OCCUPATIONAL ATTAINMENT AND EARNINGS: DIFFERENCES BETWEEN ASPIRANTS WITH SEX TRADITIONAL AND THOSE WITH SEX NONTRADITIONAL OCCUPATIONAL OBJECTIVES

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PREFACE

The major objective of this research is to examine training and labor market outcomes for students pursuing sex nontraditional vocational training. The research focuses on differences in program completion, labor force participation, unemployment, the extent to which employment is related to training, and wages. The differential impact of demographic, institutional and social variables on training and labor market outcomes is also investigated.

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INTRODUCTION

The "equal pay for equal work" law has focused on equalizing pay between males and females within occupational, or more specifically, within job description/title classifications. Concurrently, research has established the importance of occupational segregation by sex as a major determinant in explaining observed differences in male-female earnings (U.S. Department of Labor, 1979; Brown, Moon and Zoloth, 1980; Stevenson, 1975; and Oaxaca, 1973).[1] On average women who worked full time, year round in 1981 earned approximately sixty cents[2] for each dollar earned by full-time, year-round male workers. Data reveal that even in occupations that are traditionally female, women's earnings have been consistently lower than men's earnings since 1960. For example, the female-male earnings ratio in clerical occupations fell from .68 in 1960 to .60 in 1980. The 1980 earnings gap was broadest for sales occupations in which female earnings were only 49 percent of male earnings. The female-male earnings ratios for professional

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[1] Other major factors include larger proportions of women in or near entry level positions; differences in the kind (but not the amount) of education, training and counseling women receive; fewer hours of overtime worked; and fewer years of work-life experience for women (U.S. Department of Labor, 1979).

[2] The female-male earnings ratio was 59.7 in 1981 (Bianchi and Spain, 1983).

and managerial occupations were .55 and .65 respectively. Women employed in craft occupations received 63 percent of male earnings in those occupations. The gap was narrowest among unskilled laborers, with females earning 76 percent of male earnings (Bianchi and Spain, 1983). Given the degree of occupational segregation which currently exists, even full achievement of "equal pay for equal work" would not significantly reduce the earnings gap (Oaxaca, 1973).

There is evidence that some occupational desegregation is occurring, and U.S. census data show that since 1960 the greatest rates of increase in female penetration into male dominated occupations have occurred in jobs such as carpentry, small appliance repair, auto mechanics, plumbing, electronics, and office machine service (Walshok, 1981). By the middle 1970's Lederer (1979) reported that about 18 percent of the nation's 29 million blue-collar jobs were held by women. However, a disproportionate amount of attention and research has been devoted to earnings differences and occupational segregation within the professions--science, engineering, medicine, and law. Women entering skilled blue-collar jobs are underrepresented both as a group of women and as a group of blue-collar workers (Walshok, 1981).[3]

Clearly, the economic hardship associated with occupational segregation is more pronounced, both in absolute and relative terms, for women without college degrees. While there are a number of well-paying occupational choices typically open to males without college

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[3]For example, one recent bibliography listed 160 articles in popular and professional journals pertaining to women in nontraditional blue-collar occupations compared to 580 listings pertaining to women in nontraditional professional occupations (U.S. Department of Health, Education, and Welfare, 1976).

degrees--occupations such as plumber, carpenter, bricklayer, roughneck, airconditioning and diesel mechanics, and welder--there are few or no well-paying choices typically available to females without college degrees.

Much of the formal pre-employment training for jobs which require less than a baccalaureate degree is undertaken in public vocational education programs in which male-female enrollment patterns historically have reinforced the occupational segregation found in the labor market. In response to pressure from women's advocacy groups, the 1976 federal Vocational Education Amendments (P.L. 94-482) mandated schools to enroll and train students of both sexes for employment in vocational occupations that had been traditionally identified as "male" or "female" oriented. The motivation for enrolling females in male traditional programs was largely based on the implicit assumption that training would culminate with employment in better paying traditionally male jobs. The motivation for requiring schools to enroll and train males in programs previously considered only for females appeared to be based more on legislative concern for fairness and equal treatment for both sexes than on the basis of economics.

Objective of the Research

The major objective of this research is to examine training and labor market outcomes for students pursuing occupational objectives that are traditionally associated with one gender. More specifically, this research attempts to discern whether there are significant differences in the post-training labor market experiences of students of the traditional gender and those of the nontraditional gender.

Data Availability

Federal law (P.L. 94-482) requires states to collect and report data on student enrollment, completion, and follow-up. While administrative rules and regulations prescribe standard definitions, states are given considerable flexibility in establishing the degree of aggregation in data collection. Oklahoma is one of only a few states which has maintained a data base detailed enough to address the objectives of this research. In addition, Oklahoma's strong and growing economy over the period considered and the State's reputation as a leader in the field of vocational education suggest that the environment in Oklahoma may have been fairly conducive to successful implementation of "sex-fair" vocational education policies. On the other hand, the State's relatively conservative social climate would seem to make implementation in Oklahoma less favorable perhaps than on the East or West coasts.

Background

Within months after the 1976 legislation was enacted, the Oklahome State Department of Vocational and Technical Education began to promote sex nontraditional career choices. According to a plan of action detailed in the Department's Five Year Plan (Oklahoma State Department of Vocational and Technical Education, 1978), early phases of implementation focused on state and local administration and emphasized awareness-type activities designed to encourage acceptance of students in sex nontraditional training roles. Awareness workshops for teachers and counselors followed; and eventually counseling

materials emphasizing the higher average wages and enhanced opportunities for promotion, advancement, and self-employment in traditional male occupations were identified or developed for use with students. Nontraditional male training was generally promoted in the context of "free to choose" and self-actualization. In addition, a number of exemplary, exploratory-type programs were supported in an effort to expose students of both sexes to nontraditional work.

Empirical analyses (Oklahoma State Department of Vocational and Technical Education, Oklahoma 1982 State Plan, 1981; Oklahoma State Department of Vocational and Technical Education, Oklahoma 1980 Accountability Report, 1981; and Oklahoma Advisory Council for Vocational Education, 1980) indicate that the vocational enrollment trend in Oklahoma has tended in the direction of a more balanced representation of males and females in the traditional predominantly male or predominantly female programs.[4] Using the State's classification scheme, the percentage of total male enrollment in programs traditionally female oriented rose from 9.70 percent in Fiscal Year (FY) 1974 to 15.92 percent in FY 1980. The percentage of females enrolled in male oriented programs rose from 6.43 percent in FY 1974 to 13.53 percent in FY 1978, before falling slightly to 11.51 percent in FY 1980. Rehman (1980), who examined the Oklahoma rate of minority to majority sex enrollment before and after the 1976 legislation, found a statistically significant change toward a more equal representation of males and females. Rehman assumed that the efforts described in

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[4] A few vocational programs have traditionally enrolled approximately equal numbers of males and females. Some of these include horticulture, general merchandising, commercial art, commercial photography, and upholstery.

the Department's Five Year Plan (Oklahoma State Department of Vocational and Technical Education, 1978) had contributed to this change.

Summary

This chapter has described the objective of the research and has provided background information. A review of the literature follows in Chapter II. The models to be estimated and methodology are developed in Chapter III. Chapter IV presents results from the empirical work and Chapter V contains a short summary of the research and conclusions.

CHAPTER II

LITERATURE REVIEW

Introduction

The literature was reviewed to examine (1) definitions of occupational segregation, (2) the extent of occupational segregation, (3) reasons for occupational segregation, (4) the economic impact of occupational segregation, (5) differences in labor market outcomes by sex and race, (6) differences in individuals who choose nontraditional occupations and those who choose traditional occupations, (7) the results of previous research relating to nontraditional vocational training and training outcomes, and (8) other models of occupational attainment.

Definitions of Sex Segregation

A criterion for identifying training objectives as sex traditional or sex nontraditional should obviously be based on a quantifiable definition of what constitutes a sex-segregated occupation. Bernard's (1976, p. 88) definition of a sex-fair distribution of work as "one which takes into account both the distribution of talent in the work force and the distribution of individual preferences or aspirations" is essentially nonquantifiable, but clearly it would not necessarily imply across-the-board numerical equality. Tangri's (1976, p. 84) definition of occupational segregation as "occupations where the

work force in that occupation does not contain a representative distribution of persons on the major demographic variables according to their proportion in the adult population" seems to imply an equal proportional distribution. Sawhill (1976) adopted, without explanation, an asymmetrical classification in which occupations with 80 percent or more of all workers being male were classified as traditional male and occupations in which 30 percent or less were male were classified as traditional female.

The Extent of Occupational Segregation

The literature documents the fact that sex segregation in the labor market is pervasive. A few representative descriptions of the extent of occupational segregation follow.

In 1960 women represented 33 percent of total employment. Whereas 47 percent of employed women were in occupations in which women represented 80 percent or more of total employment, only 2 percent of employed men were in those occupations. While almost 90 percent of employed men were in occupations in which they represented two-thirds or more of the total employment, only 20 percent of employed women were in those occupations (Zellner, 1975). There was only a very small change in the direction of less segregation between 1960 and 1970, and no further changes since 1970 (Lloyd and Niemi, 1979).

Weisskoff (1972) reported that by 1969 half of the female work force was distributed among 21 detailed census listing occupations, with 5 occupations accounting for approximately one-fourth of female employment. By contrast, half of the male work force was employed in 65 occupations.

Bianchi and Spain (1983) found that women were proportionately overrepresented (by comparison to their overall percentage of the labor force) in clerical and service occupations. In 1980, women constituted 44 percent of all workers, but they represented 81 percent of clerical, 97 percent of private household, and 61 percent of other service occupations. Women's representation in professional and sales occupations, 46 percent and 49 percent respectively, was roughly proportional to their overall representation in the labor force. Women were underrepresented in managerial occupations (28 percent), among operatives (34 percent) and in crafts (6 percent), laboring (11 percent) and farming (17 percent).

Although the change in the total distribution of men and women across occupations has been slight, The Department of Labor reported that the percentage of women employed in predominantly male traditional occupations nationwide increased from 7 percent in 1971 to 12 percent in 1979 (U.S. Department of Labor, 1980). Wolshok (1981) and Lederer (1979) also reported significant gains for females in blue-collar occupations.

Employment statistics for the state of Oklahoma indicated that over one-third of the employed females in the state were in clerical occupations and over one-half were in clerical and service occupations combined. Less than 2 percent of employed females were working in craftsmen, foremen, and related occupations. Further, almost three-fourths of all clerical employees were female, while less than 1 percent of Oklahoma craftspeople were female (Oklahoma Employment Security Commission, 1979).

Reasons for Occupational Segregation

Why does occupational segregation occur and why does it persist? A number of theories have been advanced to explain the degree of occupational segregation apparent in the labor market. Reagon and Blaxall (1976, p. 2) argued that occupational segregation of the sexes "results from the interaction of a well-entrenched and complex set of institutions that perpetuates the inferior position of women in the labor market." They contend that family, legal, economic, cultural, and historical pressures within society support occupational segregation; and, therefore, an interdisciplinary approach is necessary to successfully understand and reduce sex segregation in the labor market. Reagon and Blaxall cited a number of models which focus on psychological, cultural, and historical determinants (Lipman-Blumen, 1976; Laws, 1976; and Safilios-Rothschild, 1976). These models generally emphasize fundamental nonquantifiable changes in the way sex roles are defined in the home as well as in the market.

The "crowding hypothesis," attributed to Bergmann (1976), presents an alternative approach to discrimination. The presence of occupational segregation which arbitrarily excludes females from some occupations has the simultaneous effect of (1) reducing the supply of labor to male occupations below what it would have been in the absence of segregation and (2) increasing the supply of labor to female occupations. Since the range of female occupational choice is limited with respect to the range for males, "crowding" forces women to compete with each other for jobs that are confined within a few occupations, reducing female wages. At the same time,

men with access to jobs in many more occupations are protected from female competition, thus earning higher wages than would have prevailed in the absence of occupational segregation (Stevenson, 1975). Data on occupational distribution by sex cited in the previous section appear consistent with the "crowding" theory. Recall Weisskoff's (1972) observation that half of the female labor force is "crowded" into 21 occupations, while half of male employment is spread over 65 occupations.

Blau and Jusenius (1976) critiqued various economic theories of sex segregation including the overcrowding, human capital, monopsony, internal labor market, and dual labor market approaches. The authors argued that the major contribution of the neoclassical approaches has been in the area of "explaining" male-female pay differences and that institutional approaches more successfully incorporate the linkage between pay differentials and sex segregation.

Human capital models have not explicitly incorporated occupational segregation, however Blau and Jusenius (1976) claimed that a number of "seemingly reasonable" inferences can be drawn. First, men and women are not perfectly substitutable since women accumulate less human capital as a result of fewer years of work experience. Second, once the value of the female's time in home production is realized, the female's decision to invest in less human capital is rational. Hence, human capital theorists would expect women to enter occupations which neither reward work experience nor penalize workers for discontinuous employment.

However, both male and female occupations require varying skill levels (varying amounts of human capital). As Stevenson (1975)

demonstrated, more occupational segregation exists within skill levels than across skill levels. To explain the observed pattern of segregation, human capital theory has to resort to differences in tastes. As Blau and Jusenius (1976, p. 184) interpret it: "If their /two respective occupations/ wage tags tell us that A does not offer more than B, then there is only one explanation of the worker's choice--she entered A because she likes it better."

The monopsony model, credited originally to Robinson and recently extended by Madden, emphasizes the possibility of a less elastic supply curve of female labor resulting from women's relative immobility. Two major imperfections restrict the model's general applicability. First, there is no a priori reasoning to support the required less elastic supply curve. Second, the monopsony model is flawed by circular reasoning since occupational segregation is, itself, cited as a source of immobility.

The internal labor market approach preferred by Blau and Jusenius (1976) recognizes that neoclassical market forces operate principally on occupations at the entry level. Beyond the entry level, most jobs are filled internally through advancement along relatively well-defined promotion ladders. In the internal labor market, administrative apparatus (i.e., job analyses, job evaluations, formal salary plans) replace external market forces. Since these rigid administrative apparatus cannot accommodate intra-occupational pay differentiation, differences in group behavior, such as differences in expected tenure, could lead to occupational segregation.

The conventional dual labor market approach, with its emphasis on primary and secondary labor markets and the distinction between lower-,

working-, and middle-class subcultures, tends to be a better description of male jobs than of female jobs. However, Piore (1978) suggested that this limitation could be overcome by reference to the differences between male and female roles in various subcultures. Moreover, the tendency for women to be viewed as secondary workers, weakly attached to the labor force, has contributed to the employment of women in jobs with little promotional opportunity (Reagon, 1980). Bergmann (1980) contended that the barring of women from jobs in which there is a significant opportunity for on-the-job training has been particularly injurious to women. She observed that employers have rationalized the practice by pointing to women's lower commitment to the labor force, creating what she called a "vicious circle" where poor career opportunities lead to lower commitment, which in turn leads back to restrictive employer practices.

Zellner's (1972) empirical model of occupational segregation emphasizes the impact of the expected participation level on career choice. She hypothesized that the participation level is positively related to the wage rate for some (male) occupations, while the wage rate is independent of the participation level in other (female) occupations. Because male and female participation levels differ, their expected wage differs and females who expect a low participation level rationally choose female-dominated occupations. Results using data for wives with husbands present were less than satisfactory; however, some of the findings have implications for this research.

Contrary to predictions from Zellner's labor supply model, she found number of children under 6 and number of children between 6 and 11 to be negatively related to the choice of a traditional occupation.

She argued that women who remain in the labor force with young children have very strong tastes for market work. One explanation of her result then would be that women with relatively strong tastes for market work enter male dominated occupations. Moreover, she identified a "second career" effect, with number of children 12 to 17 years of age having a significant negative relationship to the proportion female in the mother's occupation. Somewhat surprisingly, Zellner found that the women most likely to be in the male-dominated occupations in 1960 were around 52 years of age. She asserted that this result was likely to be a purely secular phenomenon, depicting these women as the aging "Rosie the Riveter" cohort.

The Economic Impact of Occupational Segregation

Empirical work focusing on the economic impact of occupational segregation led Oaxaca and Stevenson both to recommend an occupational desegregation policy. According to Oaxaca (1973):

> Discrimination against females can be said to exist whenever the relative wage of males exceeds the relative wage that would have prevailed if males and females were paid according to the same criteria (p. 125).

Arguing that differences in occupation, industry, and union membership are sources of discrimination, Oaxaca estimated a set of personal characteristics wage regressions which do not control for these variables. In the absence of sex discrimination as defined, he found the average female wage as a percentage of the average male wage would have been 88 percent for white females rather than the observed 65 percent.

Employing a discrimination coefficient similar to the one introduced by Becker (1971), Oaxaca estimated that discrimination accounts

for approximately 74 percent of the male-female wage differential for whites and 92 percent for blacks. The discrimination coefficients from his full-scale regressions (controlling for occupation, industry, and union membership) yielded more conservative estimates of 53 percent and 52 percent respectively.

Oaxaca concluded that the federal Equal Pay Act of 1963 would be useful in reducing only discrimination within narrowly defined job titles. Moreover, he argued that the occupational distribution among women would have to change substantially before there would be a significant impact on relative wages. Noting the insidiousness of social conditioning, he recommended widespread recruiting and training programs on the part of government and private industry to move women into better-paying typically male jobs. He concludes:

> . . . The factors presently accounting for the wage differential indicate an underutilization of the resources and talents of women. The underutilization is the product of social biases and the consequent adaptation to these biases by women. If occupational barriers would be eliminated and women encouraged to exploit their talents to the fullest extent compatible with their own preferences, we can be assured that any observed wage differential is the outcome of voluntary choices affecting occupational attachment and investment in human capital (p. 151).

Stevenson (1975) found that for white women, almost all of the male-female wage differential was attributed to occupational segregation within occupational levels (jobs requiring similar educational development and training time); none of the wage difference was attributable to differences in the distribution across occupational levels. She concluded that women must enter male occupations and men must enter formerly female occupations in order to achieve any quantitatively significant reduction in the wage gap. She went on to

assert that faulty counseling and mistaken expectations with regard to women's labor force participation results in a misallocation of resources and that government funds should be legislated for programs to inform school counselors and vocational educators about the disadvantages of traditional sex-stereotyped training programs.

From a somewhat different perspective, Ferber and Lowry (1976) reported findings which indicated that moving women into more predominantly male occupations would increase female unemployment rates. In seven of the nine major occupational categories, they found that the female unemployment rate was inversely related to the percentage of women in the detailed occupational categories. Conversely, the male unemployment rate was positively related to the percentage of women in the occupational categories.

Laws (1976) claimed that studies of female occupational choice have been fundamentally flawed by the lack of an attempt to determine the antecedents of the preferences expressed. She advanced the unique (in this literature) argument that traditional feminine occupations offer distinct advantages in terms of minimizing sex-role conflict, releasing the "achievement motive," and minimizing situational arousal of the motive to avoid success. Thus, if we are interested in continuous labor force attachment and life-time earnings, this set of occupations may have been underrated.

Differences in Labor Market Outcomes by Sex and Race

Sex and race differentials in labor force participation, unemployment and earnings are well documented. Male labor force participation

rates have remained higher than those for females, but female participation has been increasing while male participation has been falling, particularly at older ages. Women's participation rate increased from 34 percent in 1950 to 52 percent in 1980. During that same period, men's participation fell from 87 percent to 78 percent. For women not in the labor force, 90 percent reported they did not want a job; of this percentage, three-fourths gave home responsibilities as the major reason for not seeking market work (Bianchi and Spain, 1983).

Generally, women have had a higher incidence of unemployment than men, with the gap widening during economic expansions and narrowing during economic recessions. Women have been overrepresented among discouraged workers--those who would like market work, but have discontinued job search after becoming discouraged about the prospects of obtaining employment (Bianchi and Spain, 1983).

Black women historically have exhibited higher labor force participation rates than white women, with the differential narrowing over time as the participation of white females increased faster than that of nonwhites. Conversely, the nonwhite male participation rate has generally been lower than that for white males and the differential has widened over time as the participation of nonwhite males fell faster than that of white males (Lloyd and Niemi, 1979). Although black women are at the bottom of the earnings hierarchy, the gap between black and white women's median earnings has narrowed dramatically. The earnings of black men and women appear to be converging, in contrast to the widening earnings gap between white males and females (Bianchi and Spain, 1983). Before 1962, the unemployment rate for nonwhite females was lower than that for nonwhite males. However, this situation changed

with the 1962-1969 expansion and since 1962 nonwhite females have had higher unemployment rates than nonwhite males (Lloyd and Niemi, 1979).

Individual Differences and Occupational Choice

Why do some individuals choose nontraditional training and/or occupations and others do not? Do these inherent differences influence the labor market outcomes under investigation? Unfortunately, there is no clear cut response in the literature to these two important questions. Walshok (1981) described the nontraditional women in her book as risk takers, independent, as having compelling needs and a great deal of confidence. She claimed, based on her experience, that women who succeeded in blue-collar occupations were younger than the general female labor force, had fewer children, and were better educated. Many had childhood crises and reported a childhood preoccupied with atypical activities. In marked contrast, Lederer (1979) described the typical woman in skilled trades as generally several years older than the average employed woman, a little less educated, probably married but more likely to be widowed or divorced than white-collar workers. Nationally, nine out of ten women in the skilled trades are white and half of the married women are married to blue-collar workers.

Crawford(1978) found that "pioneer" women were more liberal socially and were more likely to have had working mothers, but she found no differences in self concept between pioneer (that is, women employed in male traditional occupations) and traditional women. A major longitudinal study of the labor market experiences of young women profiled nontraditional noncollege women in 1968 as having

technical, professional or managerial fathers, as having terminated high school educations at grade 10 or 11, as having worked in 6 or more different occupations including previous atypical experience and as being separated, divorced, or widowed (U.S. Department of Labor, 1978).

Hedges and Bemis (1974) wrote that sex stereotyping in the skilled trades is declining as increased mechanization reduces the need for strength and stamina. With respect to aptitudes they summarized data which show no significant differences between male and female aptitude along dimensions such as numerical reasoning, manual dexterity, analytical reasoning, inductive reasoning, objective personality, and subjective personality. Males were reported to have higher average performance in spatial reasoning, grip, and structural visualization, while females performed better in form perception, clerical perception, motor coordination, finger dexterity, abstract visualization, graphoria (accounting aptitude), ideaphoria (flow of idea in verbal pursuits), and observation.

Training for Nontraditional Vocational Occupations

With respect to the vocational literature, much of the literature focuses on the underrepresentation of females in vocational training, overcoming barriers to nontraditional enrollment, the sex bias of earlier vocational curricula and career counseling materials and reports or case studies of isolated and typically small exemplary programs to overcome sex bias and sex stereotyping and to promote

training in nontraditional vocational areas.[1] Few studies have addressed training outcomes for sex nontraditional enrollment.

Green (1979) examined male-female dropout behavior in Kansas balance-of-state CETA programs by traditionality of the training program. His descriptive analysis shows nontraditional women to have a high dropout rate (70 percent), leading him to conclude that:

> . . .Even in the type of situation in which women are free to pursue the career of their choice, this study indicated that females are failing to find success in occupations that are considered traditionally male (p. 60).

Smith (1982), using earlier data and chi-square contingency tables, found some significant differences between traditional and nontraditional students with regard to training and labor market outcomes. When data were analyzed by subgroup, the significance of these differences appeared to be sensitive to the student's age, the type of training institution, and the size of the city in which the training took place. The methodology used did not permit direct control for these differences nor was any attempt made to control for differences in labor market conditions.

Heller (1979) analyzed selected student behavior by sex and traditionality of college major. As expected, the results indicated that working environment and conditions, work attitude, tasks and interpersonal interaction were sex-linked. Among other differences, Heller found that the females in her sample changed majors more frequently, had higher grade-point averages, and higher job performance

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[1]See Heller (1979) for an annotated bibliography.

ratings. However, students majoring in fields in which their sex was opposite that of the dominant group were reported to have the characteristics of the dominant group rather than those of others of their own sex. Heller noted a tendency for all women, but especially those with nontraditional majors, to acknowledge that they had more personal problems than those acknowledged by traditional males.

The California Study on Women in Nontraditional Employment (Advocates for Women, 1977), a descriptive report based on in-depth unstructured interviews, reported very few of the nontraditionally-trained women interviewed were currently working in the field for which they had trained and that many were, in fact, back in traditional jobs. The study identified sex stereotyping, male attitudes, employer attitudes, conditioning, and lack of nontraditional role models as barriers to nontraditional employment for women. Further, all women interviewed said they were led to believe that they would get training-related jobs after they had completed training.

Models of Occupational Attainment

Brown, Moon and Zoloth (1980) and Schmidt and Strauss (June, 1975 and July, 1975) attempted to model occupational determination. Brown et al. (1980) employed a reduced form multinomial logit model of occupational attainment in an attempt to incorporate occupational attainment into studies of male-female earnings differentials. The authors argued that the reduced form version was required since they focused on attainment rather than occupational choice and attainment is a function of both the individual's decision to work in a specific occupation and the employer's willingness to hire. Their model was

specified as:

$$P(Y_i = occ_j) = F(X_i)$$

where $P(Y_i = occ_j)$ is the probability that individual i is in occupation j and X_i is a vector of exogeneous variables affecting supply and demand decisions. The exogeneous variables included previous experience, education, number of years of vocational training, number of children, a personality variable, and a dummy variable for urban or rural residence. Separate functions were estimated for each of j occupations to accommodate different production functions for human capital and different occupational impact on individual utility.

The Brown procedure consisted of estimating the parameters for the model from men's data using eight major occupational categories, substituting women's data into the male equations to predict the probability of belonging to a specific occupation and then summing predicted probabilities over observations to produce the expected distribution of women across occupations. Results yielded an expected distribution much different from the actual distribution. Specifically, the expected distribution included more women in high paying jobs and fewer in low paying jobs. The authors attributed only 14 to 17 percent of the total earnings differential to differences in endowments and confirm Stevenson's finding that most of the wage difference occurs within rather than across broad occupational groupings.

Schmidt and Strauss (June, 1975) also used a multiple logit model to predict the relative probability that an individual would be employed in a menial, blue-collar, craft, white-collar or professional occupation based on the individual's race, sex, education, and job experience. Their model was specified as:

$$\log e \frac{P_{jt}}{P_{1t}} = X_t B_j, \; j = 2, 3, \ldots, N \quad t = 1, 2, \ldots, T$$

where X is a 1 x k vector of explanatory variables and B is a k x 1 vector of unknown parameters. Estimation of the model indicated that race and sex have strong effects. In fact, if the occupations are ranked in descending order then being female makes one more likely to be in the lower of any two occupational groups. Separate estimates were provided for 1960 and 1970 and results indicated that the sex coefficient increased, although not significantly, indicating an increase in occupational differences due to sex. Schmidt and Strauss (July, 1975) extend the logit analysis to a simultaneous system where they predict industry and occupation simultaneously.

Summary

Clearly, occupational segregation exists and empirical work focusing on its economic impact has led to an appeal for occupational desegregation. A key question remains to be addressed: how does the choice of a nontraditional occupational objective affect labor force participation, unemployment, and wages. Zellner has argued that women who choose nontraditional occupations have strong tastes for market work, suggesting that females choosing nontraditional training might be expected to have higher post-training labor force participation rates than women who choose traditional training. Ferber and Lowry have argued that moving women into nontraditional occupations would increase female unemployment rates. The general presumption appears to have been that women employed in male-dominated occupations would enjoy the same earnings and promotion

advantages that the men employed in those occupations share. However, little work has been done to verify this presumption. Research focusing on female blue-collar aspirants has been descriptive in nature and frequently based on small samples. The use of the logit statistical technique and a large sample size in this research will contribute to the understanding of the relationship between sex, occupational choice, employment, and earnings.

CHAPTER III

DETERMINANTS OF TRAINING AND LABOR MARKET OUTCOMES FOR VOCATIONAL STUDENTS

Introduction

This chapter will develop the theoretical bases of the three models to be estimated, describe the data used for estimation, discuss methodological considerations, and formally specify the models used for estimation.

Consider four groups of students, a group of males and a group of females enrolled in vocational training sequences typically characterized as male and a group of males and a group of females enrolled in vocational sequences typically labelled female. Completion of the training sequence and subsequent labor market experience may be expected to vary with certain individual characteristics such as sex, race, and age and with certain environmental characteristics such as type of school and size of labor market. Training and labor market outcomes may also vary significantly with group membership and there may be interaction effects between group membership and one or more of the other characteristics affecting the outcomes.

Determinants of Completion

Completion is hypothesized to be a function of group membership, a vector of individual characteristics, and a vector of socio-economic

variables describing the individual's environment. The males' stronger attachment to the labor force is expected to have a positive impact on completion as a more certain and a longer average worklife increases the expected benefits from completing training. Similarly, the difficulties blacks and other nonwhites encounter in the labor market lower the expected benefits from completing training, leading to reduced completion rates. The nature of the relationship between completion and age cannot be predicted a priori. The expected benefits from completion are lower for older students who have fewer years of worklife experience over which to garner the returns to training. On the other hand, older students will be at a more advanced stage in the process of occupational choice, suggesting that the enrollment in a particular training program is less likely to be experimental in nature. The first effect would reduce the probability of completion while the second would increase the probability of completion for older students.

Successful termination of a training sequence depends on environmental factors as well as individual characteristics. Completion should be facilitated by a school environment with adequate and unbiased counseling and one with remedial resources. Completion rates may be higher in some types of training programs than in others; specifically completion rates may be higher in "clean" programs (such as distributive education and marketing, health occupations, home economics related occupations, and office occupations) and lower in "dirty" programs (such as trade and industrial occupations and vocational agriculture. Completion rates may be higher (or lower) in occupational areas where labor market demand is "stronger" (such as distributive education and

marketing, health occupations, and office occupations) and lower (or higher) in occupational areas where demand is "weaker" (such as vocational agriculture, home economics related occupations, and trade and industrial occupations). Higher completion rates in strong demand areas would result if favorable future prospects of employment encouraged students to complete training. Lower completion rates would result if favorable current employment opportunities lured students into early labor market entry.

On balance students in the nontraditional groups (that is the group of males in programs typically thought of as female-oriented and the group of females in programs typically thought of as male-oriented) are expected to have lower completion rates. Although significant gains have been made in reducing sex bias and sex-role stereotyping in vocational programs and curriculum materials, these attitudes have not been completely eliminated. Further, the problem may well be worse for the males who assume stereotypic female roles. Negative feedback from peers, perhaps from teachers, and from family and society-as-a-whole is expected to be strong enough to discourage a significant number of nontraditional students.

Determinants of Labor Market Outcomes

For the purposes of this research, labor market outcomes are identified as follows: (1) not in the labor force, (2) unemployed, (3) employed in an occupation which is not related to the student's training, and (4) employed in an occupation which is related to the student's training. Labor market outcome is hypothesized to be a function of group membership, a vector of individual characteristics

and a vector of environmental/economic variables.

Clearly, being female is expected to increase the probability that a student will experience outcome (1) relative to any other outcome. After all females have more socially accepted nonmarket alternatives (i.e., home production) than males, thus reducing female labor force participation. Being female should also make it more likely that a given student will be employed in an occupation related to his or her training rather than in an occupation unrelated to training (outcome 4 vs. outcome 3). This result is attributed to a more clearly defined labor market for females who are "crowded" into a much narrower range of occupations. Being nonwhite is expected to increase the chance of labor force participation (outcome 1), but to decrease the chance that the student is employed. Being younger is expected to decrease both the probability of participation and the probability of employment. These results would be consistent with observed differences in labor market outcomes by sex and age.

A number of environmental factors--institutional and economic--also have an impact on labor market outcomes. Training in occupational areas with higher labor market demand and hence higher wages enhances both the likelihood of participation and employment in the occupation for which trained. Training in a more narrowly defined field, health occupations for example, is also expected to enhance the individual's probability of achieving outcome (4) with respect to outcome (3). Similarly, training in areas where employment is growing rapidly should improve a student's chances of achieving a higher numbered outcome relative to a lower numbered one.

Institutional factors are again expected to play an important role. Area vocational-technical centers provide a broad range of support services for their students including not only the learning labs and vocational counseling mentioned with respect to program completion, but also a formal job placement activity in addition to the usual placement efforts of instructors. These factors should be reflected in the probability of achieving higher numbered outcomes for students trained in area vocational-technical centers.

As before, nontraditional students are expected to encounter additional difficulties associated with their pioneering role in the labor market. To the extent that these difficulties exist, they will be reflected as an increased likelihood of ending up in a lowered numbered outcome with respect to a higher numbered outcome. Moreover, the institutional advantages associated with the area vocational-technical centers should be particularly important to the success of nontraditional students. In the same vein, more mature nontraditional students can be expected to persevere in the face of adversity, improving their outcomes relative to those of younger students.

The social environment is seen as an important determinant of labor market outcomes for nontraditional students. Students who have trained and who are seeking work in areas (both occupational and geographical) in which occupational segregation and sex-role stereotyping are beginning to break down should encounter fewer barriers, leading to the prediction that an urban environment will be more conducive to nontraditional employment. Further, as time passes barriers are increasingly being challenged and removed, resulting in expected improvements in nontraditional performance over time.

The presence of female-headed households may be expected to have an impact on nontraditional outcomes. It is frequently argued that women who choose nontraditional occupations and endure the hardships associated with a nontraditional choice do so in order to provide a standard of living for their families which is not attainable on the average earnings associated with employment in typical female occupations. The presence of these women as role models and barrier breakers in the community would be expected to enhance the opportunities of nontraditional females. Data indicate that increases in rates of family headship have occurred primarily among women under 45 years of age. Bianchi and Spain (1983) claim that the economic implications of changes in trends in marital status and family living arrangements are substantial. Specifically, women's training, participation, and earnings become more significant with the realization that many women will manage their own households at some point during their adult lives.

Determinants of Wages

Wage determination may be viewed in a reduced-form model in which wages are a function of labor demand and labor supply variables. Individual characteristics such as sex, race, age, educational level, and work experience are usually found to be significant in earnings functions. In addition to these individual factors, wages should clearly be higher in high employment growth areas, both occupational and geographical, as strong labor market demand bids wages up. Although the quality of an individual's work is generally recognized

as an important determinant of earnings, data limitations usually prohibit its use in empirical work.

In summary, training and labor market outcomes vary with certain individual, institutional, economic, and social factors. As stated in Chapter I, the objective of this research is to discern whether there are significant differences in the post-training labor market experiences of students of the traditional gender and those of the nontraditional gender.

Data Used for Estimation

Individual enrollment, completion, and follow-up data for school years 1978-79, 1979-80, and 1980-81 were obtained from the Oklahoma State Department of Vocational and Technical Education. Each student record contained coding describing the student's career objective; sex; race; age; grade level; handicaps and disadvantages, if any; limited English-speaking ability; and displaced homemaker and/or CETA status at the time of enrollment. Additional coding described the student's enrollment status (dropped, continuing, or completed) and follow-up status for noncontinuing students. Follow-up status responses included (1) military, full time; (2) employed, related to training; (3) employed, not related to training and not pursuing additional education; (4) pursuing additional education and not currently employed in a related occupation; (5) unemployed, seeking work, not in school; (6) not in the labor force or school; (7) status unknown; and (8) deceased.

Methodology

Identification of Gender-Specific Training Objectives

Occupational objectives were classified as (1) male traditional, (2) female traditional or (3) not sex traditional based on the male/female enrollment ratio in 1977-78. No clear numerical precedent seemed to exist for the determination of the dividing line between male traditional and female traditional. The following operational definition was adopted: an occupational objective was considered male (female) traditional if 75 percent of the enrollment in that occupational objective was male (female).

Male and female traditional occupational objectives as determined by the 75 percent criterion are listed in Tables I and II respectively. Occupational objectives which were not classified as sex traditional /those in which the enrollment of males (females) represented less than 75 percent and greater than 25 percent of total enrollment/ are listed in Table IX in the Appendix. The resulting classification appears consistent with Tangri's (1976) equal-proportional definition. Recall Bianchi and Spain's (1983) determination that women are overrepresented in clerical, private household, and service occupations and underrepresented in craft and agricultural occupations. Bianchi and Spain found that the percentage of women employed in sales occupations was roughly proportional to their overall representation in the work force. They note, however, that within sales occupations, men and women tend to be distributed differently.

Data on total and female enrollment as shown in Tables I and II

TABLE I

MALE TRADITIONAL OCCUPATIONAL OBJECTIVES

Code	Occupational Objective	Total	Total Female	Percent Female
Vocational Agriculture				
0101XX	Agriculture Production	23,392	1,625	6.9
0102XX	Ag Supplies and Services	1,647	167	10.1
0103XX	Ag Mechanics	5,685	111	2.0
0104XX	Ag Foods	531	57	10.7
0106XX	Ag Resources	1,013	73	7.2
0107XX	Forestry	558	32	5.7
Distributive Education				
040300	Automotive	143	13	9.1
040900	Hardware	78	12	15.4
041200	Industrial Marketing	35	5	14.3
041600	Petroleum	34	3	8.8
Health Occupations				
070909	Funeral Service	21	5	23.8
Trade and Industrial				
170100	Airconditioning	3,058	169	5.5
1702XX	Appliance Repair	122	5	4.1
170301	Auto Body	2,222	34	1.5
170302	Auto Mechanics	5,449	341	6.3
170399	Auto Parts	153	5	3.3
1704XX	Aircraft Mechanics	292	25	8.6
1705XX	Blueprint Reading	261	36	13.8
170519	Buidling and Grounds Mtn.[1]	-	0	0.0
170600	Business Machine Repair	1	0	0.0
171001	Carpentry	3,302	102	3.1
171002	Electricity	2,276	58	2.5
171003	Heavy Equipment Operator[2]	-	-	2.4
171004	Masonry	939	34	3.6
171007	Plumbing - Pipefitting	318	0	0.0
171099	Construction Management	1,934	145	7.5
171100	Custodial Services	546	40	7.3
171200	Diesel Mechanics	1,314	9	0.1

TABLE I (CONTINUED)

Code	Occupational Objective	Total	Total Female	Percent Female
Trade and Industrial (Continued)				
171300	Drafting	1,680	335	19.9
171400	Electrician Related	12,000	2,425	20.2
171402	Electric Lineman			
171502	Electronics	2,435	282	11.6
171503	Radio/TV Repair			
171700	Foreman	129	18	14.0
172100	Instrument Mechanic	22	2	9.1
172301	Foundry	14	0	0.0
172302	Machinist	2,062	159	7.7
172306	Welder	4,856	109	2.2
172400	Metal Occupations	128	1	0.1
172601	Barber	1	0	0.0
172700	Plastics	163	3	1.8
172801	Fireman Training	7,799	87	1.1
172802	Law Enforcement	5	1	20.0
173000	Refrigeration	16	1	6.3
173100	Small Engine Repair	1,009	24	2.4
173200	Energy Sources	200	47	23.5
173400	Leather Work	58	8	13.8
173600	Woodworking	881	147	16.6
173601	Cabinetmaking			
179901	Truck Driver[2]			24.1
179902	Farm Machine Repair[2]			1.5

[1]Total enrollment not available; program not open to females until after the 1976 legislation.

[2]Totals not available; percent female reported in the Oklahoma Advisory Council's Twelfth Annual Report, 1980.

SOURCE: "Enrollments in Vocational Education Programs, 1977-78," Unpublished federal report submitted by the Oklahoma State Department of Vocational and Technical Education

TABLE II

FEMALE TRADITIONAL OCCUPATIONAL OBJECTIVES

Code	Occupational Objective	Total	Total Female	Percent Male
Distributive Education				
040200	Apparel & Accessories	504	445	11.7
040500	Floristry	46	35	23.9
040600	Food Distribution	1,454	1,273	12.4
Health Occupations				
070101	Dental Office Assistant	99	99	0.0
070203	Medical Lab Technician	2	2	0.0
070204	Medical Lab Aid	139	104	25.2
070302	Practical Nurse	991	952	3.9
070303	Nurse Assistant	2,418	2,255	6.7
070401	Occupational Therapy Asst.	29	24	17.2
070402	Physical Therapy Asst.	13	12	7.7
070815	Community Mental Health	10	8	20.0
070904	Medical Office Assistant	658	625	5.0
070914	Medical Assistant			
070210	Medical Record Technician			
Occupational Home Economics				
090201	Child Care	1,199	1,091	9.0
090202	Clothing Management	1,415	1,287	9.0
090203	Food Management	1,284	1,011	21.3
090204	Home Furnishings	451	419	7.1
090205	Institutional Management	2,104	2,038	3.1
Business and Office				
1401XX	Bookkeeping	3,491	2,802	19.7
140202	Keypunch Machine Oper.	1,406	1,083	23.0
140299	Data Processing, Other			
1403XX	General Office	3,617	3,368	6.9
1404XX	Communications	109	97	11.0
1407XX	Clerical	4,705	4,649	1.2
1409XX	Clerk-Typist	2,880	2,727	5.3
Trade and Industrial				
172602	Cosmetology	1,017	994	2.3

SOURCE: "Enrollments in Vocational Education Programs, 1977-78," Unpublished federal report submitted by the Oklahoma State Department of Vocational and Technical Education

verify that a stricter criterion, say 85 or 90 percent, would have yielded only minor changes in the programs designated as sex traditional. Data in Table IX reveals that a more liberal criterion, say 65 percent, would have resulted in the inclusion of several programs in which females do not appear to be over- or underrepresented (i.e., finance and credit, food services, and upholstery).

Male vocational enrollment was heavily concentrated in vocational agriculture and trade and industrial programs, with females comprising only 8.5 percent of the vocational agriculture enrollment and 13.5 percent of the trade and industrial enrollment. Within specific trade and industrial occupations, females represented as little as 1.5 percent of the auto body enrollment, 3.1 percent of the carpentry enrollment, 2.5 percent of the electricity enrollment, 3.6 percent of the brick masonry enrollment, 0.11 percent of the diesel mechanics enrollment, and 2.2 percent of the welding enrollment.

Female vocational enrollment was heavily concentrated in health occupations, business and office, and occupational home economics programs with males comprising 11.2 percent of the health occupations enrollment, 10.6 percent of the occupational home economics enrollment, and 14.8 percent of the business and office enrollment. Within specific female traditional occupational objectives, males comprised as little as none of the dental office assistant enrollment, 3.9 percent of the practical nursing enrollment and 1.2 percent of the secretarial training enrollment.

Training and Labor Market Outcomes

Figure 1 and Table III summarize possible training and labor

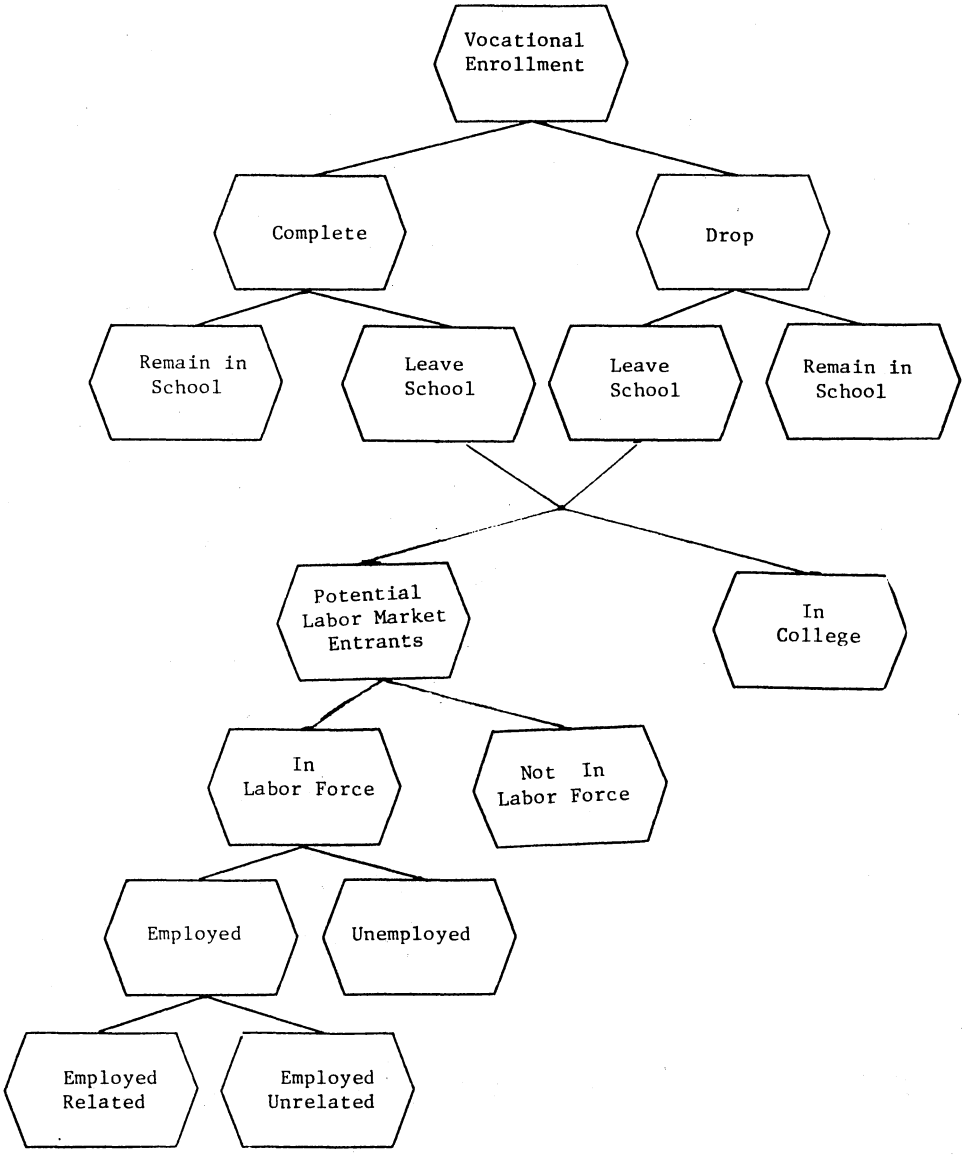

Figure 1. Training and Labor Market Outcomes

market outcomes. Figure 1 shows that there are a number of pitfalls along the path between enrollment in a training program and eventual placement in an occupation which is related to that training. First, some of those students who enrolled may drop out of the program and/or school before completion of training; second, some of those who complete the training program and become available for placement may not enter the labor force; third, some of those who enter the labor force may be unemployed; fourth, some of those who become employed may take jobs which are unrelated to their training. The nonstandard classification of higher education in the Figure 1 taxonomy in effect treats college attendance as neutral in the analysis which follows. In this respect continuing education at the post-secondary level delays labor market entry.

Statistical Analysis

Qualitative response models, including linear probability models, probit models, and logit models, are appropriate when the variable to be explained is categorical in nature (Forthofer and Lehnen, 1981). Suppose one wanted to investigate the occurrence or nonoccurrence of some event such as completing or dropping out of a training sequence. Following Amemiya (1981), consider a linear specification of a simple univariant dichotomous model:

$$P(y_i = 1) = F(x_i B) \quad i = 1, 2, \ldots, n$$

where the random variable y has the value of 1 if some event occurs and 0 if not; x is a vector of independent variables; B is a parameter vector, and the subscript i denotes the i-th individual.

TABLE III

DEPENDENT VARIABLES

Training Outcomes	
COMP	1 if completed training sequence and left school
	0 if dropped out of training program and left school
Labor Market Outcomes	
NLFP	1 if not in the labor force
U	2 if unemployed
EURLTD	3 if employed in an occupation not related to training
ERLTD	4 if employed in an occupation related to training
Wage Outcomes	
ADJWAGE	the individual's hourly wage adjusted for wage inflation

The three most common functional forms can be written:

Linear Probability Model:

$$F(w) = w$$

Probit Model:

$$F(w) = \theta(w) = \int \frac{w_1}{\sqrt{2\pi}} e^{-t^{2/2}dt}$$

Logit Model:

$$F(w) = L(w) = \frac{e^{w}}{1 + e^{w}}$$

The linear probability model is flawed by the fact that $x_i B$ is not constrained to lie between 0 and 1. Neither the probit nor the logit model is subject to this defect and Amemiya claims there is little basis upon which to choose between them. Pindyck and Rubinfeld (1981) prefer the logit model for its computational ease.

The logit model can easily be extended to the multiple response case in the following manner:

$$P(y_i = j) = F_{ij}(X^*, \theta) \qquad \begin{matrix} i = 1, 2, \ldots, n \text{ and} \\ j = 1, 2, \ldots, m_i \end{matrix}$$

where X^* is a vector of independent variables, θ is a vector of parameters, i is the i-th individual and j is the j-th category. As Amemiya (1981) points out, a multiple response model is characterized by $\sum_{i=1}^{n} m_i$ binary variables y_{ij}, $i = 1, 2, \ldots, n$ and $j = 1, 2, \ldots, m_i$, whereas a dichotomous qualitative response model is characterized by n binary variables. While $\{y_i\}$ are independent, $\{y_{ij}\}$ are not, since $\text{COV}(y_{ij}, y_{ik}) = \frac{-P_{ij}}{P_{ik}}$ for $y \neq k$. Multiple response models may be either ordered or unordered.

For example, the binary choice logit model can be extended to the three choice case by noting that:

$$\log \frac{P_2}{P_1} = \alpha_{21} + \beta_{21} X$$

$$\log \frac{P_3}{P_1} = \alpha_{31} + \beta_{31} X$$

$$\log \frac{P_3}{P_2} = \alpha_{32} + \beta_{32} X$$

Since the system is constrained so that the sum of the individual probabilities equals one, it is unnecessary to estimate all three equations directly.

Maximum likelihood is the most suitable estimation technique for logit models using individual observations. Maximum likelihood parameter estimators are consistent and asymptotically efficient. Parameter estimators are also asympototically normal so the ratio of the estimated coefficient to its estimated standard error follows a normal distribution.

The Models to Be Estimated

Training Outcomes. To determine differences in training outcomes for traditional and nontraditional students, the following model will be estimated:

$$P(y_i = 1) = F(x_i B) \quad i = 1, 2, 3, \ldots, n \qquad \text{(Equation 1)}$$

where the dependent variable is the natural logarithm of the odds that a particular outcome will result and X is a vector of exogeneous variables including nontraditionality, sex, the interaction between nontraditionality and sex, race, age, school type, percent of female-headed households, time, and occupational area. The independent variables are described more fully in Table IV.

The same basic equation, with appropriate omission of irrelevant independent variables, will be estimated separately for nontraditional students, traditional students, and each of the four groups defined by sex and traditionality of occupational objectives; that is, male traditional (MT), male nontraditional (MNT), female traditional (FT) and female nontraditional (FNT). Results from these equations will be

TABLE IV

INDEPENDENT VARIABLES

Variable	1	0
NONTRAD	If nontraditional	If traditional
SEX	If female	If male
SEXTRAD	If female nontraditional	If otherwise
RACE	If nonwhite	If white
SCHTYP	If area vocational-technical center	If otherwise
DROP	If discontinued training before completion	If completed training
AG	If vocational agriculture	If otherwise
DE	If distributive education	If otherwise
HO	If health occupations	If otherwise
HERO	If home economics related occupations	If otherwise
OFFICE	If business and office	If otherwise
TI	If trade and industrial	If otherwise

AGE - student's age at the time of enrollment

PFEMHH - the percent of all households in a county which have female heads

TIME - the year of enrollment, ranging from 0 to 2

URBAN - the percent of population in a county residing in an urbanized area

PCEMP - the percent change in employment by county from 1970 to 1980

EVAL - the employer's rating of the individual's overall work performance on a five-point Likert scale

used to compare coefficients and to isolate differences in the way independent variables affect outcomes for the different groups. Technical difficulties with estimation due to the large sample sizes and the large number of independent variables preclude estimating many of the interaction terms directly.

Labor Market Outcomes. To determine differences in labor market outcomes, the following model will be estimated:

$$P(y_i = j) = F_{ij}(X^*,\theta) \quad \begin{matrix} i = 1, 2, \ldots, n \\ j = 1, 2, 3, 4 \end{matrix} \qquad \text{(Equation 2)}$$

where i is the i-th individual and j is the j-th outcome as defined in Table III. The dependent variable is the logarithm of the odds that a particular outcome will result with reference to another outcome; for example, $\log \frac{P_2}{P_1}$, $\log \frac{P_3}{P_1}$, $\log \frac{P_4}{P_1}$. θ is a vector of parameters and X* is a vector of independent variables which affect labor market outcomes, including nontraditionality, sex, the interaction between sex and traditionality, race, age, school type, urbanness, percent change in employment, percent female heads of household, time, and occupational area. Each equation presumes that the logarithm of the odds of being in one group relative to a second group is a linear function of the independent variables. Statements for $\log \frac{P_3}{P_2}$ (for example) can be derived in the following manner:

$$\alpha_{32} = \alpha_{31} - \alpha_{21}$$

$$\beta_{32} = \beta_{31} - \beta_{21}$$

and so on. The basic equation will be estimated separately for

traditional, nontraditonal, male traditional, male nontraditional, female traditional and female nontraditional groups. The results from these equations will be used in the manner previously described.

Wages. Finally, the following multiple regression model will be estimated for students who obtained training-related employment.

$$\begin{aligned} ADJWAGE = {} & B_0 + B_1 NONTRAD + B_2 SEX + B_3 SEXTRAD + B_4 RACE \\ & + B_5 SEXRACE + B_6 AGE + B_7 TYPSCH + B_8 URBAN \\ & + B_9 PCEMP + B_{10} EVAL + B_{11} DROP + B_{12} TIME \\ & + B_{13} AG + B_{14} DE + B_{15} HERO + B_{16} OFFICE \\ & + B_{17} HO + B_{18} TI \end{aligned} \quad \text{(Equation 3)}$$

where the adjusted wage is the reported hourly wage adjusted for increases in the nominal wage over the period and the independent variables are described in Table IV. This specification of the wage equation is unique in that the EVAL variable provides a direct measure of the employer's evaluation of the employee's overall quality of work. Since this particular sample does not include college graduates, education can be adequately controlled with a dummy variable reflecting high school completion or noncompletion. Job experience, usually found to be a significant determinant of earnings, is also omitted since the precedent training is considered to be pre-employment or entry-level training. The hypothesis that there is no significant difference between the wages of persons employed in sex-typical and sex-atypical occupations can be tested by testing the null hypothesis that $B_1 = 0$.

Some General Limitations

No explicit attempt is made to control for any personality or psychological differences which might predispose nontraditional students to either success or failure in the labor market. First, this data source does not contain data on aptitudes, psychological profiles, or attitudinal measures. Second, the literature is divided on the extent to which traditional and nontraditional students differ psychologically, if at all (Crawford, 1978; Walshok, 1981; Lederer, 1979; and Heller, 1979). Third, the fact that there has been wide-scale recruiting might suggest that students now choosing nontraditional training would have, without the policy intervention, been in the traditional groups. Nevertheless, some students do choose nontraditional occupations while others do not, and to simply ignore such motivational phenomena as aspirations, attitude toward risk and perception of occupational attractiveness is probably not without cost (Laws, 1976). Moreover, it is impossible, within the scope of this research, to control for the possible existence of discrimination which nontraditional job aspirants might encounter, although the URBAN and TIME variables may provide some control in this regard.

Finally, follow-up data were collected approximately one year following scheduled termination of training. If it takes a longer (or shorter) period of time to secure nontraditional employment relative to traditional employment, the results of the analysis may be sensitive to the timing of the follow-up survey.

CHAPTER IV

EMPIRICAL RESULTS

Introduction

This chapter presents and discusses the results of the empirical analysis. The results for training outcomes (equation 1) are presented first, followed by the results for labor market outcomes (equation 2) and wage outcomes (equation 3).

Training Outcomes

Equation 1 was estimated for 10,200 students randomly selected from among those who either completed or dropped out of a sex traditional vocational program during the three year period, 1978-1981. The basic equation was also estimated separately for traditional students, nontraditional students, traditional males, nontraditional males, traditional females, and nontraditional females. Results are summarized in Table V.

As indicated in Table V, being of the nontraditional sex had the expected negative impact on completing the training sequence. However, the coefficient on the sex-nontraditional interaction term was positive indicating being female enhanced the probability that a nontraditional student would complete training. Sex, race, age, school type, concentration of female-headed households, time, and occupational

TABLE V

TRAINING OUTCOMES

Group	Intercept	NONTRAD	SEX	SEXTRAD	RACE	AGE	SCHTYP	PFEMHH	TIME	AG	DE	HO	HERO	OFFICE	TI
All N=10220 Model χ^2 =586.13***	1.342***	-.504***	-.463***	.552**	-.170***	.012***	-.410***	.017*	-.053*	-.598***		.382***	- .893***	.104	-1.003***
Trad's N=5303 Model χ^2 =283.32***	1.704***		-.323*		-.131$^+$	.004	-.270***	-.007	-.072*	-.426*		.442**	-1.139***	.122	- .932***
Nontrad's N=4917 Model χ^2 =310.64***	.277		.339		-.232**	.028***	-.581***	.041***	-.023	-.832***		.289	- .629***	.082	-1.201***
MNT N=1916 Model χ^2 =95.00***	.810**				-.215$^+$	-.014	-.380**	.043*	.111$^+$		.042	.326$^+$	- .687***		
FNT N=3001 Model χ^2 =160.02***	-.504*				-.337**	.046***	-.918***	.038*	-.096*	.121					
MT N=2076 Model χ^2 =77.04***	-.335				-.430***	.048***	-.256*	.009	-.010	.554***					
FT N=3227 Model χ^2 =154.85***	1.738***				-.017	-.011*	-.278**	-.028$^+$	-.107*		.075	.506***	-1.126***		

$^+$P = .10, *P = .05, **P = .01, ***P = .001

area were shown to be significant determinants of training outcome.

Table V also contains evidence of the differential impact of demographic, institutional and environmental factors on the different groups. While being female significantly reduced the probability of completion for the traditional group, it had a positive (although not significant) impact on completion for the nontraditional group. This difference may reflect the greater expected benefits from nontraditional training relative to traditional training. Belonging to a racial minority group generally had the expected negative impact on outcome, but some differences among groups are noted. Specifically, an examination of the race coefficient reveals no significant negative effect (at the .05 level) for nontraditional males and traditional females--that is males and females enrolled in traditionally female occupational training programs. This is in strong contrast to the pronounced negative effect for nontraditional females and traditional males--the males and females enrolled in male traditional programs. Racial discrimination, thought to be severe within the skilled trades, may be reflected in lower probabilities of completion.

Maturity, to the extent that it is reflected by chronological age, improves the probability that the nontraditional student will complete the training sequence, but once again interesting differences appear among groups. For males (MT) and females (FNT) in male-oriented curricula, there is a strong positive relationship between age and completion; however for males (MNT) and females (FT) in female-oriented curricula, the relationship is weaker and negative. So while being older enhances the probability of completion for students in male traditional programs, it seems to deter completion in female

traditional programs. This result is consistent with a rational approach to career choice as students of both sexes become more cognizant as they mature of the higher expected benefits from male-oriented training and the lower expected returns from female-oriented training.

Contrary to the prediction of Chapter III, regardless of group those students trained in area vocational-technical centers displayed lower probabilities of completion than those displayed by students trained in comprehensive high schools. It was hypothesized that the more elaborate support functions, such as formal job counseling and remedial learning labs, available in the vo-tech centers would facilitate completion. It was further argued in Chapter III that these support systems would be particularly important for nontraditional students. Moreover, extensive efforts had been made to accommodate nontraditional students in the area vocational-technical schools. In view of these factors, the strength and direction of the AVTS effect for nontraditional females is puzzling.

As hypothesized, the concentration of female-headed households in the training locale was positively related to completion for the nontraditional group. However, the differential impact of the variable, PFEMHH, merits attention. Only the coefficient for traditional males was insignificant; the coefficient was significant and positive for both nontraditional males and nontraditional females and significant and negative for traditional females. In the case of nontraditional females, the positive effect was expected as females exposed to the realities of supporting a family on typical female earnings opt for the higher paying male occupations. The results for traditional females provide additional evidence that females become disillusioned

traditional female work and discontinue traditional training. The nature of the positive effect on male nontraditional completion is more obscure.

Turning to the occupational variables, the probability of completion was generally greater in health occupations and office occupations--training programs which are characterized as clean and have strong labor market demand. Nontraditional males appeared to have a reduced incidence of completion in the home economics related occupations (i.e., child care, clothing production and food production occupations). These programs are occupational areas in which stereotypic roles are likely to be quite strong. However, it should be noted that traditional females also experienced reduced completion in these occupational areas which are characterized by pay which is poor even by female occupational wage standards. In contrast, the strength of the positive relationship between enrollment in health occupations training and completion may be due in part to the fact that health occupations offer relatively high wages within the female wage structure.

While traditional males appeared to have higher rates of completion in vocational agriculture programs than in trade and industrial programs, nontraditional females appeared to do as well in either. Enrollment in vocational agriculture is sometimes considered avocational; if that is the case, it is an avocation which would appear to have more appeal to males than to females.

Labor Market Outcomes

Equation 2 was estimated for a sample of potential labor market

entrants (see Figure 1) from among the completers and leavers identified earlier. The basic equation was also estimated separately for traditional students, nontraditional students, traditional males, nontraditional males, traditional females and nontraditional females. These results are summarized in Tables VI and VII.

As indicated in Table VI, the negative impact of nontraditionality appears to be confined to a reduced probability of labor force participation (outcomes 2 vs. 1, 3 vs. 1, and 4 vs. 1). The interaction between sex and nontraditionality was positive but not significant at the .05 level. This reduction in participation appears to contradict Zellner's interpretation that women who choose nontraditional careers have strong tastes for market work. Clearly the reduced participation need not be viewed as adverse, however, it should not automatically be viewed as benign. Additional evidence is needed to determine if the lower participation results from personal choice or if it is indicative of a "discouraged worker" effect. Sex, race, age, school type, urbanness, time and occupational variables were found to have a significant impact on labor market outcomes. Percent change in employment (PCEMP) proposed as a proxy for labor market demand and percent female-headed households (PFEMHH) were not significant.

As predicted, the positive sex coefficient for the employed related vs. employed unrelated outcomes (4 vs. 3) reflects the more narrowly defined traditional female labor market. Note that the nontraditional females in the group, designated by the SEXTRAD interaction term, do not experience the higher probability of related-to-training placement.

TABLE VI

LABOR MARKET OUTCOMES
(ENTIRE GROUP)

Outcome Reference	Intercept	NONTRAD	SEX	SEXTRAD	RACE	AGE	SCHTYP	URBAN	PCEMP	PFEMHH	TIME	AG	HO	HERO	OFFICE	TI
2/1	.588	-.873^{+}	-1.835***	.859	.163	-.014	.380*	.001	.004	.019	.197*	- .513	-.533	-.335	-.365	-.672^{+}
3/1	2.611***	-.808*	-2.613***	.990^{+}	-.313*	-.020*	.109	.006**	.003	-.013	.129*	- .361	-.587*	-.124	.010	-.481^{+}
4/1	2.356***	-.987**	-2.191***	.599	-.353**	.018**	.352**	.010***	.004	-.014	.104^{+}	-1.178***	-.191	-.877***	-.179	-.987***
3/2	2.023***	.065	- .778*	:131	-.477**	-.006	-.271	.005	-.001	-.032	-.068	.152	-.054	.211	.375	.190
4/2	1.768**	-.114	- .356	-.260	-.517***	.032**	-.027	.009**	-.001	-.033	-.092	- .664^{+}	.341	-.542^{+}	.186	-.315
4/3	- .255	-.179	.422^{+}	-.391	-.040	.038***	.243*	.004*	.0003	-.001	-.024	- .816***	.395*	-.753***	-.189	-.506*

N = 4,250 Model Chi Square = 2439.06***
+P = .10, *P = .05, **P = .01, ***P = .001

Being older appeared to have a strong positive impact on the probability that a student would attain training-related employment (outcomes 4 vs. 1, 4 vs. 2, and 4 vs. 3). In contrast to the negative relationship between completion and type of school attended, students trained in area vocational-technical centers appeared to have the predicted advantage as reflected by higher probabilities of training-related placement.

Focusing next on the likelihood of being employed in an occupation related to one's training (outcome 4) vs. being employed in an occupation that is not related to one's training (outcome 3), these results support the contention that the probability of training-related employment is greater the more narrowly defined the occupational area. Also notice that enrolling in an occupational home economics or vocational agriculture program increases the likelihood of nonparticipation and of being employed in an occupation not related to training if participation does occur--a pattern consistent with an avocational approach to enrollment. However, it should be noted that the pattern for trade and industrial occupations is virtually identical to that for occupational home economics and vocational agriculture and the avocational explanation is intuitively less satisfying in the trade and industrial case.

Table VII shows similarities and differences between the traditional and nontraditional groups. Notably, females in both groups had lower probabilities of participation and employment than males. While being nonwhite reduced the probability of participation for the traditional group, minority status did not have a significant effect on participation for the nontraditional group. The reverse

TABLE VII

LABOR MARKET OUTCOMES
(SUBGROUPS)

Group	Outcome Reference	Intercept	SEX	RACE	AGE	SCHTYP	URBAN	PCEMP	PFEMHH	TIME	AG	HO	HERO	OFFICE	TI
TRAD	2/1	- .337	-1.570**	-.180	-.033*	.557*	-.006	.008	.133*	.450***	- .140	- .620	- .810	- .588	- .848
	3/1	2.981***	-2.654***	-.408*	-.042***	.073	.0001	.008+	.057	.228*	- .585	- .954*	- .531	- .524	-1.258**
	4/1	2.441***	-2.193***	-.498**	-.024**	.174	.003	.008*	.064+	.098	- .688	.352	- .949*	.300	- .924*
	3/2	3.318*	-1.084*	-.227	-.009	-.485+	.006	-.0006	-.076	-.222+	- .445	- .344	.279	.064	- .409
	4/2	2.777*	- .623	-.317	.009	-.384	.009*	.00003	-.069	-.352*	- .548	.972*	- .139	.888*	- .076
	4/3	- .541	.461	-.090	.018+	.101	.003	.0006	.007	-.130*	- .103	1.306*	- .419	.824*	.334
NONTRAD	2/1	.431	-1.041+	.432+	.006	.173	.005	.002	-.062	-.006	- .599	- .866	- .198	- .787	- .760
	3/1	2.028**	-2.095***	-.292	.003	.118	.008**	.0004	-.050	.063	- .127	- .836	- .199	- .518	- .230
	4/1	1.129*	-2.052***	-.268	.066***	.549**	.014***	.001	-.060	.136+	-1.235***	- .858+	-1.045*	-1.536***	-1.274***
	3/2	1.597*	-1.054*	-.724**	-.004	-.055	.003	-.002	.012	.069	.472	.031	- .001	.269	.531
	4/2	.698	-1.012*	-.700**	.060***	.376	.009*	-.001	.002	.142	- .636	.008	- .847*	- .749+	- .514
	4/3	- .899*	.043	.024	.064*	.431*	.006*	.001	-.010	.073	-1.108*	- .023	- .846*	-1.018*	-1.045*

Traditional Group, N = 2175, Model Chi Square = 1500.14***

Nontraditional Group, N=2075, Model Chi Square = 1086.93***

TABLE VII (CONTINUED)

GROUP	Outcome Reference	Intercept	RACE	AGE	SCHTYP	URBAN	PCEMP	PFEMHH	TIME	AG	DE	HO	HERO
MNT	2/1	.566	.041	-.048	-.341	.003	.006	-.055	.431+		.285	.269	.739
	3/1	3.733**	-.509	-.059**+	-.423	.006	-.006	-.078	.241		.020	.015	.327
	4/1	2.865*	-.659+	-.035+	-.212	.010	-.008+	-.071	.289		.780+	1.146*	.467
	3/2	3.167**	-.551	-.011	-.082	.003	-.012+	-.023	-.190		-.265	- .253	- .411
	4/2	2.299+	-.701*	.014	.129	.007	-.014*	-.016	-.142		.495	.877	- .272
	4/3	- .868	-.150	.024	.211	.005	-.002	.007	.048		.761***	1.131***	.139
FNT	2/1	-1.136	.511+	.018	.086	.005	-.004	-.060	-.131	.034			
	3/1	- .575	-.365	.013	.096	.008**	.0004	-.038	.035	.104			
	4/1	-2.830***	-.122	.090***	.555*	.017***	.006	-.076+	.117	.085			
	3/2	.560	-.877**	-.005	.009	.003	.004	.022	.166	.070			
	4/2	-1.69*	-.633*	.072***	.468	.012*	.009	-.016	.247+	.051			
	4/3	-2.250***	.244	.077***	.459+	.009*	.005	-.038	.082	-.019			
MT	2/1	-1.482	.026	-.096*	.556	-.009	.019	.245*	.513+	.647			
	3/1	2.583*	-.593	-.082**	-.161	-.007	.018+	.072	.203	.320			
	4/1	1.896+	-.627	-.052*	.359	-.002	.018+	.082	-.00009	.215			
	3/2	4.065***	-.619+	.015	-.717+	.003	.0001	-.173*	-.309+	-.327			
	4/2	3.378**	-.653+	.044	-.197	.007	-.0007	-.163*	-.513**	-.433			
	4/3	- .687	-.034	.029	.521**	.004	-.0009	.010	-.203*	-.106			
FT	2/1	-1.750*	-.291	-.022	.509	-.005	.006	.060	.367**		.656	- .007	- .110
	3/1	- .837	-.373+	-.033**	.360	.004	.005	.065	.184		.544	- .462+	.055
	4/1	.321	-.508**	-.016+	.127	.004	.008+	.059	.117		-.187	.165	-1.085***
	3/2	.913	-.082	-.011	-.149	.009*	-.0009	.004	-.183		-.113	- .456	.165
	4/2	2.072**	-.217	.006	-.382	.009*	.001	-.001	-.249+		-.844*	.171	- .975**
	4/3	1.159*	-.135	.017	-.233	-.00002	.002	-.005	-.066		-.731**	.627**	-1.140***

Male Nontraditional Group, N = 873, Model Chi Square = 704.57*** Female Nontraditional Group, N = 1202, Model Chi Square = 434.06***

Male Traditional Group, N = 876, Model Chi Square = 675.70*** Female Traditional Group, N = 1299, Model Chi Square = 832.63***

+P = .10, *P = .05, **P = .01, ***P = .001

is observed for employment, with minority students in the nontraditional group exhibiting higher probabilities of unemployment while race had no significant effect on the probabilities of employment for those in the traditional group. It could be that minorities in nontraditional occupations experience relatively greater employment discrimination and/or that nontraditional minorities have a stronger attachment to the labor force than traditional minorities.

Recall that the URBAN variable was used as a proxy for social attitudes. Sex role stereotyping and sex bias were argued to be less severe in the more "open" urban areas than in the more "closed" rural areas of the state. Consistent with this hypothesis, nontraditional students trained in more urbanized areas had higher probabilities of participation and training-related employment. The TIME coefficient also suggests an improvement in labor market outcomes for nontraditional students, particularly when contrasted with a deterioration in outcomes for traditional students. Age, school type, and occupational area are shown to have a differential impact on labor market outcomes for the two groups.

Table VII also facilitates comparison of the four sex-traditionality groups. It has been asserted that minority females are subject to both race and sex discrimination--that they are victims of a "double whammy." On the other hand, it has been suggested that employers forced to hire women and minorities under affirmative action guidelines might rationally seek out minority females. Notably, race was not found to be a significant determinant of unemployment (outcomes 3 vs. 2 and 4 vs. 2) for the traditional female group, while nonwhites in the nontraditional groups and in the male traditional

group had higher probabilities of unemployment. These results do not support a "double-counting" phenomenon. Further, they suggest that any "double-whammy" effect in this population is confined to nontraditional females.

Being older and being in an urban area significantly improved the nontraditional female's chances of being employed in an occupation which was related to her training (outcomes 4 vs. 2 and 4 vs. 3), but had no significant impact on those outcomes for the other three groups. Receiving training in an area vocational-technical center enhanced the chances that students in the traditionally male programs would be employed in training-related occupations if they were employed (outcome 4 vs. 3). School type did not appear to be a significant factor in the placement of students in the traditionally female programs. A possible explanation is the relative superiority of training in traditionally male programs in the area vocational-technical school setting. Another possibility is that industrial coordinators, who are usually male, focus their efforts on employers that hire students trained in traditional male areas--that is, it is possible that the industrial coordinators spend more time placing welders, carpenters, and mechanics than they do placing secretaries, nurses, and child care workers.

Surprisingly an increase in employment had a negative impact on the employment (outcomes 3 vs. 2 and 4 vs. 2) of nontraditional males and no significant impact on the employability of the other groups. While much of the growth in employment has been in traditionally female jobs, this growth in employment has been accompanied by a dramatic increase in the labor force participation of married women.

Both the young females and the young males in the traditional female programs had to compete with large numbers of new labor market entrants for available positions. There is some evidence from this sample that the nontraditional males had a competitive disadvantage.

The PFEMHH variable yields confusing and sometimes inexplicable results. The competition argument advanced above could be applied to traditional males in this case; that is, the increasing penetration of females into male-dominated occupations could have increased the competition experienced by these young males. However, the relatively small absolute numbers of women entering male traditional occupations make this explanation less likely in this instance.

Given the general deterioration in employment outcomes (4 vs. 2 and 3 vs. 2) over time for the other three groups, the small gains for nontraditional females appear to indicate some break down in barriers to female nontraditional employment over a relatively short period of time.

Finally, consider the occupational variables. No significant differences between occupational areas were found for the traditional males or for the nontraditional females. However, results for the nontraditional males and traditional females help to clarify the pattern which emerged for the entire group. There is additional evidence here that females do indeed approach the choice of a home economics related program avocationally. Participation in those programs significantly reduces the probability of labor force participation and the probability of training-related employment if participation does occur. In marked contrast, these effects are nonexistent for the males enrolled in these programs. Being enrolled in a

distributive education program enhanced the chances that a nontraditional male would be employed in a related-to-training occupation, but reduced the chances that a traditional female would be employed in a related occupation.

Wage Outcomes

Equation 3 was estimated for all 10,009 students who were reported to be employed in occupations related to their training. The basic equation was also estimated separately for traditional students, nontraditional students, males, females, traditional males, traditional females, nontraditional males and nontraditional females. The results are displayed in Table VIII.

As indicated in Table VIII, the coefficients estimated for all of the variables are significant and have the expected sign. As expected, there is evidence of a significant wage penalty for females, almost $.92 an hour. However, the females employed in nontraditional occupations recover almost half of the penalty, around $.45 an hour.

Table VIII also reveals some interesting differences between groups. Comparing the traditional and nontraditional groups, notice that the sex differential is lower, but not appreciably so, for the nontraditional group. Moreover, keep in mind that this result is attributed both to the expected higher earnings for nontraditional females and the expected lower earnings for nontraditional males relative to the traditional group. Also notice that a higher job rating translates into significantly higher wages only for the traditional group.

TABLE VIII

WAGE OUTCOMES

Variable	All N=10,009	Traditional N=9494	Nontraditional N=515	MNT N=343	FNT N=172	MT N=4312	FT N=5182	Males N=4655	Females N=5354
Intercept	3.404***	3.337***	4.182***	3.763***	3.340***	3.584***	2.241***	3.732***	2.249***
NONTRAD	- .311**							- .021	.391***
SEX	- .916***	- .970***	- .885**						
SEXTRAD	.447*								
RACE	- .421***	- .415***	- .420*	- .417*	- .100	- .421***	- .123***	- .427***	- .127***
SEXRACE	.303***	.302***	.143						
AGE	.020***	.020***	.010	.020	.010	.033***	.019***	.031***	.018***
SCHTYP	.160***	.157***	.339*	- .071	1.174***	.498***	.052*	.408***	.070**
URBAN	.0035***	.0038***	-.0009	.0015	- .0033	- .0013	.0081***	-.0010	.0075***
PCEMP	.0023***	.0022***	.0036	- .0001	.0085*	.0019	.0022***	.0017	.0027***
EVAL	.143***	.150***	.031	.007	.070	.195***	.121***	.184***	.117***
DROP	- .105*	- .119**	.122	.112	.090	.0015	- .253***	.0021	- .217***

TABLE VIII (CONTINUED)

Variable	All N=10,009	Traditional N=9494	Nontraditional N=515	MNT N=343	FNT N=172	MT N=4312	FT N=5182	Males N=4655	Females N=5354
AG	.452***	.511***	- .286		- .739*	.092		.013	- .454**
DE				.353+			.0027	- .476***	.015
HO	.310***	.411***	- .484*	.166			.542***	-1.110***	.557***
HERO	- .629***	- .603***	- .754***	- .208			- .487***	-1.246**	- .476***
OFFICE	- .157*	- .081	- .527**					-1.053***	
TI	.594***	.610***	1.000**						.681***
R^2	.2199	.2262	.1367	.0622	.3009	.0293	.2034	.0479	.2199
F	176.08***	197.91***	5.66***	2.20*	8.77***	16.26***	132.04***	17.97***	115.77***

+P = .10, *P = .05, **P = .01, ***P = .001

Focusing next on the results for males and females, pursuing a nontraditional occupation had a significant, positive independent effect on earnings for females but no significant independent effect for males. Similarly, being in an urbanized, high growth area had a positive impact on female earnings but was not significant for the male group. Conversely, dropping out of school was negative for females and not significant for males.

A further breakdown of groups indicates that nonwhites, with the exception of those in the nontraditional female group, have an earnings disadvantage. Also notice the particularly strong positive impact of area vocational-technical school training on the earnings of nontraditional females. While the advantages of being in an urban area appear to accrue only to traditional females, employment growth is positive for both groups of females. Similarly the wage penalty for dropping out is found only in the traditional female group. The interpretation of this result is not clear since higher wages for the other three groups may have enticed male and nontraditional females to enter the labor force prior to the completion of their educations. Finally, being employed in an agricultural occupation was negatively related to earnings for females, but not for males.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The major objective of this research was to examine training, labor market, and wage outcomes for vocational students pursuing occupational objectives that are traditionally identified as male-oriented or female-oriented. More specifically, this research attempted to discern whether there were significant differences in the post-training experiences of students of the traditional gender and those of the nontraditional gender.

Following a review of the literature, three models were developed to explain (1) training outcomes, (2) labor market outcomes which were defined as not in the labor force, unemployed, employed in an occupation not related to training, and employed in an occupation related to training and (3) wages. The first two models had qualitative dependent variables and were estimated using multiple logit. The third model was estimated with ordinary least squares regression.

The empirical analysis revealed that being in the nontraditional group (1) significantly reduced the probability that a student would complete the training sequence and (2) significantly reduced the probability that a student would be in the labor market. In addition, for those persons employed in occupations for which they trained, being in the nontraditional group significantly reduced wages. However, a sex/

nontraditional interaction term revealed that the interaction between being female and being nontraditional was positive for both program completion and wages.

The relevant chi square and F statistics for the models were all significant at the .05 level or beyond. The coefficients for the individual, institutional, social and economic variables generally had the expected sign and t statistics indicated that sex, race, age, school type, percent change in employment, percent female-headed households, time, and occupation were significant determinants of training outcomes. Sex, race, age, school type urbanism, time, and occupation were significant determinants of labor market outcomes. Sex, race, age, school type, urbanism, percent change in employment, performance evaluation, and occupation were significant determinants of wages.

Compared to the traditional group, the training outcomes for the nontraditional group were more sensitive to the impact of race, age, school setting, and the percent of female-headed households in the locale. In contrast, the wage outcomes for the nontraditional group were less sensitive to sex, age, urbanism, change in employment, performance evaluation, and school completion. The differential impact of the independent variables on labor market outcomes revealed a rather complex pattern (see Table VII). On balance, the results support the following generalizations:

1. Race has a greater negative impact on the labor force participation of students in the traditional group and a greater negative impact on the employment of students in the nontraditional group.

2. Age is negatively associated with labor force participation for the traditional group and positively (but not always significantly) associated with labor force participation for the nontraditional group.
3. An urban setting was a significant positive factor in the labor market outcomes of the nontraditional group, but not significant in the outcomes of the traditional group.
4. Outcomes for the traditional group were more sensitive to time than were outcomes for the nontraditional group.

Conclusions

The substantial male-female earnings gap continues to be the focus of public concern and public policy. Recognizing that the narrowly prescribed "equal pay for equal work" law could have little impact on relative earnings given the existing occupational distribution of men and women, researchers have recommended policies promoting occupational desegregation. Recall specifically Stevenson's (1975) recommendation that government funds be legislated for programs to inform school counselors about the disadvantages of traditional sex-stereotyped training programs and Oaxaca's (1973) endorsement of wide-scale, publically-supported recruitment and training programs to move women into the better paying, male-dominated occupations. For males and females interested in sex-nontraditional vocational careers, lack of training has been a major barrier to employment. It has been presumed that removal of the training barrier will facilitate employment in nontraditional occupations and that nontraditionally-employed females will share an earnings advantage in higher paying male jobs.

Results of this research suggest that nontraditional students have a reduced probability of completing a vocational training sequence, with nontraditional females faring better than nontraditional males and that nontraditional students have a reduced probability of labor force participation.

The wage analysis confirms that the choice of a female-dominated occupation had a negative impact on male earnings and that the choice of a male-dominated trade and industrial occupation had a positive impact on female earnings. However, the choice of a male-dominated agriculture related occupation had a negative impact on female earnings. Moreover, the regression for the nontraditional group, that is the group of males employed in "low paying" female occupations and females employed in "high paying" male occupations, indicated that even in this group, being female still had a substantial and significant negative impact on earnings. Further, these regressions suggest that pay for individuals in the nontraditional group is not directly related to job performance.

This research also verifies the importance of individual, institutional, economic, and social factors in determining the outcomes of pursuing a sex-nontraditional career choice. While race had a particular deleterious impact on program completion and labor force participation of nontraditional females, no significant racial penalty was found for earnings in the female nontraditional group, a marked deviation from the experience of nonwhites in the other groups. Age seemed to enhance the nontraditional female's probability of success while the younger nontraditional males fared better.

Among the social factors considered, an urban environment and

greater concentration of female-headed households in the local area contributed to desirable outcomes for nontraditional females. It was argued that an urban environment would be more conducive to accommodating social change and nonstereotypic roles. The impact of a larger proportion of female-headed households may operate through helping to discredit the "Cinderella Myth," that is the unrealistic belief of females that they will always have a male provider and hence their own income-earning potential is not important. In addition, there is evidence in the literature that unmarried females with dependent children are a major group of "blue-collar pioneers." To the extent some initial employment barriers may have been overcome previously.

Finally, this research confirms the importance of school setting in the outcomes of nontraditional training. While the probability of program completion was lower in the area vocational-technical schools, nontraditional females trained at the vo-tech centers were more likely to obtain training-related employment and earned significantly higher wages than the nontraditional females trained in other settings.

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APPENDIX

TABLE IX

NON-SEX TRADITIONAL OCCUPATIONAL OBJECTIVES

Code	Occupational Objective	Total	Total Female	Percent Female
Vocational Agriculture				
010500	Ornamental Horticulture	1,682	554	32.9
Distributive Education				
040100	Advertising Services	69	38	55.1
040400	Finance and Credit	205	144	70.2
040700	Food Services	626	432	69.0
040800	General Merchandising	817	468	57.3
041100	Home Furnishings	77	43	55.8
041300	Insurance	13	4	30.8
041400	International Trade	10	5	50.0
041500	Personal Services	249	180	72.3
041700	Real Estate	1,780	929	52.2
041800	Recreation and Tourism	103	49	47.6
042000	Retail Trade, Other	409	249	60.9
Health Occupations				
070501	Radiologic Technician	146	89	60.9
070903	Inhalation Theraphy	48	31	64.6
070907	Medical Emergency Tech	97	36	37.1
Business and Office				
140201	Computer Operator	61	22	36.1
140203	Computer Programmer	413	174	42.1
140500	Materials Support	4	2	50.0
140800	Supervisory & Adminis.	1,118	375	33.5
Trade and Industrial				
170700	Commercial Art	1,227	659	53.7
170900	Commercial Photography	50	30	60.0
171600	Fabric Maintenance	36	20	55.6
171900	Graphic Arts	1,008	457	45.3

TABLE IX (CONTINUED)

Code	Occupational Objective	Total	Total Female	Percent Female
Trade and Industrial (Continued)				
172901	Quantity Foods	584	316	54.1
173300	Textile Production	40	18	45.0
173500	Upholstery	803	520	64.8

Source: "Enrollment in Vocational Education Programs, 1977-78" Unpublished federal report submitted by the Oklahoma State Department of Vocational and Technical Education, 1979

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