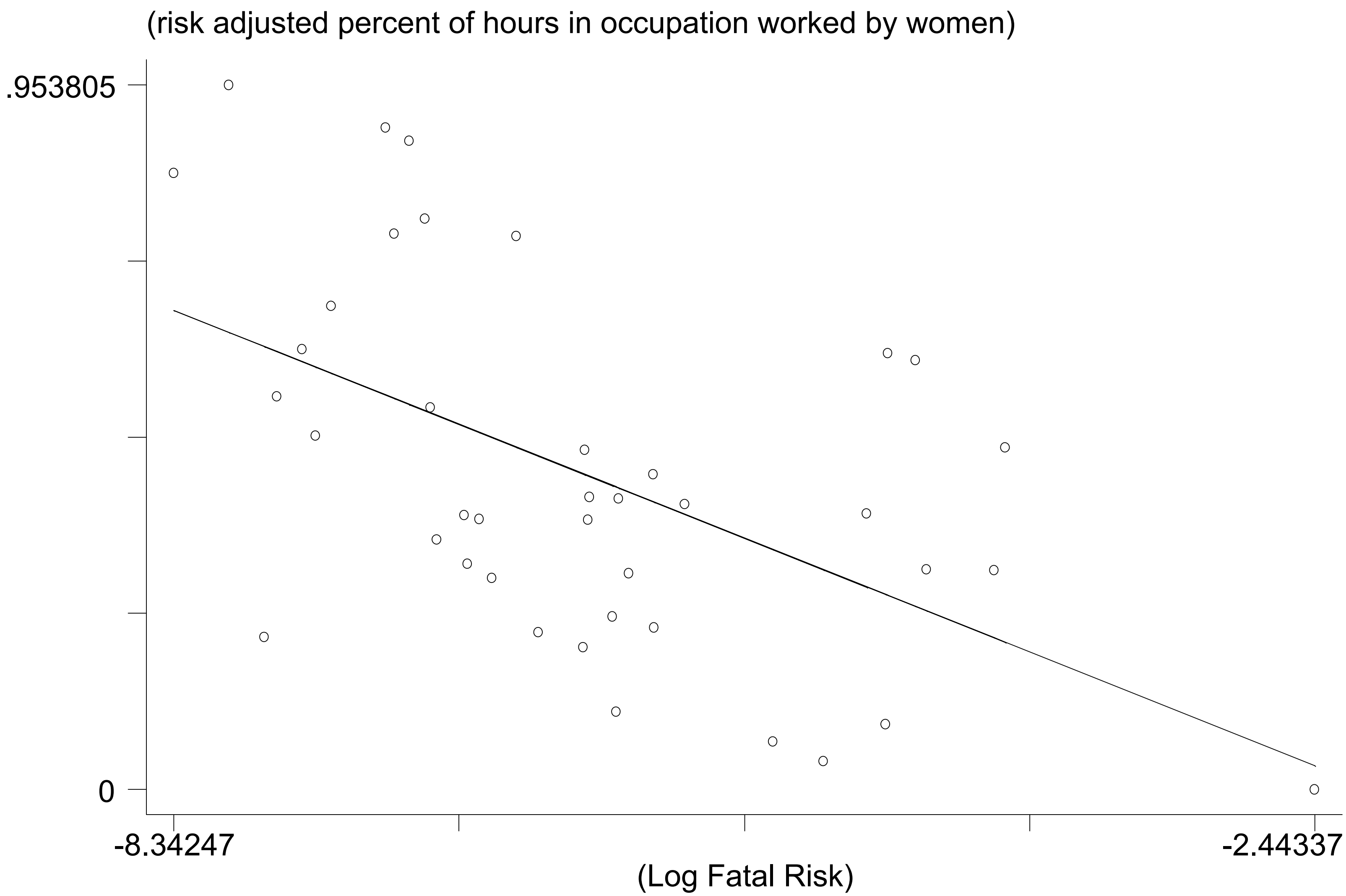

Table 1
Civilian Employment, Non-Fatal Occupational Injuries
and Fatal Occupational Injuries
By Gender, 1993 - 98

	93	94	95	96	97	98	Mean
Civilian employment							
Men (thousands)	65,349	66,450	67,377	68,207	69,685	70,693	67,960
Women (thousands)	54,910	56,610	57,523	58,501	59,873	60,771	58,031
% men	0.543	0.540	0.539	0.538	0.538	0.538	0.539
Non-fatal injuries							
Men	1,490,418	1,483,202	1,355,098	1,240,018	1,209,097	1,147,388	1,320,870
Women	735,570	730,802	667,166	620,508	605,589	571,341	655,163
% men	0.670	0.670	0.670	0.666	0.666	0.668	0.668
Fatal injuries							
Men	5,790	6,067	5,676	5,605	5,743	5,544	5,738
Women	481	521	534	507	475	482	500
% men	0.923	0.921	0.914	0.917	0.924	0.920	0.920

Mean prob. of non-fatal injury = 1,976,033/125,991,000 = 0.0157, or about 1 in 64.
Mean prob. of death = 6,238/125,991,000 = 0.0000495, or about 1 in 20,000.

Sources: Employment counts are from Bureau of Labor Statistics' series LFU11000001 (men) and LFU11000002 (women), based on the Current Population Survey. Non-fatal injury counts are from the BLS Survey of Occupational Illnesses and Injuries. Fatal injury counts are from the BLS Census of Fatal Occupational Injuries.

Table 2
Occupations with highest and lowest risk of death, 1992 - 1999, and the fraction of employment that is female

Deaths per 100 FT workers	**Occupation**	**Fraction female**
Highest risk:		
0.0869	494-499: Forestry & fishing occupations	0.044
0.0176	803-814: Motor vehicle operators	0.097
0.0166	823-859: Other transportation occupations and material moving	0.044
0.0117	477-489: Farm workers	0.165
0.0110	864-889: Construction laborers; freight, stock and material handlers; equipment cleaners	0.180
0.0096	226-235: Technicians except health, engineering and science	0.366
0.0094	473-476: Farm operators and managers	0.168
0.0086	413-427: Protective services occupations	0.140
0.0068	553-599: Construction trades	0.020
0.0053	503-549: Mechanics & repairers	0.038
Lowest risk:		
0.0007	403-407: Private household service occupations	.928
0.0005	316-336,345-353,359-389: Other administrative support occupations, including clerical	.720
0.0005	113-154: Teachers, college and university	.386
0.0005	155-159: Teachers, except college and university	.678
0.0004	303-307: Supervisors -- administrative support	.563
0.0004	64-68: Mathematical and computer scientists	.267
0.0003	313-315: Secretaries, stenographers and typists	.971
0.0002	337-344: Financial records processing occupations	.887
0.0000	283-285: Sales-related occupations	.616
0.0000	308-309: Computer equipment operators	.560

Table 3
Pairwise correlations of job characteristics, injury risks and fraction female

Characteristic:	Percent female	Fatal risk	Non-Fatal risk	Subs. complex	Motor skills	Phys. demands	Hot/cold/ wet	Creative skills
Fatal risk	-0.3885 (0.0100)	1.0000						
Non-fatal risk	-0.3609 (0.0174)	0.5679 (0.0001)	1.0000					
Substantive complexity	-0.0186 (0.9059)	-0.3153 (0.0394)	-0.7076 (0.0000)	1.0000				
Motor skills	-0.0515 (0.7431)	0.0388 (0.8048)	-0.1465 (0.3484)	0.0086 (0.9566)	1.0000			
Physical demands	-0.4839 (0.0010)	0.5984 (0.0000)	0.6181 (0.0000)	-0.5070 (0.0005)	-0.0615 (0.6954)	1.0000		
Hot, cold, or wet	-0.3612 (0.0173)	0.5270 (0.0003)	0.6032 (0.0000)	-0.4611 (0.0019)	0.0280 (0.8583)	0.4215 (0.0049)	1.0000	
Creative skills	0.0197 (0.9004)	-0.1223 (0.4346)	-0.2463 (0.1113)	0.4407 (0.0031)	0.1952 (0.2097)	-0.2500 (0.1060)	-0.1421 (0.3634)	1.0000
Percent unionized	-0.1870 (0.2299)	0.0398 (0.8001)	0.3337 (0.0287)	-0.2491 (0.1071)	-0.0199 (0.8991)	0.1301 (0.4057)	0.1689 (0.2789)	-0.0696 (0.6576)

Entry in each cell is: correlation
(p-value of H_0: correlation is 0)

Table 4: Descriptive Statistics of Job Characteristics by Family Structure and Gender

	All men Mean (s.d.)	Single men w/o kids Mean (s.d.)	Married men w/o kids Mean (s.d.)	Single men w/ kids Mean (s.d.)	Married men w/ kids Mean (s.d.)
Fatal Risk	0.004 (.005)	0.004 (.005)	0.004 (.005)	0.005 (.005)	0.005 (.006)
Non Fatal Risk	12.44 (11.1)	11.798 (11.0)	10.324 (10.8)	15.545 (10.5)	13.467 (11.2)
Subst. Complexity	-0.187 (.910)	-0.173 (.915)	0.034 (.930)	-0.536 (.753)	-0.248 (.894)
Motor Skills	-0.007 (.902)	0.051 (.876)	0.062 (.962)	-0.139 (.805)	-0.069 (.904)
Physical Demands	0.150 (.953)	0.079 (.933)	0.002 (.897)	0.342 (.950)	0.248 (.977)
Working Conditions	0.274 (1.13)	0.289 (1.19)	0.109 (1.02)	0.594 (1.27)	0.290 (1.10)
Creative Skills	-0.106 (.864)	-0.044 (.978)	-0.038 (.936)	-0.297 (.354)	-0.164 (.756)
Percent Unionized	0.154 (.096)	0.148 (.096)	0.142 (.097)	0.173 (.091)	0.162 (.095)
Percent Female	0.299 (.207)	0.327 (.216)	0.305 (.202)	0.294 (.218)	0.274 (.196)
N	13,955	5,086	2,281	621	5,967
Row percent	1.000	0.364	0.163	0.045	0.428
	All women	Single women w/o kids	Married women w/o kids	Single women w/ kids	Married women w/ kids
Fatal Risk	0.002 (.002)	0.002 (.002)	0.002 (.002)	0.002 (.002)	0.002 (.002)
Non Fatal Risk	6.746 (7.37)	6.120 (7.03)	5.169 (6.01)	8.711 (8.21)	7.281 (7.69)
Subst. Complexity	0.030 (.777)	0.125 (.791)	0.237 (.726)	-0.246 (.727)	-0.043 (.766)
Motor Skills	0.121 (.945)	0.178 (.940)	0.229 (.976)	0.049 (.858)	0.043 (.960)
Physical Demands	-0.434 (.501)	-0.452 (.483)	-0.510 (.402)	-0.343 (.573)	-0.418 (.521)
Working Conditions	-0.165 (.814)	-0.188 (.775)	-0.279 (.659)	-0.020 (.961)	-0.147 (.842)
Creative Skills	-0.043 (.950)	0.096 (1.168)	0.024 (1.054)	-0.186 (.636)	-0.139 (.746)
Percent Unionized	0.119 (.080)	0.120 (.088)	0.108 (.070)	0.124 (.077)	0.123 (.080)
Percent Female	0.561 (.236)	0.546 (.232)	0.541 (.232)	0.584 (.234)	0.575 (.240)
N	9,714	3,030	1,823	1,518	3,343
Row percent	1.000	0.312	0.188	0.156	0.344

Table 5: Coefficients from Conditional Logit Model: Men vs. Women

	Men	Women	Men	Women
	Coef. (s.e.)	Coef. (s.e.)	Coef. (s.e.)	Coef. (s.e.)
Fatal Risk	-35.211 (1.423)	-197.145 (5.361)	-47.019 (1.630)	-113.983 (5.436)
Non-Fatal Risk	0.047 (0.001)	0.020 (0.002)	0.063 (0.002)	0.055 (0.003)
Subst. Complexity			0.304 (0.015)	-0.159 (0.018)
Motor Skills			0.119 (0.010)	0.163 (0.011)
Physical Demands			0.115 (0.012)	-0.878 (0.030)
Working Conditions			0.118 (0.008)	-0.051 (0.015)
Creative Skills			-0.127 (0.012)	-0.131 (0.013)
Percent Unionized			-1.569 (0.093)	-2.294 (0.110)
N	600065	417702	600065	417702
Log Likelihood	-51125.722	-35183.042	-50595.121	-34205.791

Note: N represents number of person-choices; there are 13,955 men, 9714 women, and 43 occupation choices.

Table 6. Coefficients from Conditional Logit Model: Family Structure and Gender

	Single men w/o kids Coef. (s.e.)	Single men w/ kids Coef. (s.e.)	Married men w/o kids Coef. (s.e.)	Married men w/ kids Coef. (s.e.)
Fatal Risk	-47.60 (2.9)	-64.45 (10.0)	-42.83 (4.1)	-46.25 (2.3)
Non-Fatal Risk	0.056 (0.003)	0 .048 (0.007)	0 .068 (0.004)	0.067 (0.002)
Subst. Complexity	0.205 (0.024)	-0.060 (0.073)	0.510 (0.037)	0.328 (0.023)
Motor Skills	0.144 (0.016)	-0.088 (0.054)	0.180 (0.022)	0.084 (0.015)
Physical Demands	0.056 (0.022)	0.190 (0.058)	0.041 (0.032)	0.175 (0.018)
Working Conditions	0.156 (0.014)	0.222 (0.037)	0.093 (0.023)	0.088 (0.013)
Creative Skills	-0.046 (0.017)	-0.497 (0.125)	-0.171 (0.026)	-0.189 (0.020)
Percent Unionized	-1.840 (0.160)	-0.811 (0.429)	-2.05 (0.243)	-1.24 (0.140)
N	218698	26703	98083	256581
Log Likelihood	-18494.275	-2123.311	-8338.740	-21422.716
	Single women w/o kids Coef. (s.e.)	Single women w/ kids Coef. (s.e.)	Married women w/o kids Coef. (s.e.)	Married women w/ kids Coef. (s.e.)
Fatal Risk	-96.69 (10.0)	-165.21 (13.8)	-64.55 (12.6)	-126.15 (9.1)
Non-Fatal Risk	0.038 (0.005)	0.074 (0.006)	0.038 (0.007)	0.064 (0.004)
Subst. Complexity	-0.148 (0.032)	-0.414 (0.047)	-0.012 (0.042)	-0.179 (0.031)
Motor Skills	0.178 (0.020)	0.159 (0.032)	0.205 (0.025)	0.108 (0.019)
Physical Demands	-0.796 (0.053)	-0.896 (0.071)	-0.946 (0.073)	-0.945 (0.051)
Working Conditions	-0.029 (0.028)	-0.021 (0.033)	-0.108 (0.040)	-0.066 (0.025)
Creative Skills	-0.001 (0.019)	-0.313 (0.050)	-0.142 (0.027)	-0.275 (0.028)
Percent Unionized	-1.86 (0.188)	-3.05 (0.300)	-2.71 (0.277)	-2.25 (0.187)
N	130290	65274	78389	143749
Log Likelihood	-10749.244	-5165.839	-6366.365	-11681.079

Note: N represents number of person-choices; there are 13955 men, 9714 women, and 43 occupation choices.

Table A1
Factor Loadings from a Varimax Rotated Factor Matrix

	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5
CLIMB	0.01771	-0.03591	**0.82639**	0.08414	0.02784
CLRDISC	-0.00617	**0.58784**	-0.00118	-0.25946	-0.21238
COLD	0.08643	-0.03091	0.06168	**0.46669**	-0.02921
ABSCREAT	-0.19656	-0.11392	-0.06444	-0.02566	**0.8413**
DATAL	**0.84702**	0.11411	0.18327	0.11733	-0.2025
EYHNFTC	-0.14225	0.16927	**-0.76271**	-0.01573	-0.11788
FIF	-0.10294	-0.01196	-0.02104	-0.02747	**0.89113**
FNGRDXT	-0.00918	**0.87123**	0.09742	0.14902	-0.03135
GED	**-0.94283**	-0.02373	-0.18367	-0.07407	0.06728
HAZARDS	0.06954	-0.10016	**0.69383**	0.28572	-0.07471
HEAT	0.10863	0.06464	0.05963	**0.79161**	0.01304
INTELL	**0.91629**	-0.02654	0.19936	0.10318	-0.09375
MNLDXTY	-0.28218	**0.79132**	-0.28537	-0.11136	0.06003
MTRCRD	-0.15301	**0.82253**	-0.11486	0.08309	-0.09819
NUMERCL	**0.85488**	0.05273	0.25349	0.14359	0.02963
OUT	0.20281	0.19867	**0.65708**	-0.16031	-0.02046
REPCON	**0.73114**	0.16406	0.01287	0.17038	-0.07969
SJC	**-0.66222**	0.05325	-0.05835	0.09547	0.27869
STOOP	0.2739	-0.09483	**0.76089**	0.0983	-0.05808
THINGS	-0.05587	**0.77742**	-0.1249	-0.03403	0.04259
SVP	**-0.90675**	-0.20312	0.01556	-0.05701	0.10359
VERBAL	**0.88441**	-0.07302	0.27181	0.11333	-0.08618
WET	0.16012	0.06657	0.22401	**0.68155**	0.02283

Table A2
Composition of each factor

Factor 1	SUBSTANTIVECOMPLEXITY **(SCMPLX)**
	DATAL (complexity of function in relation to data)
	GED (general educational development)
	INTELL (intelligence)
	NUMERCL (numerical aptitude)
	REPCON (Adaptability to performing repetitive work)
	SJC (sensor or judgmental criteria)
	SVP (specific vocational preparation)
	VERBAL (verbal aptitude)
Factor 2	MOTOR SKILLS **(MSKILL)**
	CLRDISC (color discrimination)
	FNGRDXT (finger dexterity)
	MNLDXTY (manual dexterity)
	MTRCRD (motor coordination)
	THINGS (complexity in relation to things)
Factor 3	PHYSICAL DEMANDS **(PHYDDS)**
	CLIMB (climbing, balancing)
	EYHNFTC (eye-hand-foot coordination)
	HAZARDS (hazardous conditions)
	OUT (outside working conditions)
	STOOP (stooping, kneeling, crouching, crawling)
Factor 4	WORKING CONDITION **(WORKCON)**
	COLD (extreme cold)
	HEAT (extreme heat)
	WET (wet, humid)
Factor 5	CREATIVE SKILLS **(CSKILL)**
	ABSCREAT (abstract & creative activites)
	FIF (feelings, ideas or facts)