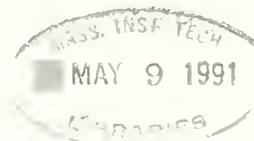RACE AND GENDER DIFFERENCES IN PRIVATE SECTOR
TRAINING FOR YOUNG WORKERS

by

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I.   Introduction

     While there have been numerous studies devoted to examining the impact of
governmental training programs on workers who have experienced difficulties in
the labor market, there has been remarkably little research on the actual
occurrence and consequences of training provided by the private sector. Apart
from the difficulty of measuring exactly how much is spent each year by firms
on training, we know little about who receives training, what types of
training programs are provided and where, the degree of firm specificity and
portability of firm provided training, and the impact of training on the
productivity and consequently on the wages and wage growth of workers. Due to
the lack of appropriate data, few researchers have been able to examine
directly the characteristics of private sector training and many have had to
infer the impact of this source of human capital from the shape of wage
profiles. Given the potential long term consequences of training (or lack of)
in the early years of a worker's labor market experience, this paper focuses
on the early training experience of young workers and the impact of this on
their productivity and wages. In particular, this study examines how the
experience with private sector training varies by race and gender and how this
may explain the persistent wage gap between blacks and whites and males and
females.

     Some of the few empirical studies on the returns to private sector
training using actual measures of training rather than inferring training from
the shapes of wage profiles include Duncan and Hoffman (1979), Mincer (1988),
Brown (1983), Lillard and Tan (1986), Pergamit and Shack-Marquez (1986), and
Barron et. al. (1987). Unfortunately, each of these studies is subject to
different limitations. Some of the more critical issues include the lack of

complete employment, training and schooling histories on individuals in the various surveys, difficulties in actually measuring the amount of private sector training the respondent received, and problems in distinguishing firm-specific from general types of training. Few of the surveys used for the analyses actually asked about the training the respondent had acquired on the current and past jobs. For example, the question from the Panel Study of Income Dynamics, PSID, on training is how long it took the "average" person to become qualified for the job, not how long the respondent actually took to become qualified. In the older National Longitudinal Survey, NLS, cohorts, training is measured as training received or used on the current job, therefore, one is not able to observe when the training actually took place or other types of training undertaken by the respondent.

It is possible to overcome many of these problems and gain new insights into training in the U.S. using data from the new NLS youth cohort. This data allows one to reconstruct the entire training history for each individual including the occurrence and length of each training spell. Moreover, the data is particularly useful in distinguishing between different sources of private sector training (on-the-job training, training received outside the firm or off-the-job training, and apprenticeships). This paper analyzes how personal characteristics including employment histories and local demand conditions determine the probability of receiving training and its effect on wages and wage growth of young workers. More specifically, this paper focuses on the existence of differentials in the private sector training experience by race and sex.

II. The Theoretical Framework

In order to measure the true impact of training on wages of young workers it is necessary to first examine the characteristics of those individuals who actually receive training. It is unlikely that individuals are randomly assigned to training. The decision of whether or not to acquire training by an individual worker or to place a worker in a firm provided training program can be described in terms of an index function. Let NB_i be an index of net benefits to the appropriate decision maker (the individual worker or the firm) of either OJT, off-the-job training, or an apprenticeship:

$$NB_i = Z'_i \theta + v_i \tag{1}$$

where Z' is a vector of individual characteristics. An individual experiences training if $NB_i > 0$, otherwise there will be no investment in training. There are a variety of factors which might influence an individual's probability of having some training such as their work experience, and educational background. For firm specific training it is more likely that a firm will invest in those individuals who appear more attached to the workforce and the firm. Therefore, tenure on the job, total work experience and demographic factors may be expected to influence the firm's decision on training.

The impact of on-the-job training on wages has been examined in the context of black/white wage differentials by both Duncan and Hoffman (1979) and Lazear (1979). The narrowing of the black/white and male/female wage differentials since the passage of affirmative action legislation has been especially true for young workers. But as Lazear (1979) discussed, employers may have responded to affirmative action legislation by paying higher wages to women and blacks while reducing the amount of on-the-job training provided to

these groups. In Lazear's model there is an assumption that employers may have been discriminating in wages before affirmative action legislation but not in training so that when the legislation is passed they "switch" the discrimination from wages to training. It may be possible, however, that the employers were discriminating in both wages and training before affirmative action legislation so that what we observe after affirmative action legislation is similar starting wages for blacks and whites and males and females, but a widening gap in earnings as the groups are given training at different rates. If employers refuse to invest in certain groups of workers because they believe these groups are less attached to their jobs, this differential pattern in human capital investment becomes very important in explaining long term black/white and male/female earning differences. In addition, women and blacks may have responded to not receiving on-the-job training by obtaining "visible off-the-job" training to improve their productivity and to signal their commitment to the workplace. There is certainly some evidence of this type of behavior in the schooling decisions of blacks (see Lang and Ruud (1986)). All of this implies that we might observe women and blacks receiving less on-the-job training or apprenticeships but perhaps more off-the-job training than white males.

After examining the patterns of acquisition of training it is then possible to analyze the impact of training on wages and wage growth. As a worker acquires more training there should be an increase in the individual's productivity and consequently in their earnings. If there is no explanation for wage growth other than productivity enhancing training, then tenure on the job should have little impact on wages once training has been controlled for. If instead, there are other factors which influence the growth of wages, then tenure will continue to be significant even after including training. One

straightforward way to specify a wage equation to take these various factors into account and to examine the impact of race and sex is as follows:

$$\log w_t = X'_t B + T'_t \lambda + a_1 S_t + a_2 Exp_t + a_3 tenure + a_4 race + a_5 sex \quad (2)$$

where X'_t is a vector of individual characteristics and local demand conditions, T' is a vector containing information on the occurrence and total number of weeks of different types of training received from the private sector, S is the highest grade of schooling completed, EXP is total work experience and tenure is total work experience with the current employer.

Given the detailed nature of the training data used in this paper the vector of training variables T' contains information on on-the-job training (OJT), training received outside the firm or "off-the-job" training (OFF), and apprenticeships (APPT). The specification of equation 2 allows for each of these three types of training to have different returns. Since the data is also longitudinal it is also possible to distinguish between spells of training in each of these categories received during employment with a previous employer and spells received during current employment. This means that the training vector, T', will include:

$$T_t = [\text{Time in OJT, OFF and APPT in previous employers, Time in spells of OJT, OFF, and APPT from current employer, DOFF, DOJT, DAPPT]} \quad (3)$$

All of these variables are measured in weeks with the exception of the last three dummy variables that are equal to 1 if the individual ever had the particular type of training and 0 otherwise.

III. The Data

The NLS youth cohort of 12,686 males and females (who were 14 to 21 years of age at the end of 1978) contains some of the most comprehensive data available on private sector training. Some of the questions respondents were asked included what types of training they had received over the survey year (they were asked about all spells not just the longest), and dates of training periods by source. The training spells had to be at least four weeks in length to be included. Potential sources of training included business college, nurses programs, apprenticeships, vocational and technical institutes, barber or beauty school, a correspondence course, and company training. All of these sources of training exclude training received through regular schooling programs. However, given the way in which the questions are asked it may be possible that the respondents are giving information only on formal training spells rather than more informal on-the-job training. For this reason, the tenure variable may be picking up both non-training related returns to seniority and returns to informal training.

Using a constructed weekly event history of private sector training, employment, and schooling it is possible to examine the patterns and outcomes of training for young U.S. workers. For the analysis presented in this paper a subsample of the 12,686 respondents has been selected. This sample is composed of individuals who had completed their schooling by the 1980 interview date and who were not in the military. In addition, these individuals had to have wage observations at both the 1980 and the 1983 interview dates. This restriction does not imply that the respondent had to be working at the interview date since this wage data is wages in current or last job over the survey year.

For the empirical work the training data has been separated into three categories - company training, apprenticeships, and training obtained outside

the firm. Training outside the firm or "off-the-job" training, includes training from business colleges, barber or beauty school, nurses program, vocational and technical institutes, and correspondence courses. The major source of training for the sample comes from "off-the-job" both in terms of the percentage of the sample (15%) who have experienced this type of training and the amount of time spent in this training (average number of weeks of training is 40). This is particularly true for women and nonwhites since approximately 80 percent of the women and nonwhites who had training had it in the form of off-the-job training while only 60 percent of the white males had their training off-the-job. The number of women and nonwhites who are in apprenticeship programs is small and this needs to be kept in mind when interpreting some of the results in the next section.

IV. Results

In Table 1 estimates of the probabilities of an individual receiving each of the three types of training are presented. Differentiating among these types of training reveals some interesting patterns especially by race and gender. The probability of investing in off-the-job training is lower if the youth is male or has longer tenure on the job. On the other hand, company provided on-the-job training is concentrated among white married unionized males with greater work experience. The most important determinants for participating in an apprenticeship are being white and unionized. These findings suggest that women and nonwhites are less likely to receive on-the-job training and women appear to respond to this by acquiring more off-the-job training. These results also show how racial and gender differences in the probability of receiving different types of training

persist even after controlling for industry and occupation. The industry most likely to provide OJT is manufacturing and the occupations most likely to have OJT include managers, sales workers, clerical workers, and craftsmen.

Keeping these differential patterns in the acquisition of training in mind, I now examine how these three types of training affect the wages of young workers. The determinants of the log wages of young workers will include factors such as race, gender, training, total work experience, tenure, schooling, the local unemployment rate, the number of jobs held since finishing school, whether or not the respondent lives in a city, marital status, whether or not they are covered by a collective agreement, health, and industry and occupation of employment. Only the coefficients on the race, gender, tenure, work experience, training and schooling variables are presented. (A complete listing of the estimated coefficients is available from the author.) I estimate a wage equation for hourly wages at the 1980 interview date and the 1983 interview date. The 1980 wages are very close to starting wages for most of the respondents in the sample. These results are reported in Table 2.

Equation 2 of Table 2 shows the significant role that training plays in wage determination for this sample by 1983. The size of the training effect is much larger than the size of the tenure effect. Periods of off-the-job training and apprenticeship training acquired before the current employer raise wages significantly. Weeks of on-the-job training with the current employer also raise wages.

The tenure variable is always significant and there are many factors which it may be capturing. Since the measures of training in the NLS are more likely to miss spells of informal training the tenure variable will pick up not only a "tenure" effect but also this informal training. Tenure could also

represent job match quality or reflect incentives provided to reduce shirking and/or turnover.

Nonwhites and women earn significantly less per hour than white males. This is true for both starting wages at 1980 and wages at 1983. The wage gap between nonwhites and whites and males and females widens over the 1980-1983 period of time. Given the high returns to training and the low probability of women and nonwhites receiving training on-the-job this widening gap may not be so surprising. Using the estimated coefficients from equation 2 of Table 2 it is possible to calculate hourly wage rates for different characteristics of the sample. The average hourly wage of a typical white male with no training is $5.88 an hour. If this male is nonwhite the wage drops to $5.43. However, if the white male has a spell of on-the-job training, his hourly wage rises to $6.69 representing a wage differential of 19 percent over the nonwhite male. The wage differential between a white male with training and a white female with no training is 28 percent and 31 percent for nonwhite females.

Before reaching any final conclusions on the basis of the results presented in Table 2 it is necessary to discuss possible sources of bias in the training estimates due to self-selection. Employers may only place employees in training programs who have some unobservable characteristic, "trainability", or individuals who are more motivated would be more likely to pursue off-the-job training. In either case the estimated coefficient on the various training variables will be biased upwards (i.e. a "treatment" selection problem). A formal treatment of this selection along the lines suggested by Heckman and Robb (1986) using a two step estimator (see Lynch (1988) for a discussion of this) was done and no results changed. The problem of treatment selection, therefore, may not be as critical for young workers receiving private sector training as it is for older workers or those on

government training programs.

V. Conclusions

This paper has shown that private sector training plays a significant role in the wage determination and career patterns of young workers in the U.S.. Specifically, when the probability of receiving private sector training is analyzed by different types (on-the-job training, off-the-job training, and apprenticeships) some very different patterns emerge especially by race and gender. Women and nonwhites are much less likely to receive training within a firm either through an apprenticeship or other forms of on-the-job training. When an equation is estimated for the determinants of hourly wages it is shown that training from the private sector raises wages significantly. However, since women and nonwhites are much less likely to receive training, especially on-the-job, their wages are much lower. This differential pattern in the acquisition of training by race and sex may be a partial explanation of the persistent wage gap between males and females and whites and nonwhites.

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TABLES

Table 1 Determinants of the Probability of Receiving Training by Type by 1983
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Variable	Off-the-Job Training Probit	On-the-Job Training Probit	Apprenticeship Probit
Constant	-2.11	-5.89	-8.08
	(-3.91)	(-5.53)	(-4.84)
Male	-0.33	0.62	0.52
	(-2.75)	(2.69)	(1.27)
Nonwhite	-0.08	-0.61	-1.07
	(-0.61)	(-2.10)	(-1.98)
Tenure	-0.002	-0.002	-0.001
	(-2.50)	(-1.68)	(-0.40)
Work Experience	0.002	0.006	0.004
	(2.00)	(2.72)	(1.33)
School	0.001	0.06	0.06
	(0.02)	(1.00)	(0.60)
Union	0.07	0.75	0.96
	(0.50)	(3.50)	(3.00)
Unemployment Rate	0.02	-0.04	0.008
	(1.71)	(-1.33)	(0.20)
Marry	0.06	0.35	-0.09
	(0.05)	(1.84)	(-0.28)
Turnover	0.001	0.03	0.10
	(0.05)	(0.88)	(2.14)
Industry dummies	yes	yes	yes
Occupation dummies	yes	yes	yes
Log Likelihood	-1289.62	-497.71	-226.26

Number of observations = 3183

Table 2   Determinants of Log Wages at 1980 and 1983 Interview Dates (N=3183)

Variable	Equation 1 1980 wages	Equation 2 1983 wages
Male	0.12	0.13
	(8.54)	(8.55)
Nonwhite	-0.04	-0.08
	(-2.86)	(-4.81)
Tenure (wks)	0.0008	0.0006
	(3.99)	(5.58)
Work Experience (wks)	0.002	0.001
	(8.36)	(10.04)
School	0.02	0.03
	(4.85)	(7.21)
Previous off-job training	0.0002	0.002
(wks)	(0.26)	(3.16)
Previous on-job training	-0.002	-0.0002
(wks)	(-0.96)	(-0.13)
Previous Apprenticeship	0.001	0.003
(wks)	(0.40)	(2.28)
Current off-job training	-0.0008	-0.0002
(wks)	(-0.59)	(-0.23)
Current on-job training	-0.0005	0.002
(wks)	(-0.21)	(1.87)
Current apprenticeship	0.002	0.001
(wks)	(0.89)	(1.06)
R squared	0.27	0.34

Other variables included in this estimation - constant, local unemployment
rate, number of job changes, and dummies for SMSA, health, marital status,
union, industry, occupation and dummy variables for the occurrence of OJT,
off-the-job training and apprenticeship.

Date Due