Adults Returning to School: Causes and Consequences

by

Lorraine Chen

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Signature of Author . . . . . .
Department of Economics
June 18, 1996

Certified by . . . . . .
Jörn-Steffen Pischke
Assistant Professor of Economics
Thesis Supervisor

Certified by . . . . . .
Joseph Tracy
Associate Professor of Economics, Columbia University
Thesis Supervisor

Accepted by . . . . . .
Peter Temin
Professor of Economics
Chairman, Departmental Graduate Committee

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Abstract

This thesis documents an upward trend in adult school enrollment since the 1970's and investigates the causes and wage effects of returning to school. Results provide support for the hypothesis that increases in the college/high school wage premium from the late 1970's to late 1980's induced adults to return to college. Additional analyses using longitudinal data suggest that females, nonwhites, single individuals, people who are more educated, those who live in areas with high unemployment rates, people with high AFQT scores, and those who received training in the previous year, are more likely to return to school. There is also evidence that company training and additional formal schooling may be complementary to each other. Furthermore, the results show that for those who returned to school, the returns to education (acquired both before and during the additional schooling spell) are lower than that for people who had continuous schooling, but the returns to experience are generally higher. These patterns are consistent with people making optimal educational choices according to the relative productivity of their time in market and educational investments.

Thesis Supervisor: Jörn-Steffen Pischke
Title: Assistant Professor of Economics

Thesis Supervisor: Joseph Tracy
Title: Associate Professor of Economics, Columbia University

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Variable	*Definition*
age	age at time of survey
black	= 1 if respondent is black
education	highest grade completed
female	= 1 if respondent is female
married	= 1 if respondent is married, spouse present or absent

1979-93 Current Population Survey Outgoing Rotation Groups File
1964-93 March Current Population Survey Annual Demographic Files

Variable	*Definition*
Agexx	= 1 for cells for age group xx
D19xx	= 1 for cells for the year 19xx
education	average education level in each year/age cell
female	percentage female in each year/age cell
married	percentage married in each year/age cell
nonwhite	percentage nonwhite in each year/age cell

Variable	*Definition*
student	percentage enrolled in school in each year/age cell
time	time trend that increments by one for each year
$\Delta(W_c/W_{hs})$	change in the college/high school wage ratio between year t and year of graduation from high school

National Longitudinal Survey of Youth

Variable	*Definition*
AFQT percentile score	Armed Forces Qualifications Test score
degrees - GED	General Education Diploma
AA	Associate or Junior College Degree
BA, BS	Bachelor's Degrees
MA, MBA, MS, MSW	Master's Degrees
PhD	Doctoral Degree
MD, LLD, DDS	Professional Degrees
dismissed / fired	= 1 if respondent was fired from most recent job
duration of unemployment	time since last worked
employed	= 1 if respondent is currently working
experience	actual years of work
experience prior to return	years of work before returning to school
experience since return	years of work since return to school

Variable	*Definition*
female	= 1 if respondent is female
full-time	= 1 if respondent works for >= 35 hours a week
grade prior to return	educational attainment before returning to school
highest grade completed	the highest grade completed and received credit for
elementary school	completed < 8 years of education
some high school	completed >= 8 but < 12 years of education
high school	completed 12 years of education
some college	completed > 12 but < 16 years of education
college	completed 16 years of education
post-college	completed > 16 years of education
kids present	= 1 if respondent has at least one child
laid off	= 1 if respondent was laid off from most recent job
local unemployment rate	unemployment rate of the local labor market
log(wage)	logarithm of the hourly wage
married	= 1 if respondent is married or remarried
nonwhite	= 1 if respondent is black or hispanic
no. of kids	the number of children the respondent has
no. of years since last enrolled	number of years since last enrolled in school
quit	= 1 if respondent quit from most recent job
tenure	actual number of years employed by current employer

Variable	*Definition*
training	programs that help individuals acquire skills or secure employment (non-diploma or non-degree-granting)
company training	(see Table 15 notes)
apprenticeship program	(see Table 15 notes)
other training	(see Table 15 notes)
classroom training - job skill	(see Table 19 notes)
classroom training - basic skill	(see Table 19 notes)
on-the-job training	(see Table 19 notes)
job search assistance	(see Table 19 notes)
work experience	(see Table 19 notes)
years of additional schooling	years of schooling completed during the return spell

INTRODUCTION

This thesis analyzes patterns in adult school enrollment and investigates the possible causes and wage implications of workers returning to school to acquire new skills. In the traditional human capital model (Ben Porath, 1967), it is optimal for people to undertake schooling investments early in life because of longer payoff periods and lower forgone earnings. It is not inconsistent with the human capital paradigm, though, to observe people returning to school at relatively older ages after a period of labor market experience.

A number of factors could produce discontinuous schooling patterns. First, unanticipated shocks might raise the returns to education or reduce the costs, leading to a reassessment of the desirability of additional schooling. For example, sectoral shifts or technological change might lead to skill depreciation and/or job loss, making it less costly for the worker to return to school. On the other hand, factors such as a rising skill premium, a phenomenon widely documented to have occurred between the late 1970's and the late 1980's (see Katz and Murphy, 1992; Juhn, Murphy, and Pearce, 1993), would encourage people to acquire additional schooling in order to reap the now higher returns. Second, people may reassess their ability and the benefits to them of additional schooling after a period of work. Third, individuals from poorer family backgrounds who left school early due to insufficient funds (or high borrowing rates) may be able to go back when years of labor market experience provide them with the needed funds or make it easier for them to obtain credit. Fourth, if labor market experience is a complementary input to further schooling, e.g. an MBA degree, a return to school in this case will be part of

an optimal lifecycle pattern of school investments, rather than the result of unanticipated events.[1]

The focus in this thesis will be on periods of regular schooling, which includes all schooling that leads to an elementary school certificate, high school diploma, college degree or graduate degree. While investment by adults in skill formation may occur in other venues, such as enrollment in vocational/technical programs or adult education classes, it is likely that the decision to invest in regular schooling and the resulting wage impact of these investments are distinct due to the more general nature of the skills and credentials acquired. Nevertheless, whether the different types of adult skill formation are distinct from each other, or whether they are complementary or substitutable investments, is essentially an empirical question and will be assessed in this study.

To date, relatively little attention has been given to the causes and/or consequences of adults returning to school.[2] The vast bulk of the literature on estimating the returns to education implicitly assumes that education is obtained continuously during an initial schooling period, which is then followed by a period of labor market participation. While the effects of discontinuous labor force participation have been incorporated in the wage determination literature by Mincer and Polachek (1974), and Mincer and Ofek (1982), the effects of discontinuous schooling patterns on wages have only been investigated in a small

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[1] In addition, people may return to school because of desired occupational change, or for purely consumption reasons. I will not evaluate these factors in this study.

[2] There has been some work in this area outside mainstream economics, by researchers who focus on issues relating to continuing education (see Babcock, 1974; Bondi, 1976; and Cranford and Connor, 1989).

number of studies (see Marcus, 1984; Light, 1995). Both Marcus and Light restrict their analysis to male respondents, so that to date there is little information on the effects of discontinuous schooling patterns on the wages of women, and the factors leading women to return to school.[3] There have also been relatively few studies of re-enrollment decisions (see Corman, 1983; Marcus, 1986; Spletzer, 1990; and Light, 1996, for the estimation of alternative models).

In the analysis that follows, returning to school is defined as people going back to school after a nontrivial period of nonschooling. A period of nonschooling is in turn defined as a period beginning with a decision to either dropout of school or to not further one's education, and ends with a decision to return to school in order to complete a previously started degree or to obtain additional credentials.

The thesis will be organized as follows. Chapter I provides a theoretical framework for analyzing the decision to return in school. Chapter II documents patterns in adult school enrollment over time using data from the Public Use Microdata Samples of the 1970, 1980, and 1990 Censuses of Population and Housing and the May 1984 Current Population Survey (CPS) Adult Education Supplement. The chapter also reports enrollment regressions using Census data, the results of which are consistent with an increase over time in adults returning for additional schooling. Chapter III uses information from the 1979-93 CPS Outgoing Rotation Groups File as well as earnings information from the 1964-93 March CPS Annual Demographic Files to examine the

[3] Two papers from the sociological literature have addressed these questions; see Davis and Bumpass (1976), and Felmlee (1988).

specific hypothesis that the increase in the college/high school wage differential from the late 1970's to the late 1980's induced adults to return to college. The rest of the study utilizes data from the 1979-92 National Longitudinal Survey of Youth. The longitudinal nature of the data set makes it possible to identify those who returned to school during the survey period. Chapter IV compares the characteristics of these people with those who had continuous schooling and provides some insights into why people return to school. Chapter V investigates the relationship between formal schooling and training, and the extent to which they are substitutes or are complementary to each other. Chapter VI explores the wage consequences of returning to school, as well as the differential rates of return to schooling and labor market experience for those who returned and those who were enrolled continuously. Finally, the concluding section discusses directions for future work.

Chapter I THEORETICAL FRAMEWORK

As mentioned in the introduction, people return to school for two main reasons: (1) Unanticipated economy-wide shocks, capital market constraints, or individuals' reassessment of their abilities after a period of work, lead them to conclude that additional schooling is now desirable or feasible, and (2) Instead of being an unanticipated decision, individuals may plan to return to school after working for a while if work experience increases the productivity of further schooling, e.g. an MBA degree. This section models the former following the traditional human capital approach. (The next section will model the latter.) In this section, I will first lay out the individual's original schooling decision and then analyze how changes in 1) the rate of return to schooling, 2) direct costs of schooling, 3) the opportunity cost of schooling, 4) borrowing rates, and 5) the individual's evaluation of his/her abilities, affect the decision of whether or not to return to school.

Returning to School as an Unanticipated Event

1. The original schooling decision

At time 0, the individual deciding how much schooling to obtain solves the following problem:

$$\max V_0 = \int_S^{S+N} wf(S)\, e^{-rt}\, dt - \int_0^S ce^{-rt}\, dt$$

or

$$\max \tilde{V} \equiv rV_0 = wf(S)e^{-rS}(1 - e^{-rN}) - c(1 - e^{-rS})$$

where S is amount of schooling, $f(S)$ is the human capital production function such that $f' > 0$ and $f'' < 0$, w is the wage rate per unit of human capital, r is the discount rate, c is the per period direct cost of schooling and N is the number of working years independent of years of schooling.

The optimal level schooling is therefore the one which solves

$$\frac{\partial \tilde{V}}{\partial S} = (wf'(S)e^{-rS} - rwf(S)e^{-rS})(1 - e^{-rN}) - rce^{-rS} = 0$$

or

$$wf'(S) = rwf(S) + \frac{1}{1 - e^{-rN}} \cdot rc \qquad (1)$$

or more intuitively, it is the level at which the marginal benefit of schooling equals the marginal cost.[4]

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[4] The second order condition is

$$\frac{\partial^2 \tilde{V}}{\partial S^2} = [\ (wf'' - rwf')e^{-rS} - r(wf' - rwf)e^{-rS}\ ]\ (1 - e^{-rN}) + r^2ce^{-rS}$$

$$= [\ (wf'' - 2rwf' + r^2wf)(1 - e^{-rN}) + r^2c\ ]\ e^{-rS}$$

Multiplying the first order condition by r

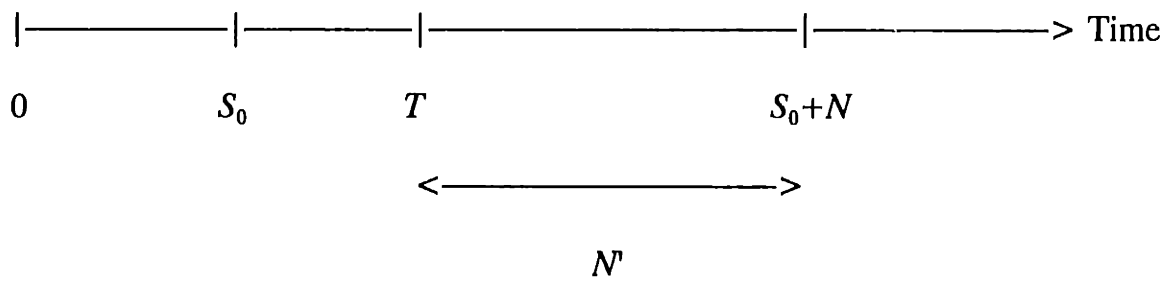
$$rwf' = r^2wf + \frac{1}{1 - e^{-rN}} \cdot r^2c$$

and substituting it into the second order condition yields

$$\frac{\partial^2 \tilde{V}}{\partial S^2} = (wf'' - rwf')(1 - e^{-rN})e^{-rS} < 0$$

2. The decision to return to school

Suppose the individual has completed S_0 years of schooling (that was chosen optimally) and we observe him/her at time T where $T > S_0$. Let $N' = S_0 + N - T$ be the remaining years of work.



The individual will return to school at time T if, by doing so, the present value of his/her income stream is greater than otherwise, or

$$\int_{\Delta S}^{\Delta S+N'} wf(S_0+\Delta S)e^{-rt}\,dt - \int_0^{\Delta S} ce^{-rt}\,dt > \int_0^{N'} wf(S_0)e^{-rt}\,dt$$

where ΔS denotes additional schooling.[5] The expression simplifies to

$$wf(S_0+\Delta S)e^{-r\Delta S}(1 - e^{-rN'}) - c(1 - e^{-r\Delta S}) > wf(S_0)(1 - e^{-rN'})$$

or

$$wf(S_0+\Delta S)e^{-r\Delta S}(1 - e^{-rN'}) - c(1 - e^{-r\Delta S}) - wf(S_0)(1 - e^{-rN'}) > 0$$

To analyze how changes in certain parameters affect the person's decision, define V such

[5] This analysis assumes that individuals return to school full-time.

that

$$V = wf(S_0+\Delta S)e^{-r\Delta S}(1 - e^{-rN'}) - c(1 - e^{-r\Delta S}) - wf(S_0)(1 - e^{-rN'}) \qquad (2)$$

If a change in a particular parameter increases V, it means that such a change will increase the person's likelihood of returning to school.

i) **Remaining working life** (N')

$$\frac{\partial V}{\partial N'} = rwf(S_0+\Delta S)e^{-r\Delta S}e^{-rN'} - rwf(S_0)e^{-rN'}$$

$$= rwe^{-rN'}(f(S_0+\Delta S)e^{-r\Delta S} - f(S_0))$$

To simplify the above expression, note that

$$f(S_0+\Delta S)e^{-r\Delta S} - f(S_0) \approx (f(S_0) + \Delta Sf'(S_0))e^{-r\Delta S} - f(S_0)$$

From equation (1),

$$f'(S_o) = rf(S_0) + \frac{1}{1 - e^{-rN}} \cdot \frac{rc}{w}$$

therefore,

$$f(S_0+\Delta S)e^{-r\Delta S} - f(S_0) \approx [\, f(S_0) + \Delta S(rf(S_0) + \frac{1}{1 - e^{-rN}} \cdot \frac{rc}{w})\,]\, e^{-r\Delta S} - f(S_0)$$

$$= f(S_0)(1 + r\Delta S)e^{-r\Delta S} - f(S_0) + \frac{e^{-r\Delta S}}{1 - e^{-rN}} \cdot \Delta S \cdot \frac{rc}{w}$$

And since

$$e^{-r\Delta S} \approx \frac{1}{1 + r\Delta S}$$

it follows that

$$f(S_0 + \Delta S)e^{-r\Delta S} - f(S_0) = \frac{e^{-r\Delta S}}{1 - e^{-rN}} \cdot \Delta S \cdot \frac{rc}{w} \qquad (3)$$

and hence

$$\frac{\partial V}{\partial N'} = \frac{e^{-r\Delta S}e^{-rN'}}{1 - e^{-rN}} \cdot \Delta S \cdot r^2 c > 0 \qquad (4)$$

The implication of this result is that the longer the person's remaining working life, or the younger (or healthier) he/she is, the more likely it is that he/she will return to school.

ii) **Wages per unit of human capital** *(w)*

$$\frac{\partial V}{\partial w} = (f(S_0 + \Delta S)e^{-r\Delta S} - f(S_0))(1 - e^{-rN'})$$

Using the result in (3),

$$\frac{\partial V}{\partial w} = \frac{e^{-r\Delta S}(1 - e^{-rN'})}{1 - e^{-rN}} \cdot \Delta S \cdot \frac{rc}{w} > 0 \qquad (5)$$

which means that the higher the wage rate per unit of human capital than was faced when the original schooling decision was made, the more likely it is that the individual will invest in additional schooling. One corollary of this result is that if wages increase more

at higher education levels, i.e. there is a greater educational wage premium, we will tend to see relatively more educated people return to school.

Furthermore,

$$\frac{\partial V}{\partial w \partial N'} = \frac{e^{-r\Delta S}e^{-rN'}}{1 - e^{-rN}} \cdot \Delta S \cdot \frac{r^2 c}{w} > 0 \qquad (5')$$

In other words, the positive effect of rising wages on the likelihood of returning to school is stronger the younger a person is.

iii) **Direct costs of schooling** (c)

$$\frac{\partial V}{\partial c} = -(1 - e^{-r\Delta S}) < 0 \qquad (6)$$

It is not surprising that additional schooling is more profitable the lower the tuition costs. Another implication, especially relevant for women with kids, is that additional schooling is more profitable the lower the child-care costs.

iv) **Opportunity cost of schooling**

To analyze how forgone earnings affect the decision to return to school, rewrite equation (2) as follows:

$$V = wf(S_0+\Delta S)e^{-r\Delta S}(1 - e^{-rN'}) - c(1 - e^{-r\Delta S}) - wf(S_0)(1 - e^{-r\Delta S}) - wf(S_0)(e^{-r\Delta S} - e^{-rN'})$$

The term

$$- wf(S_0)(1 - e^{-r\Delta S})$$

is the amount of earnings the individual has to forgo. It has the expected negative sign - the higher the opportunity cost, the less attractive it is to go back to school. Note that in the calculation of forgone earnings above, it is assumed that the individual will receive earnings for all the ΔS years. This means that if someone is currently unemployed, or anticipates job loss, his/her likelihood of returning to school is higher because the opportunity cost is lower.

v) The productivity of schooling

Suppose that $f(S) = S^{\beta}$, where $\beta < 1$,[6] and that $\beta = \beta_0$ in the initial period. Any change in the value of β, or equivalently, the productivity of schooling, wili affect the decision to return to school. Rewriting equation (2) as

$$V = w(S_0+\Delta S)^{\beta}e^{-r\Delta S}(1 - e^{-rN'}) - c(1 - e^{-r\Delta S}) - wS_0^{\beta_0}(1 - e^{-rN'})$$

it follows that

$$\frac{\partial V}{\partial \beta} = w(S_0+\Delta S)^{\beta}\ln(S_0+\Delta S)e^{-r\Delta S}(1 - e^{-rN'}) > 0 \qquad (7)$$

This result is consistent with the idea that after acquiring some work experience, individuals may decide to go back for more schooling because having understood their

[6] Note that $f' > 0$ and $f'' < 0$.

abilities better, or gained experience which enhances their ability to learn, schooling is now more productive for them.[7] This might be especially true for those who return to school for an MBA degree after working for a while.

Also, note that

$$\frac{\partial V}{\partial \beta \partial N'} = w(S_0+\Delta S)\ln(S_0+\Delta S)e^{-r\Delta S} \cdot re^{-rN'} > 0 \qquad (7')$$

which says that the younger a person is, the stronger the incentive to acquire more schooling when schooling productivity goes up.

vi) **Discount rate** (r)

$$\frac{\partial V}{\partial r} = (wf(S_0+\Delta S)e^{-r\Delta S} - wf(S_0)) \cdot N'e^{-rN'} - wf(S_0+\Delta S) \cdot \Delta Se^{-r\Delta S} \cdot (1 - e^{-rN'}) - c \cdot \Delta Se^{-r\Delta S}$$

$$= \frac{e^{-r\Delta S}}{1 - e^{-rN}} \Delta S \cdot rc \cdot N'e^{-rN'} - c \cdot \Delta Se^{-r\Delta S} - wf(S_0+\Delta S) \cdot \Delta Se^{-r\Delta S} \cdot (1 - e^{-rN'})$$

$$= c \cdot \Delta Se^{-r\Delta S} \left(\frac{1}{1 - e^{-rN}} rN'e^{-rN'} - 1\right) - wf(S_0+\Delta S) \cdot \Delta Se^{-r\Delta S} \cdot (1 - e^{-rN'}) \qquad (8)$$

Since

$$e^{-rN} \approx \frac{1}{1 + rN}$$

therefore the first term in brackets may be rewritten as follows

[7] See Altonji (1993) for an analysis of the role of uncertainty in people's decisions to terminate and/or resume formal educational studies.

$$\frac{1}{1 - e^{-rN}} rN' e^{-rN'} - 1 = \frac{1 + rN}{rN} \cdot \frac{rN'}{1 + rN'} - 1$$

$$= \frac{rN' + r^2NN' - rN - r^2NN'}{rN(1 + rN)} < 0 \qquad (N > N')$$

Substituting this result back into equation (8), it follows that

$$\frac{\partial V}{\partial r} < 0 \tag{8'}$$

An interpretation is that individuals from poor families may face high borrowing rates during the initial period of schooling and hence stop schooling earlier than if they were not constrained (see equation (1)). So when years of working experience make it easier for these individuals to obtain credit, and essentially face a lower borrowing rate, it may be profitable for them to return to school.[8]

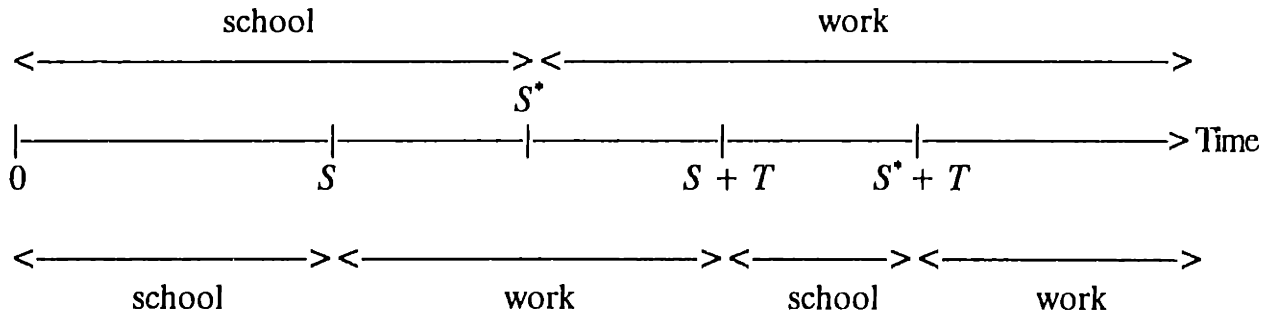
Returning to School as a Planned Investment

In the section below, I will show that if work experience increases the productivity of human capital, it may be optimal for individuals not to undertake all their schooling investments early in life, but rather to plan to acquire some work experience before completing their schooling.

Consider two alternative paths an individual may follow: (1) going to school for

[8] See Wallace and Ihnen (1975) for a theoretical discussion of how capital market imperfections may lead people to enter the labor force before completing their regular schooling.

S^* years (chosen optimally) and working thereafter, and (2) going to school for S years, where $S < S^*$, and then working for T years before going back to school for $\Delta S = S^* - S$ years.



The latter path will be preferred if [9]

$$\int_{S}^{S+T} wf(S, 0)e^{-rt}\,dt + \int_{S^*+T}^{\infty} wf(S^*, T)e^{-rt}\,dt > \int_{S^*}^{\infty} wf(S^*, 0)e^{-rt}\,dt$$

where w and r are defined as in the previous section, and $f(.\ ,\ .)$ is the human capital production function with two inputs, schooling and work experience, such that $f_1 > 0$, $f_2 > 0$ and $f_{12} > 0$. Simplifying the expression and rewriting $f(S,0)$ and $f(S^*,0)$ as $f(S)$ and $f(S^*)$ respectively yields

$$f(S)e^{-rS}(1 - e^{-rT}) + f(S^*, T)e^{-r(S^*+T)} > f(S^*)e^{-rS^*}$$

or $V > 0$, where V is defined such that

[9] For simplicity, individuals are assumed to be infinitely lived and direct schooling costs are assumed to be zero. Also, I will not be dealing with the issue of how S and T are chosen; my focus here is on whether (and when) $T > 0$ is optimal.

$$V = f(S)e^{-rS}(1 - e^{-rT}) + f(S^*, T)e^{-r(S^* + T)} - f(S^*)e^{-rS^*}$$

$$f(S)e^{-rS}(1 - e^{-rT}) + (f(S^*) + Tf_T)e^{-r(S^* + T)} - f(S^*)e^{-rS^*}$$

$$= (f(S)e^{rS} - f(S^*)e^{-rS^*})(1 - e^{-rT}) + Tf_T e^{-r(S^* + T)} \qquad (9)$$

To analyze equation (9), note that

$$f(S)e^{-rS} - f(S^*)e^{-rS^*} \approx (f(S^*) - \Delta S f_{S^*})e^{-rS} - f(S^*)e^{-rS^*}$$

$$= [f(S^*)(1 - e^{-r\Delta S}) - \Delta S f_{S^*}]\, e^{-rS}$$

Since [10]

$$f_{S^*} = rf(S^*)$$

therefore

$$f(S)e^{rS} - f(S^*)e^{-rS^*} \quad [f(S^*)(1 - e^{-r\Delta S} \quad r\Delta S)]\, e^{-rS}$$

And since

$$e^{-r\Delta S} \approx \frac{1}{1 + r\Delta S}$$

the expression may be rewritten as

$$f(S)e^{-rS} - f(S^*)e^{-rS^*} \approx -f(S^*)\,\frac{(r\Delta S)^2}{1 + r\Delta S}\, e^{-rS} < 0$$

Using this result in equation (1), we see that if $f_T \leq 0$, then V < 0. In other words,

[10] S^* is chosen optimally.

if work experience is not a productive input in the creation of additional human capital, then the only optimal path would be to concentrate all schooling investments early in life. However, if $f_T > 0$, and is sufficiently large such that

$$Tf_T e^{-r(S^* + T)} > (f(S^*)e^{-rS^*} - f(S)e^{-rS})(1 - e^{-rT})$$

(or roughly, that the period of work before the final completion of schooling produces a gain in lifetime earnings later on that more than offsets the lower earnings received during that period), then it may be optimal to acquire some work experience between schooling intervals.[11]

[11] College graduates planning to go on for a business degree may not have a choice but to work for a while because most business schools, especially the high-ranking ones, will only admit students with at least two years of work experience. However, the fact that this policy exists suggests that schools, as well as businesses, believe that work experience is important for business school training. Therefore, it is likely that if those students who prefer to go for an MBA immediately after graduating from college had as much information as the schools and businesses, they too would chose the career path described in this section.

Chapter II TRENDS IN ADULT SCHOOL ENROLLMENT

This chapter documents an upward trend in adult school enrollment since the 1970's, as well as an increase over the same period in educational attainment within the older cohorts. Since it is unlikely that many (if any) of the students in the older age groups have been continuously enrolled, these findings suggest an increase over time in the number of adults returning to school.

Data Description

Two data sets are used in this analysis. First, the 1/1,000 Public Use Samples of the 1970, 1980, and 1990 Censuses of Population and Housing.[12] While Census data do not allow us to see which individuals returned to school, they provide the most comprehensive picture of the population's educational attainment over the decades. Further, by examining cohort changes in (1) mean educational attainment at different ages, (2) the distribution of student age at different education levels, and (3) the percentage of each age group that is enrolled in school at different educational levels, we can make inferences concerning the phenomenon of adult re-enrollment in school.

The May 1984 Current Population Survey Adult Education Supplement is also used in this analysis. It supplements the Census data by providing information on enrollment patterns of adults in different types of educational programs. Unfortunately this

[12] In 1990 a 1/1,000 sample was not provided by the Census. I therefore constructed a 1/1,000 sample by generating a random sample for each state using state files and then merging the resulting samples.

Supplement was only administered in 1978 and then again in 1984,[13] so I am unable to examine trends in enrollment in different schooling environments.

Descriptive Analysis

Tables 1-4 report patterns in adults' enrollment in school using data from the 1970,[14] 1980, and 1990 decennial Censuses of Population and Housing.[15,16]

Table 1 shows the mean educational attainment of six cohorts. 30-39 year olds in 1970, who are 40-49 in 1980 and 50-59 in 1990 is one of them. Since the analysis only includes people who are at least 30 and since it is unlikely that they have been continually enrolled in school, any increase in mean educational attainment within cohorts will provide an indication of the extent to which adults are returning to school.[17]

The use of the 1990 Census data raises certain methodological issues since the coding scheme for answers to the schooling questions is fundamentally different from earlier Censuses. In 1980, the attainment (or "completion") variable was coded in single

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[13] Patterns found in the 1978 survey are essentially the same as those reported in the text for the 1984 survey.

[14] The results reported for the 1970 Census use the 5% sample, though similar results were obtained for the 15% sample.

[15] People who pass the GED (or any other equivalency exam) are considered high school graduates, though no distinction is made between the two groups in all of the Census years.

[16] I did not use the 1960 Census because information on enrollment was recorded only for people 5 to 34 years old, but starting with the 1970 Census the age restriction was removed due to the perceived "... increased interest ... in the number of older persons attending colleges and universities (the 1990 Census of Population codebook)."

[17] This conclusion might be affected by any variations across education groups in migration and mortality rates, and by any systematic overstatement of educational attainment as people age.

Table 1: Mean Education Level by Cohorts[a,b]
1970, 1980, 1990 Census of Population and Housing

Age	Census Year			
	1970	1980[c]		1990
		'70	'90	
30-39	11.78	12.93	13.01	13.12
	(2.99)	(2.84)	(3.00)	(2.75)
	[22,403]	[31,585]		[40,711]
40-49	11.26	12.13	12.19	13.10
	(3.09)	(3.06)	(3.19)	(2.98)
	[23,764]	[22,465]		[31,566]
50-59	10.48	11.44	11.49	12.29
	(3.28)	(3.24)	(3.33)	(3.20)
	[20,862]	[23,168]		[22,160]
60-69	9.56	10.67	10.70	11.56
	(3.53)	(3.37)	(3.43)	(3.28)
	[15,583]	[18,669]		[21,399]

a. Mean education levels are reported with standard deviations in parentheses. The number of observations in each cell is listed in brackets.
b. t-tests indicate that all intra-cohort increases in mean education levels over time are significant at the 5% level.
c. Due to changes in the coding scheme for answers to the schooling questions, the column labelled '70 reports means where the values of 19 and 20+ years of education are set at 18, the top code in 1970, and the column labelled '90 reports means where the top code is left at 20+.

years from 1 to 20-and-above. For the 1990 Census, however, it was coded with a mixture of years of attainment and types of post-high school degrees received. I therefore mapped the 1990 responses into years of education from 1 to 20-and-above so that the 1990 results

would be compatible to those obtained for the 1980. The coding scheme for 1970 and 1980 also differ in that the top code for 1970 is 18 years and above. In order to assess the sensitivity of my results to different coding schemes, two sets of results are reported for the 1980 Census: 1) the column labelled '70 reports 1980 means where values of 19 and 20+ years of education are set at 18, the top code in 1970 for years of education and 2) the column labelled '90 reports results where the top code for 1980 is left at 20 and above.

We see in the table that for each of the cohorts, mean educational attainment increased between 1970 and 1990, regardless of which column for the 1980 Census we look at. To evaluate the statistical significance of these changes, t-tests are performed and the results indicate that all intra-cohort increases in mean education levels over time are significant at the 5% level. These findings are consistent with the phenomenon of adults returning to school.

A complementary way to assess patterns over time in adults returning to formal schooling is to look at changes in the average age of students at specific levels of education. If there has been a secular increase in adults returning to school, it would be reflected in an increase in the average age of students.[18] We indeed see in Table 2 that for high school, college, and post-college education, average student age increases monotonically between 1980 and 1990. The results of t-tests indicate that all the increases (except for high school students between 1970 and 1980) are significant at 5%.

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[18] Of course, any secular increase in time to degree completion for continuously enrolled students will raise average student age even if there is no increase in the number of adults returning to school.

Table 2: Intercensal Comparisons of Average Student Age at Different Education Levels[a,b]

	Census Years		
	1970	1980	1990
High School	16.52 (4.73) [13,625]	16.57 (4.44) [15,136]	17.54 (7.80) [15,524]
College	22.24 (7.29) [5,840]	24.95 (9.25) [10,136]	26.95 (10.79) [12,715]
Post-College	28.95 (8.68) [945]	31.71 (9.64) [2,252]	34.35 (11.18) [3,528]

a. Mean age is reported (with standard deviations in parentheses) for people enrolled in school. Cell sizes are listed in brackets. Respondents are classified as (1) High School if they are enrolled and their educational attainment is greater than or equal to 8 years and less than 12 years, (2) College if they are enrolled and their educational attainment is greater than or equal to 12 years and less than 16 years, and (3) Post-College if they are enrolled and their educational attainment is 16 years or greater.

b. t-tests indicate that all increases in average student age over time are significant at the 5% level (except for high school students between 1970 and 1980).

To further investigate patterns in adult school enrollment, Table 3 reports changes over time in the age distribution of students at different education levels. Looking first at high school enrollment, we observe a monotonic decrease in the percentage of high school students who are 14-18 years old (the traditional enrollment ages). We observe, at the same time, increases in the percentage of high school students in all the older age

groups between 1970 and 1990. Similarly for college students, the percentage who are 18-22 years old declined monotonically, and the percentage in older age groups increased

Table 3: Intercensal Comparisons of the Student Age Distribution[a]

	Census Year					
Age	1970		1980		1990	
I. High School						
14-18	95.3	[12,980][b]	95.2	[14,413]	89.7	[13,931]
19-20	2.2	[296]	2.2	[327]	3.2	[494]
21-23	0.6	[75]	0.4	[67]	1.0	[159]
24-26	0.3	[43]	0.5	[69]	0.8	[125]
27-29	0.1	[19]	0.3	[42]	0.9	[133]
30-39	0.4	[58]	0.5	[72]	1.7	[270]
40-49	0.5	[70]	0.4	[53]	1.0	[149]
50-59	0.4	[48]	0.3	[46]	0.5	[80]
60-69	0.1	[14]	0.2	[29]	0.5	[81]
II. College						
18-22	77.0	[4,494]	59.0	[5,979]	50.5	[6,426]
23-24	6.0	[353]	8.2	[836]	7.4	[946]
25-27	5.3	[307]	8.5	[857]	7.5	[950]
28-30	2.8	[164]	5.8	[583]	6.5	[821]
31-33	1.8	[105]	5.0	[510]	5.5	[695]
34-39	2.1	[123]	5.2	[523]	8.8	[1,119]
40-49	2.3	[134]	4.5	[457]	7.8	[988]
50-59	0.9	[55]	1.8	[185]	2.6	[334]
60-69	0.4	[22]	0.8	[79]	1.3	[160]

(cont'd)

Age	Census Year 1970		1980		1990	
III. Post-College						
22-26	52.2	[493]	35.5	[800]	25.9	[915]
27-28	11.6	[110]	11.5	[260]	8.9	[315]
29-31	9.5	[90]	15.2	[343]	10.8	[380]
32-34	5.7	[54]	9.4	[212]	9.4	[330]
35-39	8.3	[78]	10.6	[238]	15.2	[536]
40-49	7.4	[70]	10.7	[240]	17.8	[627]
50-59	2.2	[21]	4.3	[97]	5.1	[179]
60-69	0.8	[8]	1.2	[27]	2.2	[79]

a. Cells report the percentage of students (enrolled in the above education categories) in each age group.
b. Cell sizes are listed in brackets.

between 1970 and 1990. The increase in the percentage who are 34-39 and 40-49 is particularly striking. As for post-college students, the percentage in age groups 22-26 and 27-28 declined while the percentage in age groups 32-34 and above increased monotonically. Figures 1a to 1c provide graphical illustrations of these patterns in high school, college, and post-college enrollment respectively.[19]

[19] Since the age categories used in Table 3 vary in width, the percentages plotted in Figures 1a to 1c are those listed in Table 3 divided by the number of years included in the corresponding age categories.

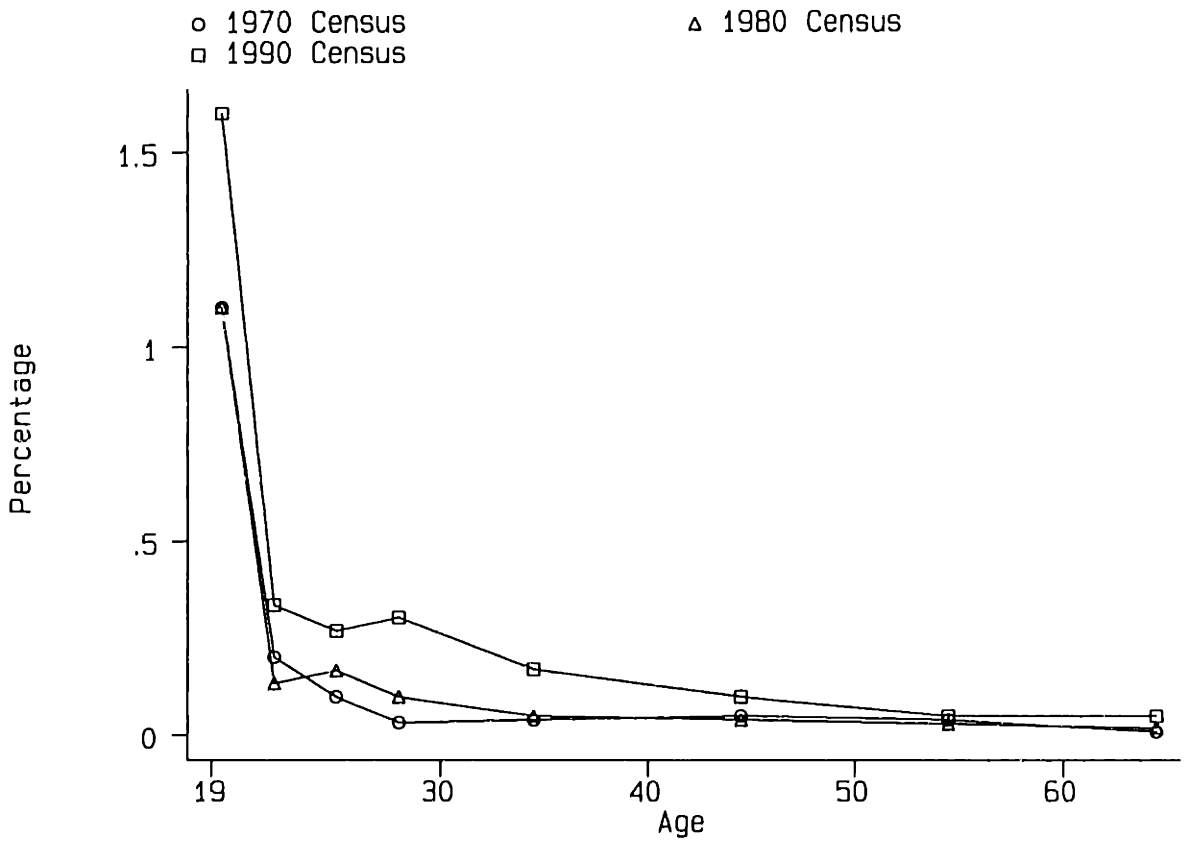

Fig. 1a Age Distribution of HS Students, Ages 19+

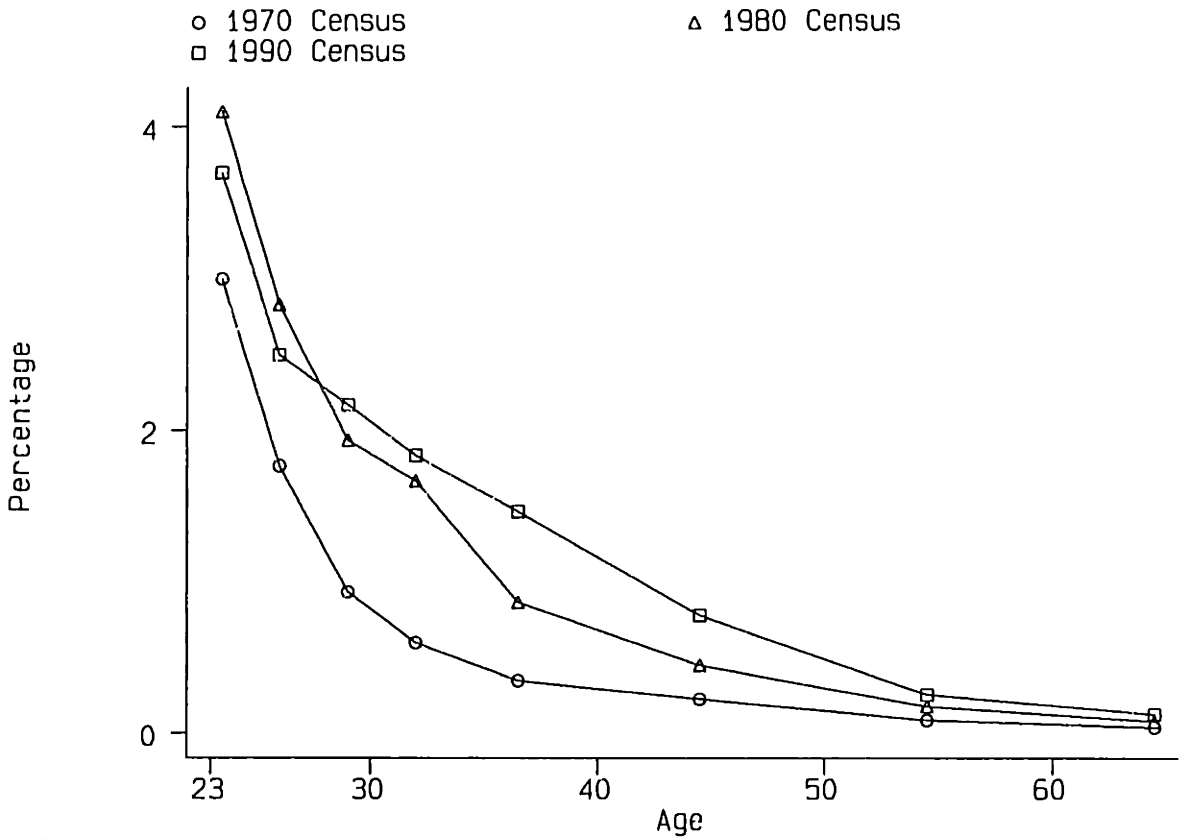

Fig. 1b Age Distribution of College Students, Ages 23+

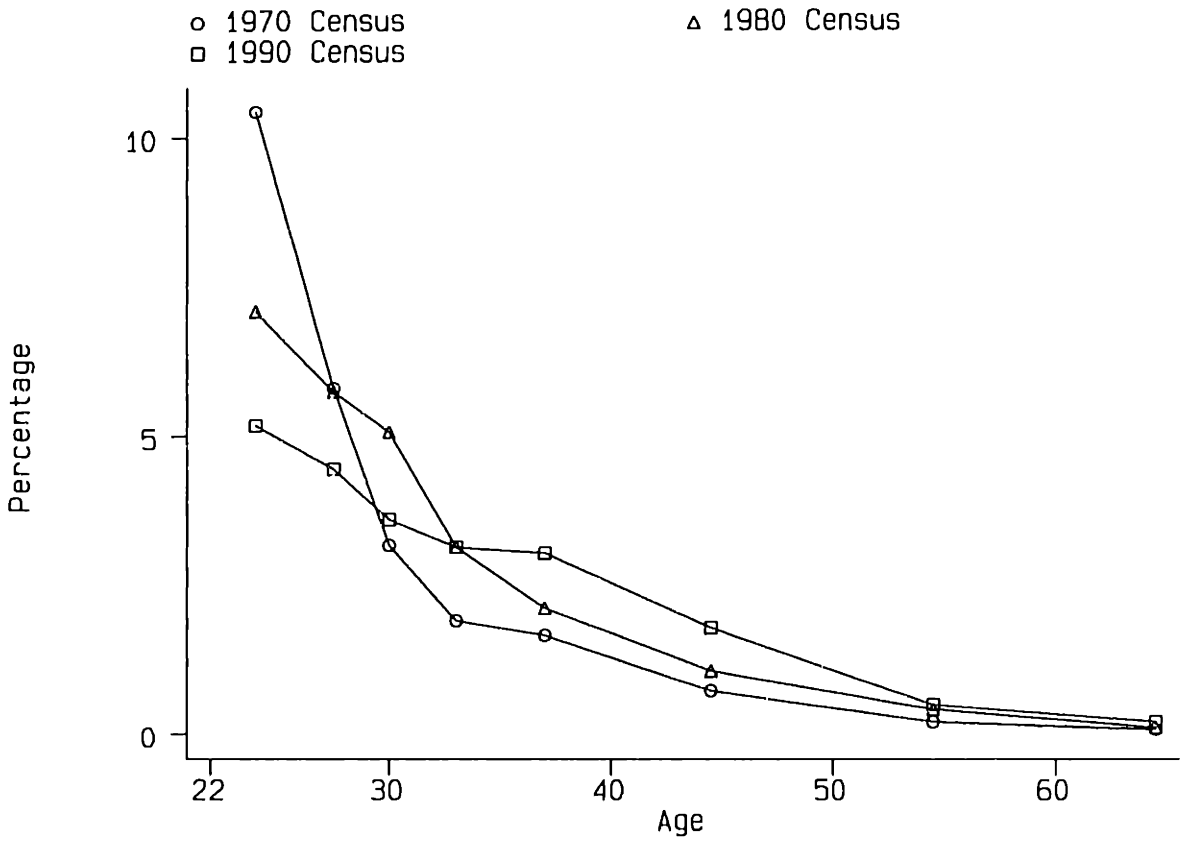

Fig. 1c Age Dist. of Post-College Students, Ages 22+

Although changes in the age distribution of the population, rather than an increase in adult enrollment school, could produce the patterns above, Table 4 provides evidence

Table 4: Intercensal Comparisons of the Percentage Enrolled by Age Group[a]

Age	Census Year 1970	1980	1990
I. All			
14-18	84.27 [19,455][b]	86.96 [20,625]	88.92 [17,163]
19-20	38.10 [6,944]	38.45 [8,710]	51.06 [7,378]
21-23	18.73 [9,883]	22.37 [12,443]	31.90 [10,102]
24-26	7.34 [8,200]	12.59 [12,109]	15.87 [11,048]
27-29	4.94 [7,794]	9.73 [11,502]	11.79 [12,112]
30-34	3.22 [11,380]	7.10 [17,721]	8.93 [21,117]
35-39	2.03 [11,157]	5.00 [14,013]	7.99 [19,594]
40-44	1.45 [11,788]	4.04 [11,713]	6.28 [17,667]
45-49	1.18 [12,150]	2.68 [10,883]	4.71 [13,899]
50-54	0.97 [11,038]	1.76 [11,797]	3.13 [11,402]
55-59	0.76 [10,062]	1.20 [11,539]	2.19 [10,758]
60-64	0.58 [8,732]	0.90 [9,991]	1.45 [10,981]
65-69	0.48 [7,120]	0.76 [8,845]	1.55 [10,418]
II. High School			
14-18	66.72 [19,455]	69.88 [20,625]	81.17 [17,163]
19-20	4.26 [6,944]	3.75 [8,710]	6.70 [7,378]
21-23	0.76 [9,883]	0.54 [12,443]	1.57 [10,102]
24-26	0.52 [8,200]	0.57 [12,109]	1.13 [11,048]
27-29	0.24 [7,794]	0.37 [11,502]	1.10 [12,112]
30-39	0.26 [22,537]	0.23 [31,734]	0.66 [40,711]
40-49	0.29 [23,938]	0.23 [22,596]	0.47 [31,566]
50-59	0.23 [21,100]	0.20 [23,336]	0.36 [22,160]
60-69	0.09 [15,852]	0.15 [18,836]	0.38 [21,399]

(cont'd)

Age	Census Year 1970	1980[b]	1990[c]
III. College			
18-22	26.10 [17,218]	28.22 [21,189]	36.29 [17,709]
23-24	6.00 [5,887]	10.13 [8,249]	13.83 [6,842]
25-27	3.64 [8,432]	7.18 [11,942]	8.21 [11,574]
28-30	2.19 [7,488]	5.20 [11,214]	6.47 [12,680]
31-33	1.58 [6,640]	4.58 [11,138]	5.59 [12,437]
34-39	0.92 [13,308]	3.10 [16,888]	4.71 [23,753]
40-49	0.56 [23,938]	2.02 [22,596]	3.13 [31,566]
50-59	0.26 [21,100]	0.79 [23,336]	1.51 [22,160]
60-69	0.14 [15,852]	0.42 [18,836]	0.75 [21,399]
IV. Post-College			
22-26	3.34 [14,777]	3.92 [20,394]	5.19 [17,631]
27-28	2.04 [5,392]	3.33 [7,807]	4.02 [7,841]
29-31	1.24 [7,281]	3.10 [11,052]	2.97 [12,814]
32-34	0.83 [6,501]	2.05 [10,364]	2.62 [12,574]
35-39	0.70 [11,157]	1.70 [14,013]	2.74 [19,594]
40-49	0.29 [23,938]	1.06 [22,596]	1.99 [31,566]
50-59	0.01 [21,100]	0.42 [23,336]	0.81 [22,160]
60-69	0.01 [15,852]	0.14 [18,836]	0.37 [21,399]

a. Cells report the percentage in each age group that are enrolled in the above education categories.
b. Cell sizes are listed in brackets.

against this interpretation by examining changes over time in the percentage of students in adult age groups. We see in Panel I that within each age group the percentage enrolled

in either high school, college, or post-college education increased monotonically between 1970 and 1990, with the largest percentage increase for the 35-39 and 40-44 year olds. This is graphically illustrated in Figure 2. Looking back at Table 4, when I decompose these patterns by education level, I find within each category - high school, college, or post-college - large increases in the percentage enrolled of those who are past the traditional enrollment ages. Note especially the monotonic increase within the college category. Figures 2a to 2c provide graphical illustrations.

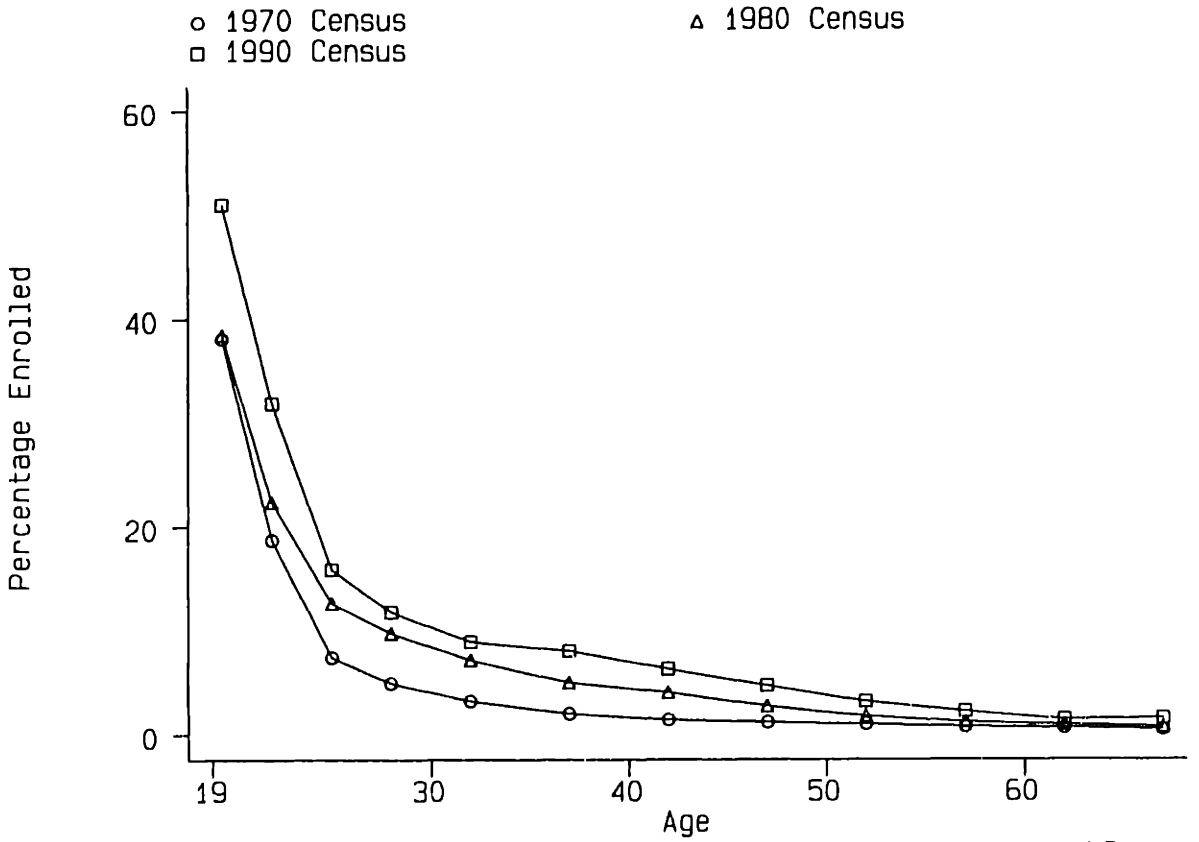

Fig. 2 % Students in Different Age Groups, Ages 19+

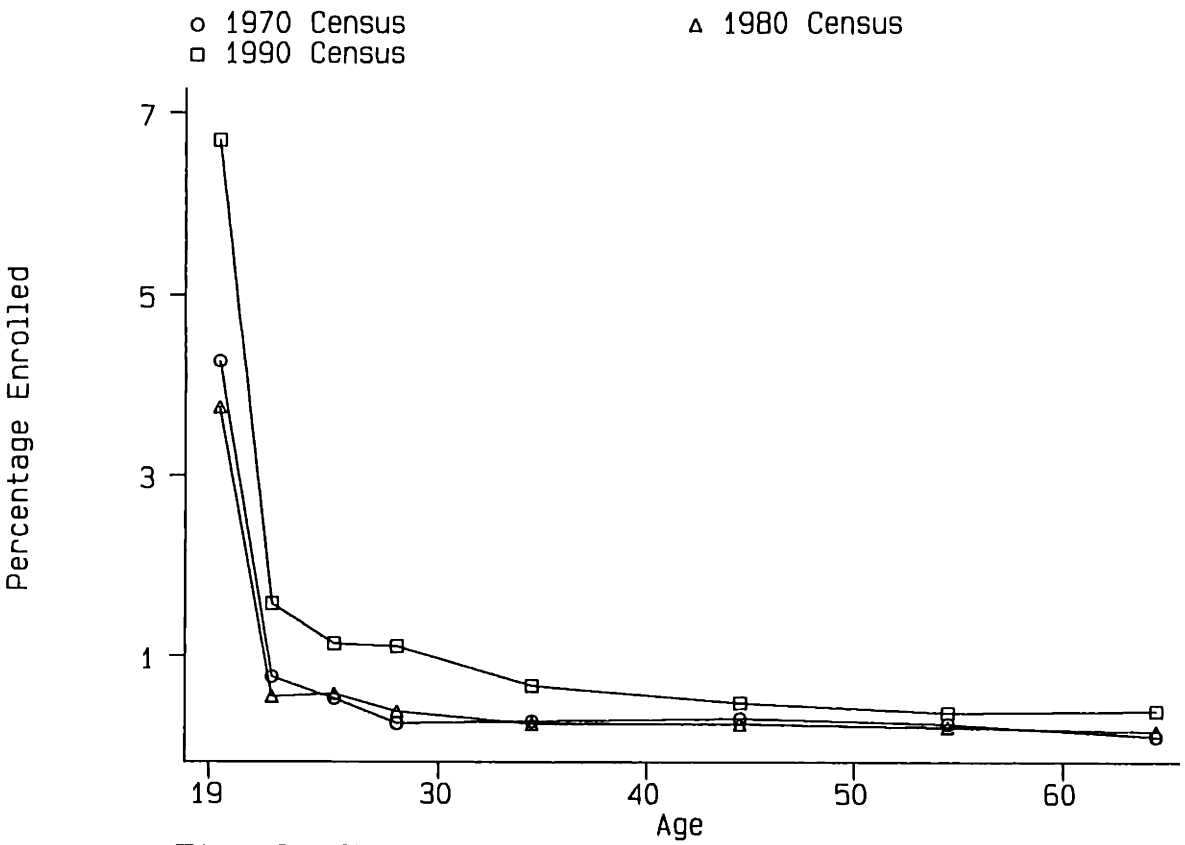

Fig. 2a % High School Students, Ages 19+

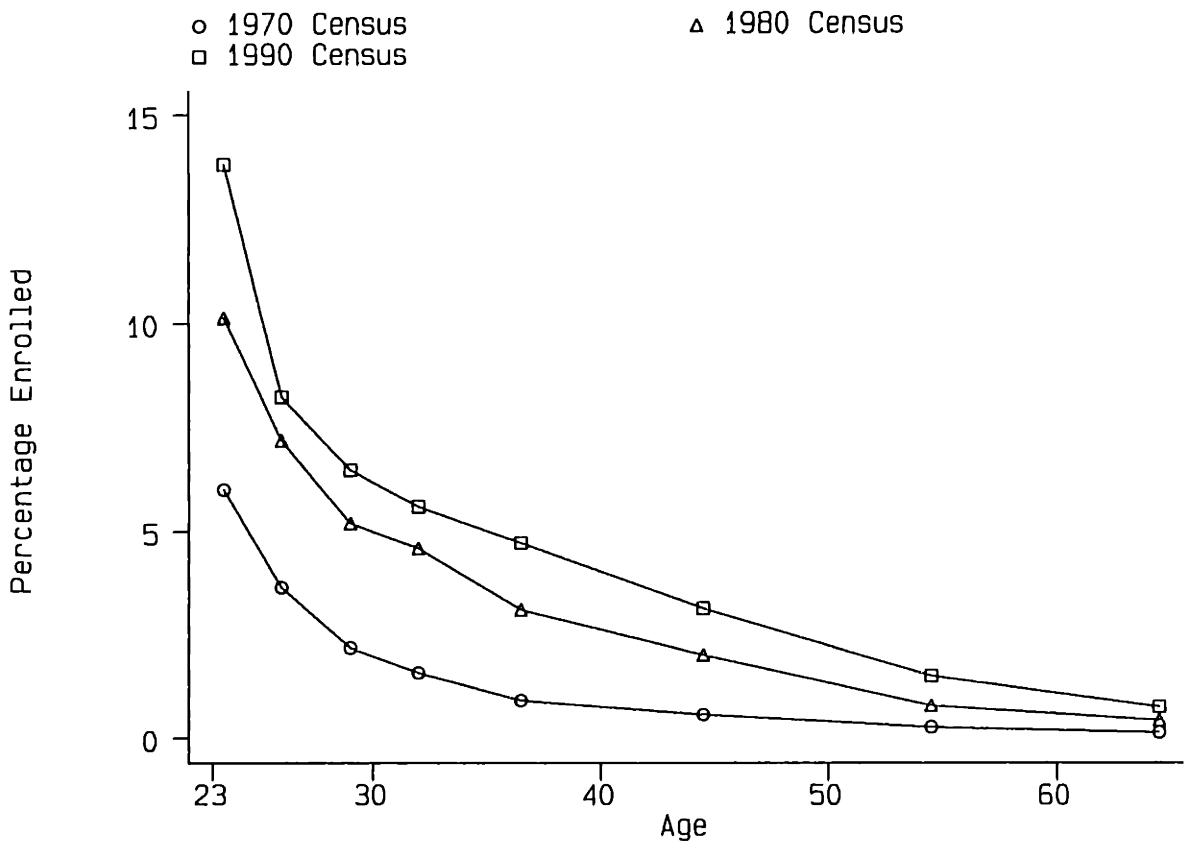

Fig. 2b % College Students, Ages 23+

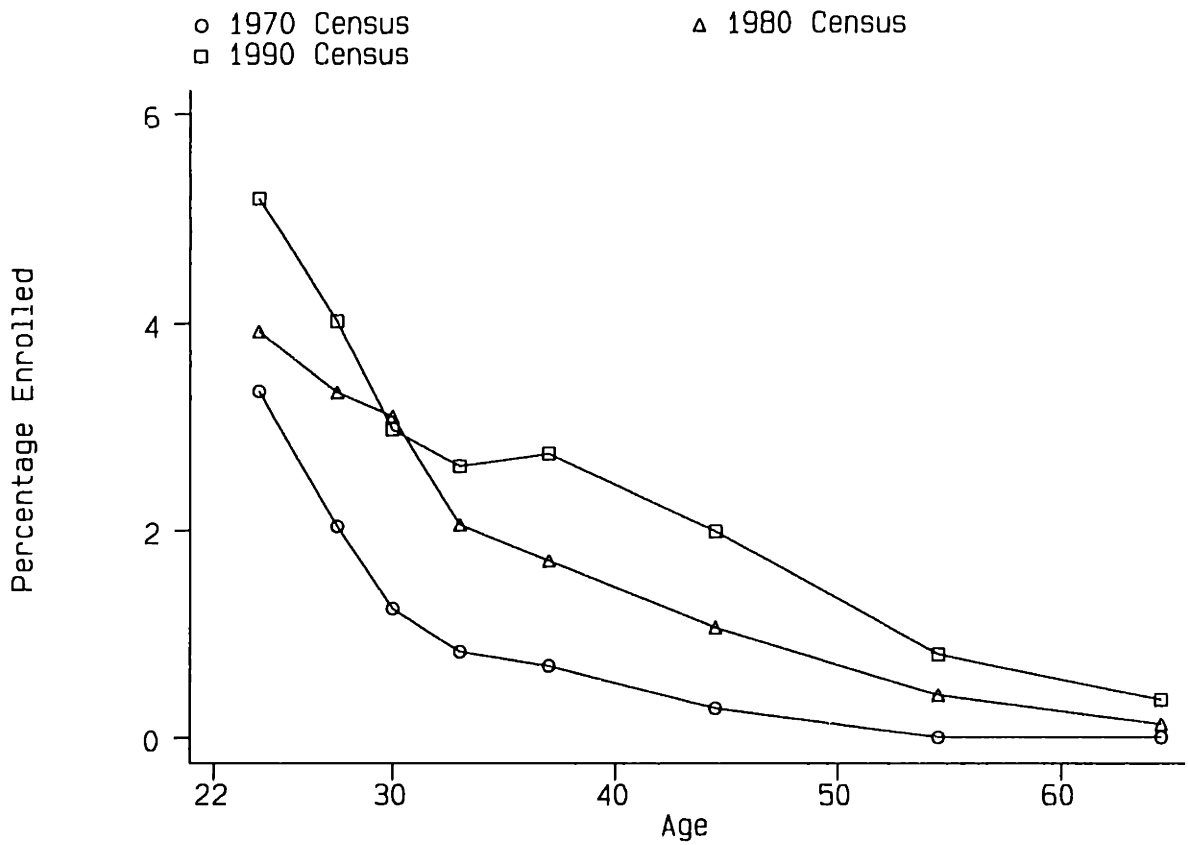

Fig. 2c % Post-College Students, Ages 22+

Table 5 also reports the percentage of each age group that is enrolled at different educational levels, but uses data from the May 1984 Current Population Survey (CPS) Adult Education Supplement. Besides providing a consistency check on Census data, I am able to distinguish between part-time and full-time high school and college enrollment, enrollment in a GED program, and enrollment in an adult education program.[20] We see in the table that adult school enrollment generally declines with age, as expected, for both full-time and part-time programs, and that part-time study is, also as expected, a more prevalent mode in which adults acquire additional formal schooling.

To compare the results in this table with those reported for the Census in Table 4 above, we can for example calculate from this table that 1.02% of 21-23 year olds are high school students in 1984. This figure, which is found by summing up the percentages of 21-23 year olds enrolled in high school full-time or part-time and those working toward a GED, lies between 0.54% (1980 Census) and 1.57% (1990 Census). Repeating the analysis for all other age groups, we can see that the CPS and Census high school enrollment figures data are generally in accord except for the oldest age groups (50 year olds and above). The college enrollment figures reveal a similar divergence at older ages. It is possible that the differing sample frames for the Census, which includes the entire population, and the CPS, which is based on a sample of the civilian, non-institutionalized population, might be responsible for these different results.

[20] This category includes enrollment in any part-time educational activities. As such, it will overlap with the part-time college and part-time high school categories.

Table 5: Percentage Enrolled by Age Group[a]
May 1984 Current Population Survey (n=114,396)

	Enrollment Categories					
Age[b]	Full-Time High School[c]	Part-Time High School Diploma[d]	Full-Time College[e]	Part-Time College Diploma[f]	Adult Education Program[g]	GED[h]
All	5.18	0.17	3.95	1.63	13.09	0.25
14-18	76.12	1.25	6.29	0.55	6.35	0.75
19-20	4.15	0.53	30.38	2.90	9.40	0.99
21-23	0.32	0.36	18.78	4.31	12.41	0.34
24-26	0.08	0.23	6.03	3.83	18.28	0.30
27-29	0.01	0.11	2.82	2.91	19.80	0.33
30-34	-	0.07	1.48	2.50	20.72	0.30
35-39	-	0.05	0.86	2.06	20.29	0.17
40-44	0.02	0.02	0.57	1.53	17.86	0.25
45-49	0.01	0.03	0.38	0.91	15.30	0.17
50-54	-	0.04	0.20	0.51	12.25	0.04
55-59	-	-	0.15	0.23	9.17	0.03
60-64	-	0.01	0.04	0.19	7.35	0.04
65-69	-	0.05	0.03	0.05	4.62	-

a. Cells report the percentage of each age group that is in a given enrollment category, i.e. 1.48% of 30-34 year olds in the CPS are enrolled in college full-time
b. Sample sizes for each age group are 7,468 (14-18), 4,937 (19-20), 7,827 (21-23), 7,878 (24-26), 7,847 (27-29), 12,317 (30-34), 10,582 (35-39), 8,937 (40-44), 7,549 (45-49), 7,037 (50-54), 7,478 (55-59), 7,007 (60-64), 6,080 (65-69), 11,452 (>=70)
c. Full-Time High School =enrollment in regular high school full-time
d. Full-Time College =enrollment in college full-time
e. Part-Time High School =enrolled in high school part-time
f. Part-Time College =enrolled in college part-time
g. Adult Education Program =enrolled in at least one adult education class
h. GED=General Educational Development examination

- denotes less than 0.01%

Multivariate Enrollment Regressions

In order to look at adult schooling decisions in a multivariate context and to quantify the degree of secular change in adult enrollment patterns, Tables 6a and 6b report enrollment regressions for each Census year, and for a pooled sample across all three decades. Looking at the separate regressions for each Census year in Table 6a, we see that the negative effect of age on enrollment declines monotonically over time, a result consistent with an increase in the likelihood of adult enrollment.[21]

In order to directly test the statistical significance of the decline over time of the negative effect of age on enrollment likelihood, the last column of Table 6a reports regression results based on the pooled sample, and includes interactions of age with Census year dummies as well as interactions of the other explanatory variables with the Census year dummies. We see that the two age interaction terms are positive and highly significant, indicating that the negative effect of age on enrollment likelihood indeed declines monotonically and significantly across the three decades. This finding strongly suggests that the phenomenon of adults returning to school for supplemental education has been steadily increasing in magnitude over the past three decades.[22]

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[21] Tables 6a and 6b impose no age restrictions on the sample so that age effects on enrollment can occur at all age levels.

[22] A number of other patterns are also interesting: the effect of being female changes from significantly negative in 1970 to significantly positive in 1990; the negative effect of being either black or married declines monotonically over time. They suggest that patterns of adult enrollment may differ by gender, race, and marital status. The influence of these factors on decisions to return to school patterns will be analyzed in Chapter IV below.

Table 6a: Enrollment Regressions
1970, 1980, 1990 Census of Population and Housing[a,b]

Variables	Census Years			
	1970 (183,492)	1980 (210,732)	1990 (235,105)	Merged 1970-90 (629,331)
age	-1.034 (0.003)	-1.006 (0.003)	-0.899 (0.004)	-1.034 (0.004)
age * D1980[c]	-	-	-	0.027 (0.005)
age * D1990	-	-	-	0.134 (0.005)
education	-2.488 (0.017)	-2.790 (0.016)	-1.197 (0.018)	-2.488 (0.019)
education * D1980				-0.302 (0.025)
education * D1990				1.291 (0.025)
female	-2.948 (0.129)	-1.387 (0.131)	0.314 (0.142)	-2.948 (0.145)
female * D1980				1.560 (0.198)
female * D1990				3.262 (0.193)
black	-7.282 (0.202)	-4.773 (0.180)	-3.073 (0.238)	7.282 (0.227)
black * D1980				2.509 (0.294)
black * D1990				4.209 (0.313)
married	-29.643 (0.152)	-22.838 (0.150)	-20.123 (0.163)	-29.643 (0.171)
married * D1980				6.805 (0.231)
married * D1990				9.520 (0.226)

(cont'd)

Variables	Census Years			
	1970 (183,492)	1980 (210,732)	1990 (235,105)	Merged 1970-90 (629,331)
D1980				-0.235 (0.382)
D1990				-25.270 (0.362)
intercept	107.934 (0.246)	107.699 (0.254)	82.665 (0.259)	107.934 (0.276)
Adj-R^2	0.6496	0.5758	0.4078	0.5392

a. The dependent variable is one if the person is enrolled as a student.
b. Parameter estimates are listed with standard errors in parentheses (sample sizes are listed in parentheses in the column headings); all values are multiplied by 100. All regressions are estimated by OLS (linear probability models). All variables are significant at 5% or better (except for D1980 in the last column). The first three columns additionally contain a vector of eight Census region dummies. The last column additionally contains the same eight region dummies, plus interactions of each region dummy with 1) D1980, and 2) D1990.
c. D1980=1 for 1980 Census data (zero otherwise), D1990=1 for 1990 Census data (zero otherwise).

Of course, these age effects might reflect a secular increase in the time that continuously enrolled students take to complete their degrees. To evaluate this possibility, the first column of Table 6b replaces the linear age term in Table 6a with a dummy for age greater than 30. I find the same pattern as in the last column of Table 6a. Since most continuously enrolled students will have finished school by age thirty, we can conclude that the results are not driven by longer average time to completion. Finally, in order to be confident that these conclusions are robust to alternative (nonlinear) functional forms, the last two columns in Table 6b report estimates based on 1) a

Table 6b: Enrollment Regressions
1970-90 (Merged) Census of Population and Housing[a,b]

Variable	Dummy for age>30 Specification	Reciprocal Specification 1/age	Logarithmic Specification ln(age)
age[c]	-39.551	553.899	-37.307
	(0.175)	(2.611)	(0.126)
age * D1980[d]	2.755	-207.090	-0.140
	(0.239)	(3.252)	(0.174)
age * D1990	1.279	-418.686	7.593
	(0.238)	(3.172)	(0.169)
education	-2.937	-0.352	-0.964
	(0.02)	(0.025)	(0.020)
education * D1980	-0.229	-1.242	-0.153
	(0.03)	(0.033)	(0.027)
education * D1990	1.546	-1.005	1.218
	(0.03)	(0.033)	(0.027)
female	-3.572	-3.766	-2.745
	(0.150)	(0.158)	(0.142)
female * D1980	1.091	0.607	1.667
	(0.205)	(0.216)	(0.194)
female * D1990	3.065	1.772	2.821
	(0.200)	(0.211)	(0.189)
black	-6.422	-4.503	-5.567
	(0.235)	(0.247)	(0.222)
black * D1980	3.067	2.834	2.469
	(0.304)	(0.320)	(0.288)
black * D1990	4.671	2.628	3.884
	(0.324)	(0.341)	(0.306)
married	-27.246	-31.546	-24.133
	(0.185)	(0.187)	(0.173)
married * D1980	6.190	1.665	5.583
	(0.250)	(0.250)	(0.233)
married * D1990	10.665	2.152	5.569
	(0.244)	(0.244)	(0.227)

(cont'd)

Variables	Dummy for age>30 Specification	Reciprocal Specification 1/age	Logarithmic Specification ln(age)
D1980	-1.201	21.256	-0.570
	(0.386)	(0.565)	(0.544)
D1990	-23.342	25.083	-44.362
	(0.367)	(0.564)	(0.512)
intercept	95.915	25.688	177.902
	(0.279)	(0.425)	(0.394)
Adj-R^2	0.5044	0.4517	0.5581

a. The dependent variable is one if the person is enrolled as a student.
b. Parameter estimates are listed with standard errors in parentheses (sample sizes are listed in parentheses in the column headings); all values are multiplied by 100. All regressions are estimated by OLS (linear probability models). All variables are significant at 5% or better (except for *age**D1980 and D1980 in the last column). All columns additionally contain a vector of eight Census region dummies, plus interactions of each region dummy with 1) D1980, and 2) D1990.
c. In the first column "*age*" is a dummy=1 if age>30; in the second column "*age*" stands for 1/age; in the third column "*age*" stands for ln(age).
d. D1980=1 for 1980 Census data (zero otherwise), D1990=1 for 1990 Census data (zero otherwise).

reciprocal specification for age, and 2) a logarithmic specification for age. In both cases we see that age has a negative effect on enrollment iikelihood, but that this negative effect significantly diminishes over the three decades from 1970 to 1990, which is again the same pattern as in the last column of Table 6a.

Chapter Summary

In this chapter, I presented evidence of a rising trend in school enrollment of adults (people who are older than the traditional schooling ages) since the 1970's. I found

increases in the mean educational attainment of adult cohorts over time, increases at each education level in the average age of students, a higher percentage of adults enrolled at each education level, and a higher percentage of each adult age group enrolled as students. I also found in a regression context that the negative effect of age on enrollment declined monotonically and significantly over time. In addition, I showed that enrollment by adults is mostly part-time.

Chapter III THE EFFECTS OF CHANGES IN THE COLLEGE / HIGH SCHOOL WAGE DIFFERENTIAL ON ADULT ENROLLMENT IN COLLEGE

In Chapter I (result (5)), I show that people who have already completed their initial schooling period will respond to a rise in the rate of return to education (above what it was when they made their initial investment decision) by returning to school. In this section I will attempt to evaluate this empirically by looking at enrollment responses of adults (people who are past the traditional schooling ages) to the widely-documented rise in educational wage differentials from the late 1970's through the late 1980's (see Katz and Murphy, 1992). I will be focusing specifically on the rise in the college/high school wage differential and the decision by high school graduates to return to college.

Construction of Sample and Variables

The analysis in this section is based on information from the 1979-93 Current Population Survey (CPS) Outgoing Rotation Groups File. Since the focus is on the decision to re-enroll in college, I restrict my sample to people with completed education of 12-15 years. I then aggregate the monthly individual data into annual records for 12 age groups (ages 25-36), resulting in 180 (12 age groups by 15 years) year/age observations. As such, the variables used in this analysis are the percentages of CPS respondents who exhibit particular attributes in each age group each year, e.g. the variable "married" contains the percentage of 25 year olds who are married in 1979, the percentage of 26 years olds who are married in 1979, and so forth. The dependent variable used is

the percentage of people who are enrolled in school full-time in each age group each year, and is constructed using the employment status recode and major activities questions. Due to the cross-sectional nature of the CPS, I cannot directly identify people who are returning to school, but by restricting the analysis to those who are at least 25 years old, I can be reasonably confident that most of them have not been continuously enrolled.[23]

The key explanatory variable in this analysis is the change in the college/high school wage premium since individuals graduated from high school, constructed using the 1964-93 March CPS Annual Demographic Files.[24] Specifically, it is calculated for each year/age group as the difference between the ratio of the median[25] average weekly wages (annual earnings divided by weeks worked) of college graduates to the median average weekly wages of high school graduates in each age group in that year and the corresponding ratio

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[23] Given the small number of full-time students at older ages, I restrict my analysis to people 36 years or younger.

[24] The March CPS data is extracted from CPS Utilities on CD-ROM, made available from Unicon Research Corporation. Following Katz and Murphy (1992), I delete from my analysis people with real weekly earnings below $67 in 1982 dollars, which was equal to one half of the 1982 real minimum wage based on a 40-hour week.

[25] Median average weekly wages are used in order to minimize the effects of changes in top-code values over the years. Specifically, the annual earnings measure from which average weekly wages is calculated was top-coded at $99,000 from 1964-67, $50,000 from 1968-81, $75,000 from 1982-84, $99,000 from 1985-88, and $199,998 from 1989-93. To the extent that college graduates are more likely to earn above the top-code values, the CPS measure will tend to understate the returns to college, and will systematically understate increases in the returns to college over time during a period when the top-code is fixed. Therefore, I use median average weekly wages rather than mean average weekly wages for each year/age group so as to minimize the biases introduced by the top-coding scheme. Experiments with the use of mean average weekly wages (where people reporting top-coded earnings are given annual earnings imputed at 1.45 times the top code following Katz and Murphy (1992), and top-codes are allowed to increase over time by the rate of inflation), though, produce very similar results to those reported using median average weekly wages, so that my results are largely invariant to alternative measures of average weekly wages within cells.

for the same age group in the year when they most likely graduated from high school (i.e. when they were 18 years old). The reason for comparing the current wage ratio to that which pertained when these people graduated from high school is that it is after graduating from high school that the majority of people decide whether or not to go on for college. As such, changes in the relative returns to college since the date of high school graduation should most strongly affect their current decision about whether or not to return to college. I construct this variable using the March CPS files because my data for the outgoing rotation groups is based on the NBER 50 Variable Uniform Extract CD, which only provides data back to 1979. In order to calculate the change in the wage ratio described above, I need to use earnings data reaching back to the 1960's, e.g. 30 year olds in 1980 mostly likely graduated from high school in 1968 (when they were 18 years old). Using the 1964-93 March CPS Annual Demographic Files, I am therefore able to calculate the appropriate change in the wage ratio for all but 6 of the 180 year/age cells (constructed using the 1979-93 CPS Outgoing Rotation Groups File as described in the previous paragraph). My final dataset has a total of 174 records.[26]

Summary Statistics, Trends, and Regression Results

Table 7 reports variable definitions and summary statistics for the constructed variables used in the analysis. All summary statistics are weighted by the cell frequencies,

[26] Specifically, I deleted age groups 34-36 in 1979, 35 and 36 in 1980, and 36 year olds in 1981 since all of these groups were 18 years old prior to 1964, the first year of data I have. I experimented with assigning these groups the wage ratio in 1964, and while inclusion of these observations did not have a substantive effect on my estimates, they were ultimately dropped from the analysis in order to have a fully consistent measure of the wage ratios.

Table 7: Descriptive Statistics - Current Population Survey (1979-93)

Variable Names	Variable Definitions	Mean[a] (standard deviations)
student	Percentage of people enrolled in school in each year/age cell	0.018 (0.008)
$\Delta(W_c/W_{hs}) \times 100$	In each year/age cell, change in the ratio of median average weekly wages of college graduates to median average weekly wages of high school graduates between year t and the year when they graduated from high school	6.720 (20.019)
education	Average education level in each year/age cell	12.659 (0.081)
female	Percentage of females in each year/age cell	0.509 (0.009)
nonwhite	Percentage of people who are nonwhite in each year/age cell	0.133 (0.011)
married	Percentage of people who are married in each year/age cell	0.668 (0.083)
time	A time trend that increments by one for each year	-
D19xx	A dummy variable =1 for cells in year 19xx	-
Agexx	A dummy variable =1 for cells for age group xx	-

a. Means are reported with standard deviations in parentheses. All statistics are weighted by cell frequencies from the source Outgoing Rotation Groups File.

prior to aggregation, from the Outgoing Rotation Groups File. We see that approximately 2% of high school graduates are enrolled as students, and that the average education level of all high school graduates (including those enrolled) is a little over 12 years. Furthermore, consistent with the rise in the college/high school wage differential, the

change in the ratio of college to high school median average weekly wages since graduation from high school is positive.

Table 8 provides additional descriptive information on trends in 1) enrollment rates of high school graduates and 2) the change in the wage ratio. We see that both variables exhibit a positive, though not monotonic, time trend, reflecting 1) a secular rise in adult enrollments in formal schooling and 2) a secular rise in the relative returns to college.

Table 9a reports weighted least squares regression estimates of the effect of the change in the college/high school wage ratio on enrollment by adult high school graduates in college.[27] We see in Column I, which only includes controls for age, that the change in the wage ratio exerts the hypothesized positive effect on adult enrollment. We also see, as expected, that enrollment rates decline with age (consistent with result (4) in Chapter I).

Column II additionally includes controls for time effects and four demographic characteristics - education, gender, race, and marital status. The significantly positive education effect suggests that among people in the sample, those who have more than high school education are more likely to be enrolled. The insignificant female and nonwhite effects should not be interpreted as evidence that gender and race bear no relationship to adult enrollment patterns, but that they simply reflect the fact that there is little variation in the percentage of women or nonwhites across year/age cells (note the small standard deviations for these variables in Table 7). Finally, the significantly negative

[27] Since the unit of observation is cell averages, and cell sizes vary across records, the error term is heteroscedastic requiring the use of weighted last squares (see Greene, 1993).

Table 8: Gross Trends in Enrollment and Changes in the Median College to Median High School Weekly Wage Ratio[a]

	School Enrollment Rates[b]		Change in College/High School Wage Ratio: $\Delta(W_c/W_{hs})$	
time	0.033**		2.576***	
	(0.014)		(0.304)	
D1980		-0.057		-7.437
		(0.372)		(7.941)
D1981		-0.002		-5.463
		(0.369)		(7.862)
D1982		0.122		3.642
		(0.365)		(7.782)
D1983		0.162		-0.785
		(0.365)		(7.779)
D1984		0.158		5.265
		(0.365)		(7.780)
D1985		0.162		8.424
		(0.363)		(7.740)
D1986		0.268		14.178*
		(0.363)		(7.736)
D1987		0.156		17.378**
		(0.363)		(7.737)
D1988		0.169		15.385**
		(0.367)		(7.824)
D1989		0.291		14.786*
		(0.365)		(7.793)
D1990		0.275		24.976***
		(0.363)		(7.734)
D1991		0.481		21.912***
		(0.365)		(7.782)
D1992		0.409		30.945***
		(0.365)		(7.788)
D1993		0.426		25.548***
		(0.368)		(7.852)
Adjusted R^2	0.026	-0.048	0.290	0.264

a. All regressions are estimated by weighted least squares.
b. In the two columns below, all coefficients and standard errors are multiplied by 100.
Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

Table 9a: Effects of Changes in the College/High School Wage Ratio on Decisions of Adult High School Graduates to Enroll in College[a,b] (n=174)

	I	II
$\Delta(W_c/W_{hs})^c$ x 1000	0.060***	0.554*
	(0.013)	(0.305)
$\Delta(W_c/W_{hs})$ * time x 1000		-0.007*
		(0.004)
education		0.020**
		(0.008)
female		0.025
		(0.027)
nonwhite		0.011
		(0.032)
married		-0.063***
		(0.024)
Age26	-0.008***	-0.004***
	(0.001)	(0.002)
Age27	-0.011***	-0.006***
	(0.001)	(0.002)
Age28	-0.014***	-0.007**
	(0.001)	(0.003)
Age29	-0.017***	-0.008**
	(0.001)	(0.004)
Age30	-0.018***	-0.008**
	(0.001)	(0.004)
Age31	-0.019***	-0.008*
	(0.001)	(0.005)
Age32	-0.021***	-0.009**
	(0.001)	(0.005)
Age33	-0.022***	-0.009*
	(0.001)	(0.005)
Age34	-0.021***	-0.010*
	(0.001)	(0.005)
Age35	-0.022***	-0.010*
	(0.001)	(0.006)
Age36	-0.023***	-0.011**
	(0.001)	(0.006)

(cont'd)

D1980		0.001 (0.002)
D1981		0.001 (0.002)
D1982		0.002 (0.002)
D1983		0.002 (0.002)
D1984		0.001 (0.002)
D1985		0.002 (0.002)
D1986		0.003 (0.003)
D1987		-0.005 (0.006)
D1988		0.003 (0.003)
D1989		0.002 (0.004)
D1990		-0.001 (0.004)
D1991		0.001 (0.004)
D1992		-0.004 (0.004)
D1993		-0.004 (0.004)
Adjusted R^2	0.827	0.900

a. All regressions are estimated by weighted least squares. The dependent variable is percentage enrolled.

b. All regressors other than wages come from the NBER 50 Variable Uniform Extract of the Outgoing Rotation Groups; wages come from the March CPS files. The unit of observation is age groups within each year. Regression II additionally includes eight Census region dummies.

c. Calculated as the ratio of median average weekly wages of college graduates to the median average weekly wages of high school graduates in each age group in each year, minus the corresponding ratio for the same age group in the year of high school graduation (at age 18).

Cells report parameter estimates and standard errors (in parentheses).

***, **, * denote significance of 1%, 5% and 10% respectively.

effect of the percentage married in a year/age cell on enrollment indicates that higher marriage levels are associated with lower enrollment, consistent with the results found with individual data in the NLSY (see Chapter IV below).

Turning now to the central variable of interest, we see that the change in the wage ratio remains significantly positive even when age, time, and demographic effects are taken into account. We also see from the significantly negative interaction term of the change in wage ratio and a time trend, that the positive effect of the rise in the college/high school premium on adult college enrollment significantly declines over the sample period.[28] The negative interaction term is not surprising since when the college/high school wage differential first started rising, people who had previously ended their initial schooling period when returns were lower probably responded to the increase by returning to college. Yet, in later years people who are in the age range that I analyze, 25-36, especially the younger ones, may have already incorporated the higher premium into their initial schooling decision, and may have remained in school and completed college. As such, the impact of increases in rates of return would tend to decrease over time as these changes are increasingly incorporated into initial (continuous) schooling decisions. In other words, when returns begin to rise, adults would respond by returning to college, but as the higher returns persist, fewer and fewer people in the 25-36 age range ended their initial schooling period prior to knowing about these higher returns, so that the enrollment

[28] In fact, without the interaction, the change in the wage ratio is insignificant since the effect gets smaller with time. I also ran a specification with interactions between each year dummy and the change in the wage ratio, and found generally similar results - all the individual interactions are negative but generally insignificant, and the coefficient on the change variable is positive but not significant, possibly because with so many interactions there is a lot of noise.

response becomes increasingly incorporated into enrollment decisions at relatively younger ages.

In addition to the above consideration, it is possible that over the sample period there was a trend away from full-time enrollment by adults returning to school to part-time enrollment (perhaps more and more colleges responded to adult desires to return to school by making part-time programs more readily available), so that my full-time student enrollment status variable based on the major activities and employment status recode questions on the NBER CD is not capturing these part-time enrollment responses.

Table 9b reports specifications similar to the ones reported in Table 9a above, except that the change in the wage ratio is calculated differently. In Table 9a, the change is calculated over different time periods for different cells (because different age groups graduated high school at different times). In Table 9b, it is calculated as the change in the ratio of median college to median high school average weekly wages in period t for age group i, minus the corresponding wage ratio for age group i in year t-3. This specification allows me to evaluate the effects of recent changes in returns, as opposed to changes since high school graduation, on adult enrollment decisions. We see in the table that this variable for the change calculated using the same time period for all age groups in each year has no effect on adult enrollment decisions. I also experimented with different time periods, e.g. the change between t and t-2, and specifications that included changes for a number of past years separately, i.e. changes in returns between t and t-1, t-1 and t-2, and so forth. As in Table 9b, the results were generally highly insignificant. Apparently changes in rates of return that occur within the prior few years are much less

Table 9b: Effects of Changes in the College/High School Wage Ratio on Decisions of Adult High School Graduates to Enroll in College[a,b] (n=174)

	I	II
$\Delta(W_c/W_{hs})^c$ x 1000	0.010 (0.020)	-0.243 (0.356)
$\Delta(W_c/W_{hs})$ * time x 1000		-0.003 (0.004)
education		0.021*** (0.008)
female		0.021 (0.027)
nonwhite		0.007 (0.032)
married		-0.059*** (0.024)
Age26	-0.008*** (0.001)	-0.005*** (0.002)
Age27	-0.011*** (0.001)	-0.006*** (0.002)
Age28	-0.015*** (0.001)	-0.008*** (0.003)
Age29	-0.017*** (0.001)	-0.010** (0.004)
Age30	-0.018*** (0.001)	-0.009** (0.004)
Age31	-0.019*** (0.001)	-0.009** (0.005)
Age32	-0.021*** (0.001)	-0.010** (0.005)
Age33	-0.022*** (0.001)	-0.010** (0.005)
Age34	-0.023*** (0.001)	-0.011** (0.005)
Age35	-0.023*** (0.001)	-0.011** (0.006)
Age36	-0.024*** (0.001)	-0.012** (0.006)

(cont'd)

D1980		0.001 (0.002)
D1981		0.001 (0.002)
D1982		0.002 (0.002)
D1983		0.002 (0.002)
D1984		0.001 (0.002)
D1985		0.002 (0.002)
D1986		0.003 (0.003)
D1987		-0.005 (0.006)
D1988		0.004 (0.003)
D1989		0.002 (0.004)
D1990		-0.001 (0.004)
D1991		0.001 (0.004)
D1992		-0.004 (0.004)
D1993		-0.004 (0.004)
Adjusted R^2	0.805	0.898

a, b: see Table 9a notes.

c. Calculated as the ratio of median average weekly wages of college graduates to the median average weekly wages of high school graduates in each age group in each year, minus the corresponding ratio for the same age group *three years earlier* (the mean and standard deviation of this variable multiplied by 100 are 6.05 and 13.09 respectively).

Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

relevant to adult enrollment decisions than changes between the current period and when individuals graduated from high school.

The lack of significance for this variable is consistent with the interpretation given above for the negative interaction of the wage variable and a time trend in Table 9a. Changes in rates of return will most likely cause people to re-enroll in school if these changes occurred after they made their initial schooling decision - had rates of return increased while these people were still in high school, those who we would otherwise observe returning to school later would most likely remain in school and complete college prior to their mid-twenties. Therefore, the rise in the college/high school wage premium should have the strongest effect on people who graduated high school before the increase started, in the 1960's or 1970's. As such, the change in the wage ratio over the prior three years will fail to capture the relevant change in returns (i.e. the change that influences re-enrollment decisions) especially for these people - the older age groups in the later years - and is therefore unlikely to predict the educational choices that they make.

Chapter Summary

The evidence reported in this chapter using information from the 1979-93 CPS Outgoing Rotation Groups File and the 1964-93 March CPS Annual Demographic Files provides support for the hypothesis that increases in the college/high school wage premium from the late 1970's to late 1980's induced adults to return to college.

In addition, the results suggest that changes in rates of return since individuals

graduated from high school is much more relevant to their decisions to re-enroll in college than the changes in the prior few years.

Chapter IV THE DETERMINANTS OF RETURN-TO-SCHOOL LIKELIHOOD

The results in Chapter II show that within-cohort increases in educational attainment and a rise in adult school enrollment imply a secular rise in the percentage of adults returning to school. Furthermore, there is evidence in Chapter III that the rise in the college/high school wage differential from the late 70's to the late 80's encouraged adults to return to college. As noted, however, the cross-sectional nature of Census as well as CPS data does not allow identification of individuals' schooling spells. In order to identify each schooling spell, distinguish those individuals who returned to school from those who were in school continuously, and examine the wage implications of the two alternative schooling paths, longitudinal data is required. The rest of the study, therefore, will be based on data from the 1979-1992 National Longitudinal Survey of Youth. This chapter investigates the effects of likely covariates on the decision to return to school. Chapter V examines the relationship between additional formal schooling and training, and Chapter VI the wage consequences of returning to school.

Data Description: National Longitudinal Survey of Youth

The 1979-1992 National Longitudinal Survey of Youth (NLSY) is a nationally representative sample of 12,686 young men and women who were 14 to 21 years old when they were first surveyed in 1979.[29] Besides its longitudinal nature, this data set has the

[29] Since the NLSY is based on stratified, multi-stage random samples with oversamples of blacks, Hispanics and poor whites, sampling weights are used in the analysis.

additional advantage of containing detailed information on respondents' education, training, and labor market characteristics. I am able to determine the exact dates that each spell of schooling, as well as employment and training, began and ended and the individual's characteristics before and after each schooling, training, or employment spell.

Furthermore, continued human capital formation accomplished through a return to formal schooling is likely to take place relatively early due to the same considerations as those originally articulated by Ben-Porath. As such, the unmeasured consumption components of a return-to-school decision will tend to be smallest in this relatively young sample, making the interpretation of the findings less ambiguous.

Model Specification and Variable Definitions

The question that is asked in this chapter is as follows: Given a sample of individuals at a particular point in time, what are the characteristics that distinguish those who decide to go back to school from those who decide otherwise. To provide insights into this, a probit specification is used for estimation: the dependent variable is a dummy which equals one if the person returned to school since the last interview, and the explanatory variables are individuals' demographic and labor force characteristics, in addition to economic indicator variables, e.g. the local unemployment rate, at the time of last interview.

Specifically, the dependent variable is constructed using the following question that is asked each survey year: "At **any** time **since** (DATE OF LAST INTERVIEW), have you attended or been enrolled in regular school?" If the answer is yes, the respondent is then

asked for the exact months enrolled, starting from the beginning of the last calendar year. If the answer is yes and the respondent is not currently enrolled in school, an additional question is asked concerning the date he/she last attended school. By following individuals through the survey years, a detailed schooling history can be constructed for each individual using the above set of questions.

I classify a person as having returned to school if at least two years have passed since he/she last attended. My rationale for choosing a two-year period is that with a shorter period some continuous spells might be picked up due to reporting error or temporary absences from school due to illness or disciplinary suspensions. For those with multiple spells of returning to school (about 7% of those who returned), the first one is chosen to maintain uniformity across individuals, since first spells are possibly different from other spells.

Turning now to the explanatory variables, the rest of the section describes in detail the manner in which they are constructed. The first group of variables is available for all respondents.

highest grade completed - the highest grade completed and received credit for. Six schooling categories are constructed from this variable: (i) elementary school (completed less than 8 years of education), (ii) some high school (completed 8 or more but less than 12 years of education), (iii) high school (completed 12 years of education), (iv) some college (completed more than 12 but less than 16 years of education), (v) college (completed 16 years of education), and (vi) post-college (completed more than 16

years of education).

experience - actual years of labor market experience. Respondents were asked for the actual number of weeks worked since last interview, which I sum up over the years to get total actual experience.

nonwhite - a dummy which equals one if the respondent answers "hispanic" or "black" to the Racial/Ethnic Cohort Screener of 1979 interview.

female - a dummy which equals one if the respondent is female.

married - a dummy which equals =1 if "married" or "remarried", and =0 if "never married", "divorced", "widowed" or "separated".

AFQT percentile score - the Armed Forces Qualifications Test score, a composite score derived from select sections of the *Armed Services Vocational Aptitude Battery.*

local unemployment rate - a created variable based on the respondent's place of residence, using labor force data in Employment and Earnings published by the U.S. Department of Labor for the month of March of each survey year.

employed - a dummy which equals one if the respondent is currently working at one or more jobs.

received training in the last year - a dummy which equals one if the respondent received any government or non-government sponsored training during the previous year. (Additional training variables used in Chapter V will be discussed there.)

The next three variables are only constructed for individuals who were working at the time of last interview.

log(wage) - logarithm of the respondent's hourly wage

tenure - the actual number of years the respondent has been employed by the current employer (includes all gaps, so long as the respondent never reports having separated).

full-time - a dummy which equals one if the respondent is working for 35 or more hours per week.

The next two variables are constructed only for those who were not employed.

duration of unemployment - time since last reported period of employment (includes periods out of the labor force).

layoff versus quit - layoff=1 (quit=0) if the respondent answers "layoff", "end of temporary/seasonal job", "discharged/fired", "program ended", "plant closed", or "end of temporary/seasonal job" as the reason he/she left last job. Quit=1 (layoff=0) if the respondent answers "found better job", "bad working conditions", "pay too low", "quit to look for another job", "quit to take another job",

"own illness", "interfered with school", "entered armed forces", "pregnancy", "spouse changed jobs", or "parents changed jobs".

Sample Construction and Summary Statistics

The sample on which the analysis is based is constructed by pooling five yearly cross-sections - 1985-87, 1989, and 1990. The dependent variable for the 1985 cross-section, for example, is a dummy which equals one if the individual has returned to school since the 1984 survey and all the explanatory variables are measured at the time of the 1984 survey. The 1988 cross-section is omitted because information on individuals' characteristics at the time of the 1987 survey was incomplete. This is because only a limited telephone interview was conducted in 1987 due to funding shortages.[30,31] Since at most 2% to 3% of the respondents returned to school each year, pooling allows for more efficient estimation of parameters.[32] Likelihood-ratio tests suggest that cross-section parameters remain constant over the time period, so that pooling is indeed appropriate. (The results for these tests are discussed and reported in Appendix I.)

The years 1985 to 1990 (excluding 1988) are chosen for a couple of reasons. First,

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[30] Especially relevant for the present study is that in 1987, most of the questions on schooling and training were not asked. Although in the following year retrospective questions were asked covering the prior two-year period, there is the possibility of greater reporting errors.

[31] The 1987 cross-section can be used because the questions needed to construct the dependent variable are asked in the telephone survey. As for the explanatory variables, they are measured at the time of the 1986 survey, which is not affected by any funding problems.

[32] Since there are multiple observations on each individual, standard errors will be adjusted in all the probit regressions that follow.

starting in 1985, all the respondents are at least twenty years old and most of them are past the ordinary schooling age. Second, the vast majority of individuals in the sample returned to school during that time period. In fact, 95% of the additional schooling spells occurred before 1990.

Finally, certain exclusion criteria are used in each of the cross-sections: First, those who are out of the labor force, defined as never having held a job, are dropped from the sample (869 observations deleted). Second, workers holding public-sector, military, or agricultural jobs at previous year's survey are excluded (2,316 observations deleted).[33] Third, individuals with hourly wages less than one dollar or more than one hundred dollars are excluded (847 observations deleted). Fourth, those in the return sample are excluded once they complete their schooling spell.[34] (196, 200, 232, 180, and 150 individuals returned to school in the 1985, '86, '87, '89 and '90 cross-sections respectively.)

Table 10 reports descriptive statistics separately for those who returned for at least one period of additional schooling and those never did. A few suggestive patterns are evident: the return sample has somewhat higher average education levels, are more likely to be female, nonwhite, and not married, have higher AFQT scores, and are more likely to have received training in the year prior to their return-to-school spell. In the section below, results will show that these patterns remain even in the context of multivariate

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[33] Individuals excluded from one cross-section because of this criterion will be included in other cross-sections if they no longer hold such jobs.

[34] The reason is that for all individuals, at most one spell is analyzed. (For those with multiple spells, only the first spell is used, the reason for which is given in the previous section.) If these people were retained in the sample, therefore, they would by construction be included in the did-not-return sample in future cross-sections even though they did, in fact, experience a return spell.

analysis.

Table 10: Descriptive Statistics for the Pooled Sample

	Did Not Return	Return
Full Sample	n=33,424	n=958
highest grade completed	12.923 (2.256)	13.115 (2.163)
elementary school	0.010 (0.097)	0.006 (0.075)
some high school	0.123 (0.328)	0.107 (0.310)
high school	0.465 (0.499)	0.429 (0.495)
some college	0.227 (0.419)	0.230 (0.421)
college	0.130 (0.336)	0.204 (0.403)
post-college	0.046 (0.209)	0.024 (0.155)
experience (years)	5.239 (2.877)	5.277 (2.649)
<=1	0.064 (0.244)	0.053 (0.224)
>1 and <=4	0.302 (0.459)	0.270 (0.444)
>4 and <=7	0.366 (0.482)	0.438 (0.496)
>7	0.268 (0.443)	0.239 (0.427)
nonwhite	0.201 (0.401)	0.229 (0.421)

(cont'd)

	Did Not Return	Return
female	0.506 (0.500)	0.586 (0.493)
married	0.433 (0.495)	0.399 (0.490)
AFQT percentile score	47.084 (28.930)	50.925 (28.275)
local unemployment rate	7.336 (3.130)	7.498 (3.331)
employed	0.760 (0.427)	0.770 (0.421)
received training in the last year	0.146 (0.353)	0.235 (0.424)
<u>Employed</u>	n=24,200	n=690
log(wage)	1.929 (0.499)	1.962 (0.437)
tenure	2.574 (2.573)	2.254 (2.163)
full-time	0.827 (0.378)	0.886 (0.319)
<u>Not Employed</u>	n=9,224	n=268
duration of unemployment	1.421 (1.832)	1.235 (1.578)
laid off	0.419 (0.493)	0.433 (0.496)
quit	0.581 (0.493)	0.567 (0.496)

Cells report means and standard deviations (in parentheses).

To provide additional information on the return sample, Figure 3 displays the adaptive kernel estimate of the number of years since the individual was last enrolled

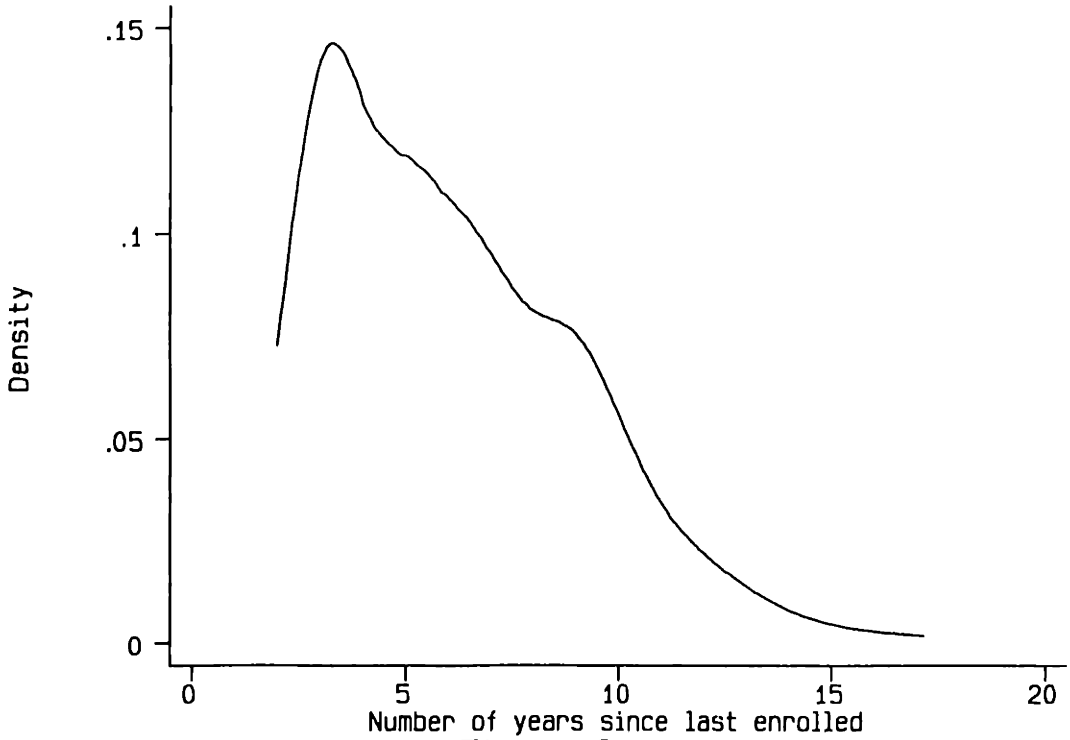

Figure 3.

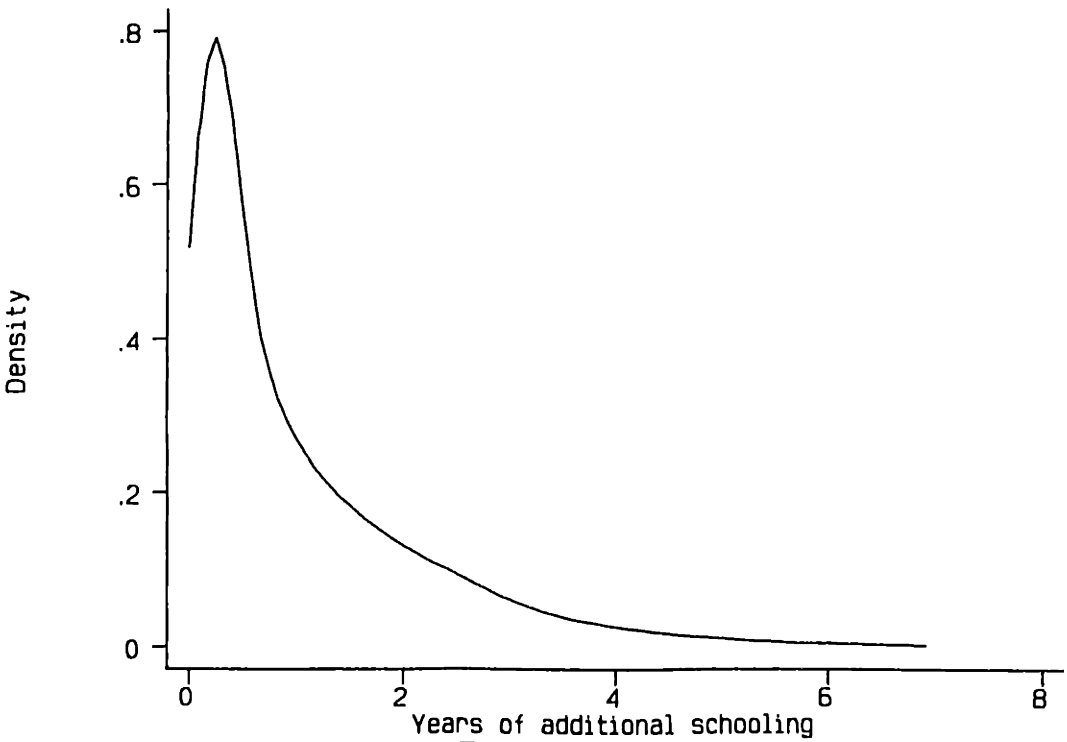

Figure 4.

(truncated below by the two year criteria). We see that the highest density appears to occur between approximately 2 and 5 years, though longer spells also occur for quite a number of people.[35] Figure 4 shows the adaptive kernel estimate of the duration (in years) of additional schooling spells. (Note that this is not a full-time equivalent measure.) It is evident that the majority of the spells are less than two years, suggesting that the return-to-school phenomenon may be associated mainly with relatively low levels of incremental schooling.[36]

Maximum-Likelihood Probit Results

Tables 11 and 12 present the results of return-to-school regressions for the entire pooled sample. In both tables the dependent variable is a dummy which equals one if the individual returned to school since the last interview date. Table 11 reports base specifications with the core demographic variables (measured at the last interview), while Table 12 additionally includes as regressors individuals' employment status, whether or not they received training during the previous year, and the unemployment rate of their local labor markets. In order to look at the effects of introducing a proxy for individual ability, specification I in both tables does not include AFQT score, whereas specification II does.

Looking first at specification I of Table 11, the results show that for education

[35] Recall that the youngest in the pooled sample is restricted to be twenty years old. Perhaps the sample is still relatively young, so that the time interval between schooling spells is relatively short.

[36] Unlike the results in Figure 3, there is no reason to believe that the patterns displayed in Figure 4 are in any way biased by the relatively young age of the sample.

Table 11: The Determinants of Return-to-School Likelihood (n=34,382)
Mean of Dependent Variable = 0.028[a]

	I[b]		II	
elementary school	0.059 (0.195)	0.381	0.231 (0.205)	1.744
some high school	0.209* (0.117)	1.489	0.351*** (0.128)	2.763
high school	0.217** (0.111)	1.351	0.316*** (0.118)	1.986
some college	0.242** (0.114)	1.684	0.292*** (0.116)	2.086
college	0.436*** (0.116)	3.654	0.452*** (0.117)	3.808
exp <=1 yr	-0.172*** (0.066)	-0.908	-0.156*** (0.067)	-0.830
1< exp <=4	-0.133*** (0.041)	-0.774	-0.126*** (0.041)	-0.733
7< exp	-0.099** (0.046)	-0.579	-0.108** (0.047)	-0.627
nonwhite	0.099*** (0.032)	0.640	0.158*** (0.038)	1.052
female	0.144*** (0.036)	0.879	0.146*** (0.036)	0.887
married	-0.069* (0.038)	-0.418	-0.074** (0.038)	-0.446
AFQT score x 10			0.026*** (0.008)	0.159
Pseudo R^2	0.012		0.014	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.

b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.

***, **, * denote significance of 1%, 5% and 10% respectively.

levels below the post-college level (which is the omitted category), more educated individuals are more likely to return to school.[37] Relative to those with post-college education, college graduates are most likely to return to school, followed by those with some college education, then high school graduates, then those with some high school education, and finally those with elementary school education. The fact that returning to school occurs at a greater rate at relatively higher education levels indicates that the return to formal schooling is more than just a remedial education phenomenon.[38] Even when AFQT score is included in specification II, the college coefficient remains large and highly significant, and those with elementary school education are still least likely to return to school.

A plausible explanation for these patterns can be found in the increase in education-based wage differentials in the late 1980's (Katz and Murphy, 1992). As shown in Chapter I (equation (5)), such an increase will encourage investments in additional schooling especially among individuals at higher education levels where the returns have grown fastest. Equation (5') further suggests that such a supply response will be strongest among young people. It is not surprising, therefore, to find these patterns for the relatively young sample used here.

Furthermore, if work experience is a productive input in later schooling and hence

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[37] It is not surprising that individuals with post-college levels of education are least likely to return to school, since they have already completed more than 16 years of education.

[38] While an alternative explanation might be that learning yields greater utility for the more educated, the fact that individuals in the sample are largely in their prime earnings and career development years makes it unlikely that consumption elements are driving these results (as might be the case with an older sample).

it is optimal to plan ex-ante to go back after working for a period of time[39], or if work experience enables individuals to understand their abilities better and realize ex-post the benefits of additional schooling (Chapter I, equation (7)), it is likely that these effects are especially strong among the more educated, and in particular, college graduates going back for an MBA or professional degree. If so, this provides an additional explanation for the large college coefficient.

As further evidence on this issue, we see in both specifications I and II that people with between 4 and 7 years of general labor market experience are more likely to return to school than those with fewer years of experience, but also that they are more likely to return than those with more than 7 years of experience. These patterns are consistent with the hypothesis that experience is a productive input for additional schooling (whether known ex-ante or discovered ex-post), although beyond 7 years of experience the effect disappears, possibly due to a combination of declining marginal productivity and increasing opportunity costs (see section (iv) of Chapter I).

A number of other interesting patterns are evident in both specifications: First, nonwhites are more likely to return to school than whites. Since nonwhites are more likely to come from relatively poorer families, they may lack the funds needed to invest in continued education, and at the same time face higher borrowing rates. Therefore, as they gain experience in the labor market and accumulate sufficient funds for further schooling, or else become more credit-worthy and thereby face effectively lower borrowing

[39] Refer to the sub-section of Chapter I titled *Returning to School as a Planned Investment.*

rates, we may observe them returning to school, as predicted by result (8') in Chapter I. (In the section titled *The Effects of Borrowing Constraints on Return-to-School Likelihood*, I will directly test this hypothesis.)

Second, we see that women are significantly more likely than men to return to school. A possible explanation for this result, which is similar to the one provided above to explain higher return rates for the more educated, is the decline in the male-female wage gap in the 1980's (see O'Neill and Polachek). Women who had completed their schooling prior to this change (or prior to the widespread recognition that the change had occurred) experienced an unanticipated increase in their rate of return to human capital, which as shown in equation (5) from Chapter I, would lead them to return to school.

Finally, we see that people who are married are less likely to return to school. For men, this may be particularly true if they are the sole wage earners of their families. As for women, since they usually bear the main responsibility for home production which often includes the caring of children after they get married, the opportunity cost of their time will tend to be higher than if they did not have these family-related responsibilities, especially if market inputs are not good substitutes for their home production. The resulting higher opportunity cost of schooling reduces their likelihood of returning to school. (This argument is similar to the one provided in section (iv) of Chapter I, and will be discussed further in the section titled *The Effects of The Presence of Children on the Return-to-School Likelihood of Married Individuals* below.)

Table 12 is identical to Table 11, except that it includes a set of additional regressors: the local unemployment rate, a dummy for employment status, and a dummy

Table 12: The Determinants of Return-to-School Likelihood (n=34,382)
(incidence of training in the past year included)
Mean of Dependent Variable = 0.028[a]

	I[b]		II	
elementary school	0.090 (0.197)	0.589	0.249 (0.207)	1.885
some high school	0.223** (0.118)	1.584	0.355*** (0.129)	2.761
high school	0.211* (0.112)	1.291	0.303*** (0.118)	1.870
some college	0.238** (0.115)	1.630	0.286*** (0.117)	1.999
college	0.427*** (0.117)	3.491	0.441*** (0.117)	3.636
exp <=1 yr	-0.195*** (0.071)	-0.992	-0.181*** (0.072)	-0.928
1< exp <=4	-0.139*** (0.043)	-0.792	-0.133*** (0.043)	-0.755
7< exp	-0.093** (0.047)	-0.537	-0.102** (0.047)	-0.583
nonwhite	0.106*** (0.032)	0.680	0.161*** (0.038)	1.056
female	0.148*** (0.036)	0.891	0.150*** (0.036)	0.896
married	-0.069* (0.038)	-0.411	-0.074** (0.038)	-0.437
unemployment rate	0.013** (0.006)	0.075	0.012** (0.006)	0.073
employed	-0.018 (0.044)	-0.110	-0.021 (0.044)	-0.127
received training last yr	0.249*** (0.044)	1.778	0.245*** (0.044)	1.734
AFQT score x 10			0.024*** (0.009)	0.146
Pseudo R^2	0.018		0.019	

a, b: see Table 11 notes.
***, **, * denote significance of 1%, 5% and 10% respectively.

for the receipt of training in the past year. We see that 1) with or without AFQT score included, the effects of the regressors in Table 11 discussed above are not substantively changed by these additional controls, and 2) while employment status somewhat surprisingly does not seem to influence return-to-school decisions, both the unemployment rate and receipt of training do have significantly positive impacts on return decisions.

The positive effect of the unemployment rate is again consistent with the result in section (iv) of Chapter I, which shows that the likelihood of returning to school is higher when the opportunity cost of schooling investments are lower. In areas with a high unemployment rate, people will, on average, tend to have lower opportunity costs because of 1) the direct negative effect of higher unemployment rates on wages and 2) a reduction in the expected returns to labor market participation as expected wages decline, via lower employment probabilities for the unemployed, or via lower expectation of continued employment (or career advancement through voluntary employer changes) for the employed.

We also see that people who received training in the year prior to last interview are more likely to have returned to school since then. This finding lends itself to two not incompatible interpretations. First, it may be the case that training and regular schooling are complementary, so that people who receive some form of training find it more profitable to return for additional further schooling, e.g. it is possible that training promotes discipline and hence better study habits, thereby raising the expected productivity of schooling. (This argument is not different from the one presented in Chapter I, equation (7).) Second, receipt of training may be a proxy for some

unmeasured productivity-related attribute of individuals, e.g. a greater drive for professional advancement, so that people who invest in training will also tend to invest in other forms of human capital accumulation.[40] Note, however, that the introduction of AFQT score in specification II has little effect on the training coefficient, suggesting the possibility that training may not be associated very strongly with any unobserved attributes. (Of course, it is equally possible that AFQT score is not a good proxy for whatever unobserved abilities that may be correlated with training.)

Finally, looking at the effect of AFQT scores on return likelihood, we see that people with higher AFQT scores, or greater ability, are more likely to return to school, which is not surprising.

Tables 13-16 report comparable specifications to those in Table 12, but decompose the analysis along the dimensions of 1) educational attainment (Table 13), 2) race (Table 14), 3) gender (Table 15), and 4) employment status (Table 16). Looking first at Table 13, which reports separate return-to-school estimates for each education category, we see that the effects of the covariates are largely similar to those found in Table 12, but there are a few interesting differences. First, while nonwhites are generally more likely to return to school (see Tables 11 and 12), possibly due to early funding shortfalls, this effect does not seem to operate at either the less than high school or college level. Perhaps for high school dropouts the reasons for leaving school have little to do with credit market

[40] Similarly, these more productive, dynamic, and/or diligent individuals may be more likely to be provided with employer-sponsored training and educational opportunities. While some information is available on the source of funds for certain training programs, there is very limited information in the NLSY on the source of funding for regular schooling. (The effects of funding sources for education and training will be examined in Table 31 below.)

Table 13a: Differences Among Education Categories in the Determinants of Return-to-School Likelihood[a]

	some high school[b] (n=5,885)		high school (n=15,773)	
exp <=1 yr	-0.081 (0.137)	-0.405	-0.088 (0.112)	-0.455
1< exp <=4	-0.066 (0.118)	-0.343	-0.054 (0.063)	-0.294
7< exp	-0.229 (0.176)	-1.039	-0.130* (0.072)	-0.691
nonwhite	0.136 (0.095)	0.753	0.174*** (0.057)	1.079
female	-0.034 (0.094)	-0.177	0.091* (0.055)	0.504
married	-0.120 (0.101)	-0.624	-0.195*** (0.056)	-1.085
unemployment rate	0.013 (0.015)	0.069	0.007 (0.008)	0.039
employed	-0.273*** (0.110)	-1.531	-0.066 (0.065)	-0.384
received training last yr	-0.059 (0.138)	-0.297	0.244*** (0.065)	1.617
AFQT score x 10	0.042 (0.032)	0.220	0.042*** (0.012)	0.234
Pseudo R^2	0.022		0.020	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
***, **, * denote significance of 1%, 5% and 10% respectively.

constraints. Also, there may not be significant racial differences in availability of funds at the college and post-college levels. Second, the negative effect of marriage on the

Table 13b: Differences Among Education Categories in the Determinants of Return-to-School Likelihood[a]

	some college[b] (n=7,410)		college (n=3,624)	
exp <=1 yr[c]	-0.689*** (0.171)	-2.195	-	-
1< exp <=4	-0.271*** (0.087)	-1.425	-0.065 (0.121)	-0.386
7< exp	-0.240*** (0.096)	-1.201	0.143 (0.104)	1.345
nonwhite	0.215*** (0.081)	1.380	-0.047 (0.115)	-0.363
female	0.208*** (0.077)	1.162	0.180** (0.090)	1.532
married	0.091 (0.083)	0.532	0.097 (0.092)	0.918
unemployment rate	-0.007 (0.012)	-0.042	0.053*** (0.015)	0.436
employed	0.170* (0.100)	0.880	0.049 (0.152)	0.681
received training last yr	0.236*** (0.091)	1.570	0.298*** (0.101)	2.912
AFQT score x 10	0.017 (0.016)	0.098	0.003 (0.023)	0.030
Pseudo R^2	0.036		0.029	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. No college graduates in the sample belong in this category.
***, **, * denote significance of 1%, 5% and 10% respectively.

likelihood of return is only evident at the lower education levels. This may be due to assortive mating, so that well-educated spouses earn a sufficiently high income which

allows substitution of time in household production with market inputs, i.e. child support, prepared meals, and so forth.

Table 14 reports return-to-school patterns for whites and nonwhites. We see that the quadratic experience effects, and the positive effect of the unemployment rate, are only evident for whites, whereas the negative effects of marriage and being employed are only evident for nonwhites. It seems that there may be different driving forces behind the decision to return for whites and nonwhites.

Table 15 reports return-to-school patterns by gender. Experience seems to have a more pronounced quadratic effect for women, a result that suggests women learn more about their abilities or desired career direction during their time in the labor market than men. We also see that the negative effect of being married on return likelihood is only present for women, which is not surprising given that the burden of home production tends to fall mainly on women in the majority of marriages. Finally, recall that in Table 12 employment status has an insignificant effect, which as pointed out is a somewhat surprising result because being employed means that the opportunity costs of schooling are higher, and therefore should exert a negative effect. It becomes clear in this table that the negative effect for men was masked by the insignificant effect for women, which is possibly reflecting relatively lower wages and lower promotion likelihood for women (see Lazear and Rosen, 1990), or the fact that a high percentage of them are employed either in part-time jobs, or else self-select into jobs with more flexible and/or less demanding hours.

Table 14: Differences Between Whites and Nonwhites in the Determinants of Return-to-School Likelihood[a]

	White[b] (n=19,803)		Nonwhite (n=14,579)	
elementary school	0.187 (0.301)	1.288	0.691*** (0.286)	8.471
some high school	0.315** (0.147)	2.325	0.727*** (0.238)	7.526
high school	0.255** (0.128)	1.507	0.699*** (0.231)	5.102
some college	0.245** (0.126)	1.618	0.672*** (0.230)	6.425
college	0.432*** (0.124)	3.370	0.594*** (0.239)	6.419
exp <=1 yr	-0.282*** (0.117)	-1.268	-0.023 (0.081)	-0.152
1< exp <=4	-0.169*** (0.054)	-0.907	-0.011 (0.058)	-0.071
7< exp	-0.115** (0.055)	-0.633	-0.032 (0.072)	-0.211
female	0.152*** (0.044)	0.872	0.142*** (0.049)	0.953
married	-0.068 (0.046)	-0.389	-0.091* (0.052)	-0.589
unemployment rate	0.015** (0.007)	0.085	0.003 (0.008)	0.017
employed	0.003 (0.057)	0.020	-0.097* (0.055)	-0.671
received training last yr	0.244*** (0.053)	1.667	0.234*** (0.061)	1.841
AFQT score x 10	0.019* (0.010)	0.110	0.050*** (0.012)	0.334
Pseudo R^2	0.022		0.017	

a, b: see Table 13b notes.

***, **, * denote significance of 1%, 5% and 10% respectively.

Table 15: Differences Between Men and Women in the Determinants of Return-to-School Likelihood[a]

	Male[b] (n=16,512)		Female (n=17,870)	
elementary school	0.590** (0.295)	5.381	-0.053 (0.247)	-0.341
some high scho '	0.556*** (0.197)	4.317	0.246 (0.172)	1.982
high school	0.529*** (0.183)	2.942	0.164 (0.157)	1.113
some college	0.424** (0.182)	2.822	0.190 (0.155)	1.399
college	0.613*** (0.181)	5.040	0.321** (0.155)	2.695
exp <=1 yr	-0.059 (0.121)	-0.285	-0.242*** (0.085)	-1.346
1< exp <=4	-0.078 (0.065)	-0.385	-0.169*** (0.057)	-1.075
7< exp	-0.159** (0.071)	-0.772	-0.064 (0.063)	-0.418
nonwhite	0.125** (0.058)	0.691	0.192*** (0.051)	1.445
married	0.004 (0.061)	0.019	-0.093** (0.049)	-0.626
unemployment rate	0.008 (0.009)	0.042	0.014** (0.007)	0.095
employed	-0.163*** (0.068)	-0.934	0.050 (0.056)	0.329
received training last yr	0.247*** (0.065)	1.510	0.237*** (0.060)	1.875
AFQT score x 10	0.025** (0.012)	0.129	0.027** (0.012)	0.182
Pseudo R^2	0.019		0.021	

a, b: see Table 13b notes.

***, **, * denote significance of 1%, 5% and 10% respectively.

Finally, Table 16 reports results separately by employment status. Looking first at the employed sample we see, as expected, that tenure (which is associated with high opportunity costs of schooling and the existence of a good job match), exerts a negative effect on return likelihood. Full-time employment increases return likelihood, possibly reflecting the investment decisions of people on upward career paths. As for the sample of those not working, surprisingly few of the covariates seem to have an effect on the decision to return to school, although the ones that are significant have the same sign as in the working sample. While it is not obvious why so few of the covariates matter, one possible reason might be that the sample is composed largely of individuals who are not currently labor force participants, and who do not plan to enter the labor force in the near future, and as such are less influenced by changes in opportunity costs, rates of return on human capital, and so forth. Finally, we do see that people who were dismissed or fired are more likely to return to school. At first glance, this finding seems inconsistent with the characterization of people who return to school as being relatively more productive and dynamic. It is possible, however, that the dismissed includes those who lost their jobs due to sectoral declines.[41] It may also be the case that people who are fired face very unfavorable wage-offer distributions, which translate into very low opportunity costs of schooling, and that while we would not generally expect them to return to school, the now very low opportunity costs are exerting an even stronger influence.

[41] There is no way to distinguish them from the others, since respondents are not asked for the reason of dismissal.

Table 16: Variations By Employment Status in the Determinants of Return-to-School Likelihood[a]

	Working (n=24,890)			
	I[b]		II	
elementary school	0.042 (0.227)	0.257	0.061 (0.230)	0.376
some high school	0.207 (0.142)	1.440	0.230 (0.144)	1.596
high school	0.239** (0.125)	1.444	0.262** (0.126)	1.554
some college	0.276** (0.123)	1.891	0.312*** (0.125)	2.148
college	0.377*** (0.122)	2.880	0.364*** (0.123)	2.713
exp <=1 yr	-0.329** (0.148)	-1.429	-0.304** (0.149)	-1.325
1 < exp <=4	-0.136*** (0.050)	-0.750	-0.129*** (0.051)	-0.700
7< exp	-0.150*** (0.050)	-0.840	-0.122*** (0.052)	-0.679
nonwhite	0.144*** (0.045)	0.930	0.148*** (0.045)	0.938
female	0.196*** (0.041)	1.178	0.227*** (0.042)	1.344
married	-0.022 (0.043)	-0.132	-0.014 (0.043)	-0.079
unemployment rate	0.012* (0.007)	0.068	0.014** (0.007)	0.084
received training last yr	0.262*** (0.049)	1.844	0.245*** (0.049)	1.671
AFQT score x 10	0.029*** (0.010)	0.172	0.030*** (0.010)	0.174
tenure			-0.027*** (0.010)	-0.159
full-time			0.240*** (0.062)	1.194
Pseudo R^2	0.027		0.032	

(cont'd)

	Not Working (n=9,284)[c]			
	I		II	
some high school	0.136 (0.234)	0.867	0.128 (0.236)	0.805
high school	0.035 (0.231)	0.205	0.025 (0.233)	0.144
some college	-0.240 (0.255)	-1.254	-0.244 (0.255)	-1.264
college	0.109 (0.285)	0.708	0.110 (0.285)	0.705
exp <=1 yr	-0.110 (0.103)	-0.607	-0.079 (0.106)	-0.444
1 < exp <=4	-0.072 (0.089)	-0.423	-0.059 (0.089)	-0.344
7< exp	0.196 (0.140)	1.354	0.187 (0.141)	1.272
nonwhite	0.172** (0.074)	1.103	0.174** (0.075)	1.104
female	-0.036 (0.072)	-0.217	-0.024 (0.074)	-0.143
married	-0.191*** (0.079)	-1.101	-0.178** (0.080)	-1.021
unemployment rate	0.010 (0.010)	0.058	0.010 (0.010)	0.056
received training last yr	0.094 (0.099)	0.593	0.088 (0.099)	0.554
AFQT score x 10	0.013 (0.018)	0.075	0.013 (0.018)	0.074
duration of unemployment			-0.015 (0.019)	-0.089
dismissed/fired			0.213* (0.121)	1.500
Pseudo R^2	0.020		0.023	

a, b: see Table 13b notes.

c. Observations with post-college education are excluded because only one person in the return sample belongs in that category. "Elementary school" is chosen to be the omitted education category in the regressions above.

***, **, * denote significance of 1%, 5% and 10% respectively.

Focusing now on those who returned to school, Table 17 provides a matrix of educational transitions, i.e. the percentage of people at each education level who returned to school and the amount of additional schooling that the spell resulted in. We see that quite a lot of people finished their first return spell without obtaining a degree,[42] though they may have moved closer to completion of a degree and may ultimately complete the degree during a subsequent schooling spell. We see that a relatively large number of high school graduates subsequently returned to school in order to attend college, with the major action taking place in two year colleges and secondarily in four year colleges -- though, once again, the majority of these people do not complete their degrees during their first return-to-school spell. We also see, not surprisingly, that the other main area where return-to-school behavior is seen is graduates from 4-year colleges returning for graduate study.

Table 18 examines the determinants of degree completion among those who returned. The dependent variable is a dummy which equals one if the individual obtained a degree during the additional schooling spell, and the explanatory variables are individuals' demographic and labor force characteristics. In both specifications, the significant determinants of whether a degree was obtained are education level, experience, and AFQT score. Specifically, 1) people who had some high school education when they returned are most likely to obtain a degree, followed by college graduates and then those

[42] These cases appear in the cells along the diagonal of the matrix which have the same pre- and post- education levels (these are people who completed less than one year of additional schooling), plus those cases in the cells that indicate additional schooling without obtaining diplomas, e.g. "some 2-yr coll.".

Table 17: Pre- and Post-Return Schooling Levels for the Return Sample

post- / pre-	<high school	high school (ged)	high school (dip.)	some 2-yr coll.	2-yr coll. (AA)	some 4-yr coll.	some 4-yr coll. (AA)	4-yr coll. (BA, BS)	some grad. school	MA, MBA, MS, MSW	PhD	MD, LLD, DDS	Total
< high school[a]	72.2 100.0	13.4 47.4	5.3[d] 8.2	4.0 1.6	2.2 4.6	2.9 2.1							100.0 11.7
high school (ged)		28.0 52.6		42.1 8.7		25.0 9.5	3.5 5.3	1.4 1.5					100.0 6.2
high school (diploma)			23.3 91.8	44.1 42.6	5.9 30.3	24.0 42.6	1.3 10.0	1.4 6.9					100.0 29.1
some 2-yr coll.				71.4 32.2	11.9 28.5	10.5 8.7	1.4 4.5	2.5 5.9	0.4 0.4	2.0 4.6			100.0 13.6
2-yr coll. (AA)					50.9 29.3		39.8 32.0	9.3 5.2					100.0 3.3
some 4-yr coll.				31.8 14.9	3.2 7.3	43.0 37.1	6.0 20.2	6.6 15.8	7.9 8.7	1.5 2.9			100.0 14.2
some 4-yr coll. (AA)[b]							48.6 28.0	51.4 20.6					100.0 2.3
4-yr coll. (BA/BS)+[c]								13.0 44.1	58.3 91.0	27.2 92.4	0.4 100.0	1.2 100.0	100.0 19.7
Total	8.5 100.0	3.3 100.0	7.6 100.0	30.1 100.0	5.7 100.0	16.3 100.0	4.0 100.0	5.8 100.0	12.6 100.0	5.8 100.0	0.1 100.0	0.2 100.0	100.0 100.0

a. "< high school" includes elementary school and some high school.

b. "Some 4-yr coll. (AA)" refers to the education level of those individuals who graduated from a 2-yr college with an Associate (AA) degree and who subsequently attended a 4-year college.

c. "4-yr coll. (BA/BS)+" means 4-yr college or above.

d. Each cell gives the row (top) and column (bottom) percentages of individuals with particular pre- and post-return schooling levels, e.g. the number 5.3 in the 4th cell, 1st row, says that 5.3% of those with less than high school education returned to high school and graduated with a diploma.

Table 18: The Likelihood of Degree Completion Among Those Who Returned
Mean of Dependent Variable = 0.285[a] (n=958)

	I		II	
elementary school	0.307 (0.705)	0.084	0.324 (0.705)	0.089
some high school	0.940** (0.456)	0.297	0.989** (0.455)	0.315
high school	0.201 (0.411)	0.048	0.224 (0.410)	0.054
some college	0.641* (0.398)	0.178	0.650* (0.398)	0.180
college	0.741* (0.394)	0.213	0.741* (0.395)	0.212
exp <=1 yr	0.339 (0.291)	0.093	0.399 (0.317)	0.111
1< exp <=4	0.438*** (0.182)	0.114	0.489*** (0.192)	0.129
4< exp <=7	0.265 (0.170)	0.064	0.302* (0.177)	0.073
nonwhite	-0.026 (0.140)	-0.006	-0.040 (0.140)	-0.009
female	0.104 (0.128)	0.024	0.112 (0.129)	0.026
married	-0.212 (0.132)	-0.049	-0.210 (0.132)	-0.049
unemployment rate			-0.013 (0.020)	-0.003
employed			0.022 (0.161)	0.005
received training last yr			0.129 (0.147)	0.031
AFQT score x 10	0.095*** (0.030)	0.023	0.096*** (0.003)	0.023
Pseudo R^2	0.082		0.084	

a. The dependent variable is a dummy which equals one if the individual obtained a degree during the additional schooling spell.

***, **, * denote significance of 1%, 5% and 10% respectively.

with some college education, 2) the effect of experience seems more or less quadratic, and 3) people with higher AFQT scores are more likely to obtain a degree.

The Effects of Borrowing Constraints on Return-to-School Likelihood

I hypothesized in Chapter I (see result (8')) that individuals who faced borrowing constraints are more likely to return to school because they are more likely to have to leave school early due to a lack of funds, so that when years of work provide them with the funds or the credit to obtain loans at a lower rate, they return for more schooling. I also hypothesized in the section above that the reason nonwhites are more likely to return to school is they are more likely to come from poor families and face stronger borrowing constraints. My goal in this section is to empirically test these hypotheses.

Table 19 reports specifications similar to specification II in Table 12, except they include controls for family background. Since I do not have information on parental income (which is probably the most direct indicator of the presence or absence of borrowing constraints), I use as proxies a series of dummies constructed using information on individuals' living arrangements at age 14 (a question asked of all respondents at the beginning of the survey in 1979) and their parents' education levels. Specifically, I created three dummies using the question on living arrangements: "lived with both parents at age 14", "lived with one parent at age 14", and "lived with neither parent at age 14", the idea being that those who lived with both parents should on average be the least financially constrained, and those who lived with neither parent the most constrained. We see in specification I that compared to people who lived with neither parent at age 14 (the

Table 19: The Effects of Borrowing Constraints on Return-to-School Likelihood[a]
(n=29,522)

	I[b]		II	
<u>family background</u>[c]				
lived with both parents at age 14	-0.159*** (0.061)	-1.042		
lived with both parents & father's ed>12 yrs			-0.128** (0.064)	-0.767
lived with both parents & father's ed<=12			-0.211*** (0.068)	-1.136
lived with one parent at age 14	-0.109 (0.073)	-0.599		
lived with one parent & parent's ed>12 yrs			-0.097 (0.086)	-0.532
lived with one parent & parent's ed<=12			-0.126 (0.084)	-0.668
<u>other variables</u>				
elementary school	0.369 (0.231)	3.115	0.401* (0.233)	3.486
some high school	0.325*** (0.135)	2.483	0.346*** (0.137)	2.678
high school	0.283** (0.121)	1.714	0.294*** (0.122)	1.806
some college	0.265** (0.120)	1.818	0.267** (0.120)	1.828
college	0.426*** (0.120)	3.435	0.424*** (0.120)	3.401
exp <=1 yr	-0.183** (0.082)	-0.931	-0.184** (0.083)	-0.932
1< exp <=4	-0.127*** (0.046)	-0.721	-0.129*** (0.046)	-0.727

(cont'd)

7< exp	-0.113**	-0.639	-0.110**	-0.625
	(0.050)		(0.049)	
nonwhite	0.126***	0.817	0.139***	0.901
	(0.042)		(0.042)	
female	0.139***	0.828	0.141***	0.835
	(0.039)		(0.039)	
married	-0.068*	-0.399	-0.065*	-0.386
	(0.041)		(0.041)	
unemployment rate	0.011*	0.066	0.012*	0.068
	(0.006)		(0.006)	
employed	0.010	0.061	0.010	0.060
	(0.049)		(0.049)	
received training last year	0.262***	1.866	0.261***	1.854
	(0.046)		(0.046)	
AFQT score x 10	0.025***	0.148	0.023***	0.137
	(0.009)		(0.009)	
Pseudo R^2	0.021		0.021	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview data.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. The family background variables are a series of dummies constructed using information on individuals' living arrangements at age 14 (a question asked of all respondents at the beginning of the survey in 1979) and their parents' education levels. The omitted category is "lived with neither parent at age 14".

***, **, * denote significance of 1%, 5% and 10% respectively.

omitted category), those who lived with one parent are less likely (significant at 14%) to return to school, and those who lived with both parents are even less likely (significant at 1%) to do so. If living arrangements are indeed reasonably good proxies for family resources, then these patterns are supportive of the hypothesis that people who were

credit-constrained are more likely to return to school.

In specification II, I use parental education level as an additional proxy for family background. The idea here is that the less educated one's parents, the higher one's likelihood of facing borrowing constraints, and subsequently returning to school. The results, however, suggest the opposite: 1) those who lived with both parents and their fathers' education is less than or equal to 12 years are *less* likely to return (larger negative coefficient) than those who also lived with both parents but their fathers' education is greater than 12 years, and 2) among those who lived with one parent, lower parental education is also associated with a lower likelihood of return, although the coefficients are not significant at the conventional levels. However, the problem with using parental education as a control is that it may be capturing other effects as well, e.g. it makes sense that parents who are more educated will tend to stress the value of education, so that among individuals who left school early, those with more educated parents may be more likely to return because they realize the importance of education. It therefore seems that living arrangements at age 14 are better proxies for financial resources, and if so, then the results in specification II also provide support for the borrowing constraint hypothesis because they show that those who lived with both parents (regardless of their fathers' education level) are least likely to return to school, followed by those who lived with one parent.

Table 20 reports the same specifications as in Table 19, but only for people with high school and some college education, i.e. those returning to college. I find the same patterns described above. However, when I estimate the same specifications for those

Table 20: The Effects of Borrowing Constraints on Return-to-School Likelihood[a] of Individuals with High School or Some College Education (n=19,986)

	I[b]		II	
<u>family background</u>[c]				
lived with both parents at age 14	-0.236*** (0.072)	-1.543		
lived with both parents & father's ed>12 yrs			-0.191*** (0.075)	-1.088
lived with both parents & father's ed<=12			-0.325*** (0.082)	-1.597
lived with one parent at age 14	-0.113 (0.087)	-0.585		
lived with one parent & parent's ed>12 yrs			-0.104 (0.100)	-0.535
lived with one parent & parent's ed<=12			-0.129 (0.103)	-0.645
<u>other variables</u>				
exp <=1 yr	-0.259** (0.112)	-1.170	-0.260** (0.112)	-1.166
1< exp <=4	-0.140*** (0.054)	-0.749	-0.142*** (0.055)	-0.754
7< exp	-0.168*** (0.061)	-0.887	-0.163*** (0.060)	-0.861
nonwhite	0.153*** (0.049)	0.960	0.170*** (0.050)	1.071
female	0.116*** (0.047)	0.652	0.119*** (0.048)	0.669
married	-0.084* (0.049)	-0.469	-0.078* (0.049)	-0.436
unemployment rate	0.001 (0.007)	0.005	0.002 (0.007)	0.010

(cont'd)

employed	0.049 (0.059)	0.271	0.049 (0.059)	0.269
received training last year	0.274*** (0.056)	1.881	0.273*** (0.056)	1.864
AFQT score x 10	0.028*** (0.010)	0.159	0.024*** (0.010)	0.137
Pseudo R^2	0.021		0.022	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview data.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. The family background variables are a series of dummies constructed using information on individuals' living arrangements at age 14 (a question asked of all respondents at the beginning of the survey in 1979) and their parents' education levels. The omitted category is "lived with neither parent at age 14".

***, **, * denote significance of 1%, 5% and 10% respectively.

with less than high school education, and for those with at least college education, I find no pattern at all. (Table 21 reports the estimates from one specification for these two groups.) The less than high school result is not surprising because the cost of going to high school is much lower than that for college, and as such, borrowing constraints may not matter very much. It is also not surprising that for those who already have a college degree, parental resource constraints have minimal influence. The absence of similar patterns for both lower and higher education categories is therefore consistent with the borrowing constraint hypothesis.

Table 21: The Effects of Borrowing Constraints on Return-to-School Likelihood of Individuals with Less Than High School, or College and Post-College Education[a]

	Less Than High School[b] (n=4,930)		College and Post-College (n=4,542)	
<u>family background</u>[c]				
lived with both parents & father's ed>12 yrs	-0.142 (0.176)	-0.655	0.589 (0.206)	0.043
lived with both parents & father's ed<=12	0.078 (0.138)	0.398	-0.010 (0.234)	-0.071
lived with one parent & parent's ed>12 yrs	-0.157 (0.218)	-0.692	-0.112 (0.269)	-0.746
lived with one parent & parent's ed<=12	-0.138 (0.159)	-0.624	-0.255 (0.340)	-1.469
<u>other variables</u>				
exp <=1 yr	1.726 (0.154)	0.088	-	-
1< exp <=4	-0.030 (0.132)	-0.151	-0.133 (0.112)	-0.907
7< exp	-0.306 (0.200)	-1.266	0.066 (0.098)	0.488
nonwhite	0.081 (0.102)	0.422	-0.087 (0.115)	-0.593
female	-0.029 (0.105)	-0.147	0.238*** (0.085)	1.738
married	-0.149 (0.110)	-0.741	0.029 (0.087)	0.214
unemployment rate	0.001 (0.016)	0.005	0.052*** (0.014)	0.380
employed	-0.274** (0.125)	-1.471	0.143 (0.145)	0.940
received training last year	0.035 (0.147)	0.180	0.281*** (0.095)	2.373
AFQT score x 10	0.052 (0.033)	0.263	-0.014 (0.022)	-0.101
Pseudo R^2	0.029		0.032	

a, b, c: see Table 20 notes.
***, **, * denote significant of 1%, 5%, and 10% respectively.

Since nonwhites generally come from poorer families, it may be that they face stronger borrowing constraints, and are therefore more likely to return to school after a period of work. ("Nonwhite" has a significantly positive coefficient in all the return-to-school regressions in Tables 11 and 12). In order to investigate this possibility, Table 22 reports similar specifications as in Table 19, but includes interactions of all the family background variables with "nonwhite". Looking at both specifications, we see that most of the interactions with "nonwhite" are positive (although none significant). Also, while the "nonwhite" coefficient is no longer significant, "nonwhite" and all the interactions are jointly significant at 5% in both specifications. These results suggest that if the family background variables do capture the presence (or absence) of borrowing constraints, then there is some support for the hypothesis that nonwhites generally face stronger borrowing constraints, and further that some of the positive effects of the "nonwhite" coefficient in earlier regressions (where family background is not controlled for) may be explained by the fact that they are more credit-constrained than whites, and hence are more likely to return to school.

The Effects of the Presence of Children on the Return-to-School Likelihood of Married Individuals

This section directly tests the hypothesis that household responsibilities, and in particular the caring of children which requires both time and money, are the major reasons behind the significantly lower return likelihood of people who are married.

Table 22: Variations by Race in the Effects of Borrowing Constraints on Return-to-School Likelihood[a] (n=29,522)

	I[b]		II	
<u>family background</u>[c]				
lived with both parents at age 14	-0.164** (0.077)	-1.073		
_____ * nonwhite[d]	0.006 (0.109)	0.038		
lived with both parents & father's ed>12 yrs			-0.134* (0.079)	-0.806
_____ * nonwhite			-0.009 (0.116)	-0.052
lived with both parents & father's ed<=12			-0.229*** (0.088)	-1.224
_____ * nonwhite			0.065 (0.121)	0.409
lived with one parent at age 14	-0.148 (0.099)	-0.790		
_____ * nonwhite	0.118 (0.133)	0.783		
lived with one parent & parent's ed>12 yrs			-0.110 (0.109)	-0.594
_____ * nonwhite			0.047 (0.154)	0.292
lived with one parent & parent's ed<=12			-0.251* (0.136)	-1.192
_____ * nonwhite			0.249 (0.169)	1.866
nonwhite	0.100 (0.103)	0.634	0.097 (0.103)	0.611

(cont'd)

other variables				
elementary school	0.367	3.095	0.395*	3.409
	(0.231)		(0.234)	
some high school	0.326***	2.487	0.348***	2.702
	(0.135)		(0.137)	
high school	0.284***	1.744	0.297***	1.821
	(0.121)		(0.122)	
some college	0.265**	1.814	0.267**	1.826
	(0.120)		(0.120)	
college	0.426***	3.428	0.423***	3.394
	(0.120)		(0.120)	
exp <=1 yr	-0.184**	-0.934	-0.184**	-0.932
	(0.082)		(0.083)	
1< exp <=4	-0.128***	-0.723	-0.129***	-0.725
	(0.046)		(0.046)	
7< exp	-0.113**	-0.641	-0.110**	-0.624
	(0.050)		(0.049)	
female	0.139***	0.828	0.141***	0.834
	(0.039)		(0.039)	
married	-0.068*	-0.399	-0.065*	-0.384
	(0.041)		(0.041)	
unemployment rate	0.011*	0.066	0.012*	0.069
	(0.006)		(0.006)	
employed	0.011	0.064	0.011	0.068
	(0.049)		(0.049)	
received training last year	0.261***	1.862	0.261***	1.852
	(0.046)		(0.046)	
AFQT score x 10	0.025***	0.148	0.023***	0.138
	(0.009)		(0.009)	
Pseudo R^2	0.021		0.022	

a, b, c: see Table 20 notes.
d. "_____ * nonwhite" is the interaction of the variable above with "nonwhite".

***, **, * denote significance of 1%, 5% and 10% respectively.

Table 23 specification I is similar to specification II in Table 12, except that it includes a dummy for "kids present". Specification II additionally includes the interaction

Table 23: The Effects of the Presence of Children on the Return-to-School Likelihood of Married Individuals[a] (n=35,582)

	I[b]		II	
married	-0.047 (0.043)	-0.280	-0.034 (0.052)	0.200
married * kids present[c]			-0.236*** (0.079)	-1.274
kids present[d]	-0.060 (0.046)	-0.355	0.078 (0.058)	0.473
<u>other variables</u>				
elementary school	0.266 (0.207)	2.041	0.263 (0.207)	2.010
some high school	0.375*** (0.129)	2.962	0.371*** (0.129)	2.908
high school	0.318*** (0.118)	1.961	0.318*** (0.118)	1.955
some college	0.291*** (0.117)	2.041	0.295*** (0.117)	2.066
college	0.441*** (0.117)	3.631	0.442*** (0.117)	3.623
exp <=1 yr	-0.181*** (0.072)	-0.925	-0.185*** (0.072)	-0.942
1< exp <=4	-0.134*** (0.043)	-0.759	-0.131*** (0.043)	-0.743
7< exp	-0.098** (0.047)	-0.563	-0.099** (0.047)	-0.566
nonwhite	0.170*** (0.039)	1.119	0.155*** (0.039)	1.012
female	0.159*** (0.037)	0.949	0.141*** (0.038)	0.838

(cont'd)

unemployment rate	0.012** (0.006)	0.072	0.012** (0.006)	0.073
employed	-0.029 (0.044)	-0.178	-0.030 (0.044)	-0.181
received training last yr	0.245*** (0.044)	1.732	0.242*** (0.044)	1.700
AFQT score x 10	0.025*** (0.009)	0.147	0.025*** (0.009)	0.149
Pseudo R^2	0.020		0.021	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. "married * kids present" is the interaction of "married" with "kids present".
d. "kids present" is a dummy which equals one if the respondent has at least one child.

***, **, * denote significance of 1%, 5% and 10% respectively.

of married with "kids present". We see in both specifications that the "married" coefficient is no longer significantly negative, and that the coefficient on "kids present" is not significant. The interaction, however, is highly significant negative. In other words, these results suggest that being married or having children per se does not affect the likelihood of returning to school, but rather it is the combination of being married *and* having children that has a negative effect. I find the same result in Table 24 where instead of using a dummy for the presence of children, I include a continuous variable for the number of children the respondent has.

These findings do support the idea that the negative "married" effect on return-to-school likelihood is produced to a large extent by the lower return likelihood of married

individuals who have children. However, if the reason they are significantly less likely to return is that children require household resources as hypothesized above, then the

Table 24: The Effects of the Number of Children on the Return-to-School Likelihood of Married Individuals[a] (n=35,582)

	I[b]		II	
married	-0.053 (0.042)	-0.313	0.001 (0.048)	0.004
married * no. of kids[c]			-0.101*** (0.038)	-0.600
no. of kids[d]	-0.027 (0.022)	-0.162	0.038 (0.028)	0.229
<u>other variables</u>				
elementary school	0.269 (0.207)	2.070	0.265 (0.208)	2.034
some high school	0.375*** (0.129)	2.956	0.370*** (0.129)	2.896
high school	0.315*** (0.119)	1.945	0.315*** (0.118)	1.937
some college	0.289*** (0.117)	2.028	0.292*** (0.117)	2.045
college	0.441*** (0.117)	3.630	0.441*** (0.117)	3.619
exp <=1 yr	-0.178*** (0.072)	-0.916	-0.181*** (0.072)	-0.926
1< exp <=4	-0.133*** (0.043)	-0.755	-0.130*** (0.043)	-0.737
7< exp	-0.099** (0.047)	-0.565	-0.100** (0.047)	-0.569
nonwhite	0.169*** (0.039)	1.114	0.158*** (0.039)	1.030
female	0.157*** (0.037)	0.939	0.144*** (0.037)	0.855

(cont'd)

unemployment rate	0.012** (0.006)	0.071	0.012** (0.006)	0.072
employed	-0.029 (0.044)	-0.175	-0.028 (0.044)	-0.169
received training last yr	0.245*** (0.044)	1.731	0.243*** (0.044)	1.714
AFQT score x 10	0.025*** (0.009)	0.148	0.025*** (0.009)	0.151
Pseudo R^2	0.020		0.021	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected star ard errors, and the second column reports marginal effects x 100.
c. "married * no. of kids" is the interaction of "married" with "no. of kids".
d. "no. of kids" is a variable that contains the number of children the respondent has.

***, **, * denote significance of 1%, 5% and 10% respectively.

insignificant coefficients of the variables "kids present" and "no. of kids" are surprising. This is because if children are indeed a burden on resources, we would expect the two variables above to be significantly positive, and further, that the interaction term be smaller or even positive, since it follows that children should be even bigger deterrents to returning to school for single parents.

Nevertheless, in Table 25 I investigate whether the return likelihood of people who are married and have children varies with income. We see that those who are married, have children, and come from households where net income in the previous year was less than $40,000, are significantly less likely to return to school, but not if they are from

households where net income was $40,000 or higher. These findings seem to suggest that children are a deterrent to returning to school because caring for them requires time and

Table 25: How the Effects of Children on the Return-to-School Likelihood of Married Individuals Vary with Household Income[a] (n=35,582)

	I[b]		II	
married (≥$40,000)[c]	0.026 (0.077)	0.155	-0.001 (0.071)	-0.002
married (≥$40,000) * kids[d]	-0.161 (0.111)	-0.837	-0.062 (0.053)	-0.367
married (<$40,000)[e]	0.040 (0.062)	0.243	0.004 (0.056)	0.026
married (<$40,000) * kids	-0.272*** (0.089)	-1.387	-0.121*** (0.043)	-0.718
kids[f]	0.078 (0.058)	0.470	0.038 (0.028)	0.227
<u>other variables</u>				
elementary school	0.264 (0.208)	2.019	0.266 (0.208)	2.038
some high school	0.376*** (0.129)	2.956	0.375*** (0.130)	2.944
high school	0.321*** (0.119)	1.971	0.318*** (0.119)	1.955
some college	0.297*** (0.117)	2.076	0.294*** (0.117)	2.055
college	0.442*** (0.117)	3.619	0.441*** (0.117)	3.617
exp <=1 yr	-0.186*** (0.072)	-0.942	-0.182*** (0.072)	-0.928
1< exp <=4	-0.131*** (0.043)	-0.740	-0.130*** (0.043)	-0.735
7< exp	-0.103** (0.047)	-0.584	-0.103** (0.047)	-0.587

(cont'd)

nonwhite	0.155***	1.007	0.157***	1.024
	(0.039)		(0.039)	
female	0.140***	0.832	0.142***	0.847
	(0.038)		(0.037)	
unemployment rate	0.013**	0.075	0.012**	0.074
	(0.006)		(0.006)	
employed	-0.028	-0.171	-0.027	-0.161
	(0.044)		(0.044)	
received training last yr	0.241***	1.695	0.243***	1.709
	(0.044)		(0.044)	
AFQT score x 10	0.025***	0.148	0.025***	0.150
	(0.009)		(0.009)	
Pseudo R^2	0.021		0.021	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. "married (≥$40,000)" is a dummy which equals one if the respondent is married and net household income last year was $40,000 or higher.
d. "married (≥$40,000) * kids" is the interaction of "married (≥$40,000)" and "kids" (see note f).
e. "married (<$40,000)" is a dummy which equals one if the respondent is married and net household income last year was less than $40,000.
f. For specification I, "kids" is a dummy which equals one if the respondent has at least one child, and for specification II, "kids" is defined as the actual number of children the respondent has.

***, **, * denote significance of 1%, 5% and 10% respectively.

money. Therefore, if household income is high, which means it is easier to substitute market inputs for one's time in raising them (e.g. the hiring of babysitters), they become less of a deterrent. Once again, however, if the above explanation is true, we would expect children to reduce the return likelihood of single parents even more, or in other

words, a significantly positive coefficient for "kids" and possibly positive interactions, which is contrary to the findings in this table.

Chapter Summary

The purpose of this chapter is to examine the effects of different covariates on individuals' likelihood of returning to school, and determine the possible factors that influence their decisions. I find that individuals who are more likely to return to school are more educated, nonwhite, female, single, received training in the last year, have higher AFQT scores, and/or live in areas with high local unemployment rates. In addition, I find some support for the hypothesis that people who face borrowing constraints are forced to leave school early and are therefore more likely to return after a period of work when they have accumulated sufficient funds, and that nonwhites are more likely to return because they face stronger borrowing constraints.

Among those who returned to school in the sample, most of them attended two-year colleges, followed by four-year colleges, and only a third of them obtained a degree. I find that people with higher AFQT scores, those with some high school or some college education, and college graduates are more likely to complete degrees. In addition, experience has a more or less quadratic effect on degree completion.

Chapter V THE RELATIONSHIP BETWEEN ADDITIONAL FORMAL SCHOOLING AND TRAINING

Human capital formation takes place in numerous different ways, from formal schooling and training programs to more informal types of skill formation such as learning-by-doing (Killingsworth, 1982). In fact, a central motivation behind this thesis is to examine, and draw attention to, the role discontinuous schooling patterns play in lifetime skill formation. As such, an important issue to explore would be how the decision to invest in additional formal schooling relates to other types of skill formation.

In this chapter I will be analyzing, specifically, the relationship between additional formal schooling and training. (The term "training" will be used throughout the chapter to describe non-diploma or non-degree-granting occupational programs designed to help individuals acquire skills or find employment.) The main questions that will be addressed are: 1) How does participation in different types of training programs, distinguished by both the nature of the skills involved as well as the duration, affect the decision to return to school, and 2) Are training programs and formal schooling complements, or are they alternative (substitutable) avenues through which workers enhance their skills.

Construction and Definition of the Training Variables

One of the strengths of the NLSY is extensive information on training investments. Respondents were asked detailed questions about training programs they were enrolled in at the time of the last interview, as well as up to four spells of training that started

since then. Information was collected on the type of training received, the types of skills provided by the training, and the duration of each training spell.

The variables for types of training programs are constructed from two questions. People are first asked the question, "Since (DATE OF LAST INTERVIEW), did you attend any training program or on-the-job training designed to help people find a job, improve job skills, or learn a new job?" If the answer is yes, then they are asked the question, "Which category on this card best describes where you received this training?" The categories provided are as follows: 1) Business school, 2) Apprenticeship program, 3) A vocational or technical institute, 4) A correspondence course, 5) Formal company training run by employer or military (excluding basic training), 6) Seminars or training programs at work run by someone other then employer, 7) Seminar or training programs outside of work (paid for by employer), 8) Vocational rehabilitation center, and 9) Other. Following the example of Lynch (1991, 1992) and Bartel and Sicherman (1993), I combine these answers into three dummies: i) apprenticeship=1 for response 2, ii) company training=1 for responses 5-7, and iii) other training=1 for responses 1,3,4, 8, and 9.

Dummies for the types of skills provided by training are constructed from the question, "What type of training program (is/was) this?" The six possible responses are: 1) Classroom training - job skill, 2) Classroom training - basic skill (includes instruction for a GED, English, or math), 3) On-the-job training, 4) Job search assistance, 5) Work experience, and 6) Other.

Questions on types of training programs and skills provided are asked for each of up to four training programs since the last interview. As such, the type dummies are

coded as =1 if any of the programs participated in during the year are of a particular type, and the skills-provided dummies are similarly coded as =1 if any of the programs participated in during the year provided training in a particular type of skill.

Measures of the length of training are based on a series of questions about start and end dates for each program. Some programs span more than one survey, i.e. those listed as still in progress at the time of the interview, and have to be traced across survey years. Up to two programs that are still in progress at the time of the interview can be traced to the next survey because at the next interview respondents are asked the end dates for up to two programs still in progress at the time of the prior year's survey. If the third or fourth program mentioned in a given year is still ongoing at the time of the survey, then that year's survey date is taken as the end date for the program. Similarly, if one or both of the first two programs that are ongoing at the time of the survey are indicated as still ongoing at the time of the subsequent survey, then the date of the subsequent survey is taken as the end date for the program(s).[43]

Beginning in 1988, however, a direct question on weeks of participation in training is asked. To evaluate if a duration measure constructed with reported start and end dates corresponds to the actual reported duration, I constructed a duration measure for training programs that took place between 1988 and 1992, and found that the constructed measure

[43] Based on discussions with consultants at the Center for Human Resource Research, the institution that manages the NLSY at The Ohio State University, it was not at all clear that programs could be accurately traced across multiple survey years. I therefore decided to truncate the very few long programs that span multiple surveys at the date of the second interview.

is, on average, more than twice the size of the actual (reported) one.[44] As such, I decided only to use the actual reported weeks of participation and restrict my analysis to after 1988, as will be discussed further below.

Finally, since I was not concerned with the effects of participation in multiple programs per se, I aggregated all programs participated in since the last survey into a single measure of weeks of training.[45] I similarly combined total weeks in all programs of a particular type - apprenticeship, company training, or other - into aggregate measures of duration, or total time spent, in each of the three types of programs.

The sample that will be used in the analysis below is a subset of the one used in Chapter IV. Recall that the sample used there is constructed by the pooling of 5 yearly cross-sections - 1985-87, 1989, and 1990.[46] In this chapter, I will be restricting my focus to the 1989 and 1990 cross-sections. The earlier cross-sections (1985-87) are not used because prior to the 1988 survey, 1) information was only collected on programs lasting at least four weeks, leading to potential biases not only in the incidence and amount of training received generally, but also in the incidence and duration of certain types of training that are provided in relatively short programs, 2) limited information was

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[44] Even when nonparticipation periods were taken into account, the resulting constructed duration measure still substantially overstated actual time spent in the program.

[45] People are also asked how many hours per week, on average, they participated in each program. Using these answers, I additionally constructed a measure of total hours of training in each program in order to see if alternative measures of training length (hours versus weeks) affect the result. They do not, as will be pointed out in footnote 48.

[46] See the section titled *Sample Construction and Summary Statistics* in Chapter IV and especially footnote 30 for a discussion of why the 1988 cross-section is omitted.

collected on the types of skill formation that took place in the programs, and 3) (as discussed above) actual weeks of participation were not recorded, so that duration measures require calculations based on comparing start and end dates for each program, and turn out to be very inaccurate.

The Effects of Training on Return-to-School Decisions

Table 12 in Chapter IV show that individuals who received training in the year prior to the last interview are generally more likely to return to school since the last interview.[47] Table 27 refines the analysis by looking at the effects on returning to school of receipt of different types of training, and how these effects vary with the duration, measured in weeks[48], of the training. Specification I only includes incidence measures, while specification II additionally includes interactions of incidence with duration of the different types of programs. (See Table 26 for descriptive statistics of the training variables used.) Looking first at apprenticeship programs, we see that neither their incidence nor duration affect people's decisions to return to school. While some people participating in apprenticeship programs may subsequently return to school (because of dissatisfaction with the apprenticeship program per se, or a reassessment of their initial career plans), the insignificant coefficients suggest it may very well be the case that since many apprenticeships are self-contained programs, further formal schooling has minimal additional value.

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[47] See Appendix II for results using alternative measures of training incidence.

[48] The results are unchanged if total hours instead of weeks are used.

Table 26: Means (and Standard Deviations) of the Training Variables

	Did Not Return (n=12,989)	Return[a] (n=327)
types of training programs[b]		
company training	0.125	0.224
	(0.331)	(0.417)
classroom training-job skill[c]	0.082	0.123
	(0.275)	(0.329)
classroom training-basic skill	0.016	0.044
	(0.124)	(0.204)
on-the-job training	0.034	0.078
	(0.182)	(0.268)
job search assistance	0.002	0.010
	(0.050)	(0.098)
work experience	0.010	0.020
	(0.097)	(0.140)
other	0.014	0.047
	(0.116)	(0.212)
apprenticeship program	0.010	0.013
	(0.100)	(0.112)
other training	0.052	0.069
	(0.222)	(0.254)
duration of program (weeks)[d]		
company training	4.282	6.412
[1375, 59][e]	(13.554)	(12.076)
apprenticeship program	9.848	19.783
[108, 3]	(21.259)	(12.917)
other training	9.168	5.498
[707, 26]	(13.629)	(11.509)

a. The mean (and standard deviation) of Return is 0.026 (0.158).
b. See Table 27 notes for definitions of the different types of training programs.
c. See Table 30 notes for definitions of the different types of skill training provided in company training programs.
d. Duration measures are reported only for those who participated in the programs.
e. Number of participants in each sample: [Did Not Return, Return].

Table 27: The Effects of Different Types and Duration of Training
Mean of Dependent Variable = 0.026[a]

	I[b]		II	
<u>training variables</u>				
received company training last year[c]	0.282*** (0.079)	1.912	0.274*** (0.080)	1.842
received company training*duration[d]			0.014 (0.012)	0.079
in an apprenticeship program last year[e]	0.215 (0.287)	1.454	-0.131 (0.309)	-0.630
in an apprenticeship program*duration			0.031 (0.021)	0.168
received other training last year[f]	0.130 (0.113)	0.799	0.235* (0.141)	1.581
received other training*duration			-0.053 (0.047)	-0.291
<u>other variables</u>				
elementary school	0.138 (0.237)	0.864	0.145 (0.237)	0.912
some high school	0.270 (0.177)	1.827	0.278 (0.178)	1.878
high school	0.206 (0.157)	1.149	0.215 (0.157)	1.194
some college	0.328** (0.157)	2.245	0.323** (0.158)	2.195
college	0.425*** (0.153)	3.129	0.422*** (0.153)	3.081
exp <=1 yr	-0.023 (0.148)	-0.122	-0.827 (0.149)	-0.045
1< exp <=4	-0.079 (0.084)	-0.420	-0.069 (0.084)	-0.367
7< exp	-0.085 (0.088)	-0.465	-0.075 (0.088)	-0.411

(cont'd)

nonwhite	0.143**	0.854	0.154***	0.921
	(0.062)		(0.062)	
female	0.173***	0.951	0.165***	0.903
	(0.061)		(0.061)	
married	-0.135**	-0.750	-0.131**	-0.724
	(0.059)		(0.059)	
unemployment rate	0.018*	0.101	0.020*	0.107
	(0.012)		(0.012)	
employed	-0.021	-0.119	-0.024	-0.131
	(0.082)		(0.082)	
AFQT score x 10	0.028**	0.154	0.030**	0.164
	(0.014)		(0.014)	
Pseudo R^2	0.029		0.030	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.

b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.

c. "received company training last year" is a dummy which equals one if the individual participated in any of the following during the previous year:
   1. Formal company training run by employer
   2. Seminars or training programs at work run by someone other than employer
   3. Seminars or training programs outside of work paid for by employer

d. "received company training*duration" is the interaction of the dummy "received company training last year" with the duration (in months) of the training.

e. "in an apprenticeship program last year" is a dummy which equals one if the individual participated in an apprenticeship program during the previous year.

f. "received other training last year" is a dummy which equals one if the individual was enrolled in any of the following during the previous year:
   1. Business school - not business classes in college or graduate school that contribute to an undergraduate or professional degree.
   2. A vocational or technical institute, e.g. beauty school, auto mechanics training, welder's school, etc.
   3. A correspondence course - a training course offered through the mail.
   4. A vocational rehabilitation center - a facility offering specialized training to prepare disabled person to enter or re-enter the workforce.

***, **, * denote significance of 1%, 5% and 10% respectively.

Turning now to the effects of "other training", its coefficient is insignificant in specification I, but becomes significant in specification II when the duration of programs is controlled for. The reason for this may lie in the fact that the "other training" category includes a wide group of programs that systematically differ in their effects on return likelihood.[49] Certain programs that are highly vocational in nature may be relatively lengthy, but provide career training which is self-contained and as such, do not encourage additional formal schooling or may even discourage it. This interpretation is supported by the negative (though insignificant) interaction term "received other training*duration". In other words, they may be weak substitutes for additional schooling. Therefore, when we simply control for incidence in specification I, we are combining the negative, or insignificant, effects of relatively longer programs and the positive effects of shorter programs.

Finally, the results for company training show that the incidence of this type of training, regardless of its duration, is positively associated with the likelihood of returning to school - the coefficient on incidence is highly significantly positive in both specifications, and the coefficient on duration is insignificant. These findings are consistent with complementarity between company training programs and additional regular schooling.[50] The possible reasons for this complementarity may be: 1) Since company training is most likely provided to employees that the company has a greater stake in and hopes to

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[49] See notes in the table for definitions.

[50] It is possible that the positive coefficients on incidence simply reflect some unobserved ability that is positively correlated with both schooling and training participation. AFQT score is therefore included as an attempt to control for this possibility.

advance, workers selected into these programs may find that once they complete the programs they are in a position to further advance their careers through additional credentialling and/or skill formation in a regular schooling environment, 2) Successful completion of these programs may also be used by the employer as a screen for advancement in the company, where selected workers are then encourage to return to regular school (and possibly financed by the employer).[51,52]

Company Training and Additional Formal Schooling

In order to investigate this idea of complementarity further, Table 28 examines more closely the characteristics and labor market behavior of people who received company training during the prior survey year and returned to school subsequently. We see first in Panel I that among those people who returned to school, 22% received some company training in the prior year, while only 13% of those who did not return received company training. These results are as expected from the significantly positive company training effects in Table 27. To put it in another way, more than twice the percentage of people who received company training returned to school compared to those who did not receive company training (5% as opposed to 2%).

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[51] I ran the regressions reported in Table 27 as well as Tables 30 and 31 (discussed below) separately for blue- and white-collar workers and found no significant differences between the two groups.

[52] Conditional on having returned to school, I found no relationship between receipt of company training and duration of schooling, nor between receipt of other training and duration of schooling. Apprenticeships, though, have a negative effect on duration of schooling.

Table 28: Descriptive Analysis of Those Who Returned to School and Received Company Training During the Previous Year

I. For the full sample, cross-tabulation of return status and whether or not received company training during the previous year

	did not return	return	total
did not receive company training last year	88%, 98%[a] (11614)	78%, 2% (266)	87%, 100% (11880)
received company training last year	13%, 95% (1375)	22%, 5% (61)	13%, 100% (1436)
total	100%, 97% (12989)	100%, 3% (327)	100%, 100% (13316)

Fisher's exact=0.000

II. For the return sample, cross-tabulation of employment status while in school and whether or not received company training during the previous year

	did not receive company training	received company training last year	total
employed while in school	62%, 71% (158)	87%, 29% (54)	68%, 100% (212)
not employed while in school	38%, 91% (109)	13%, 9% (6)	32%, 100% (115)
total	100%, 77% (267)	100%, 23% (60)	100%, 100% (327)

Fisher's exact=0.000

(cont'd)

III. For those who returned and were employed while in school, cross-tabulation of whether or not received company training during the previous year and whether or not still employed by the employer who provided the training

	did not receive company training	received company training last year	total
same employer who provided training	57%, 66% (87)	73%, 34% (40)	62%, 100% (127)
changed employer	43%, 80% (71)	27%, 20% (14)	38%, 100% (85)
total	100%, 71% (158)	100%, 29% (54)	100%, 100% (212)

Fisher's exact=0.000

a. Each cell reports column percentages (left), row percentages (right), and sample sizes in parentheses.

Panel II focuses the analysis on the return sample.[53] We see that the vast majority (87%) of those who received company training were employed during their return-to-school spell. Alternatively, 29% of those who continued to work while in school received company training, while only 9% of those who were not employed while in school did. Furthermore, we see in Panel III that among those who were employed while in school, 73% of those who received company training remained with the same employer, while only 57% of those who did not receive company training remained, or equivalently, 43% of

[53] I have elected to make these comparisons in essentially a univariate context because small cell sizes make a multivariate analysis tenuous at best.

those who did not receive company training subsequently changed employers compared to only 27% of those who did receive training. Alternatively stated, 34% of the people who remained with the same employer received company training, while only 20% of those who changed employers did. The results of tests of independence (or more specifically, Fisher's exact test) performed in each of the three panels indicate that all the above mentioned differences are highly significant.

These findings that those who received training in the prior year are more likely to remain employed during the subsequent year while in school, and are more likely to be with the *same* employer, further suggests that company training and additional schooling are complementary. The reason is that when training and additional schooling occur during a worker's tenure with a given employer, it is more likely that the two types of skill formation are related in some fashion. If additional schooling occurs after an employee has left the employer who provided the training, while it still may be the case that the training provided a foundation for further schooling, one is less confident that the two human capital investments are linked in a complementary fashion. In fact, it is possible that failure at a training program (or dissatisfaction with the program) may lead to separation from the employer and a decision to invest in regular schooling as an alternative way to enhance one's career.

In order to investigate whether such complementarity exists at all levels of education, Table 29 reports the pre-return educational attainment of those who received company training and the two further sub-groups (those who were employed while in school, and those employed by the same employer that provided the training). It seems

Table 29: Pre-Return Educational Attainment for Those Who Returned to School and Received Company Training During the Previous Year

education[a]	I[b]	II[c]	III[d]
< high school [13%][f]	1%[e] (3)	1% (3)	1% (2)
high school graduate [47%]	25% (14)	28% (13)	35% (12)
some college [17%]	20% (15)	23% (15)	20% (11)
college graduate [23%]	54% (29)	47% (23)	44% (15)
total	100% (61)	100% (54)	100% (40)

a. educational attainment before return
b. those who returned to school, and received company training during the previous year
c. those who returned to school, received company training during the previous year, and were employed while in school
d. those who returned to school, received company training during the previous year, were employed while in school, and were employed by the same employer who provided the training
e. Cells report percentages and sample sizes in parentheses
f. the percentages in each education category in the full sample

that most of the people who fall into these groups are college graduates (about 45%), even though only 23% of the full sample are college graduates, suggesting the possibility that the complementarity between training and additional formal schooling is particularly strong at higher education levels.

To assess 1) the possibility that additional formal schooling is complementary only to certain facets of company training, and 2) the impact on return likelihood of the types of skill training received in company training programs, Table 30 reports the results of a

Table 30: Different Types of Company Training and Return-to-School Likelihood
Mean of Dependent Variable = 0.026[a]

<u>training variables</u>		
received company training:		
classroom training - job skill[b]	0.036 (0.107)	0.201
classroom training - basic skill[c]	0.314* (0.195)	2.314
on-the-job training[d]	0.273** (0.135)	1.918
job search assistance[e]	0.275 (0.409)	1.965
work experience[f]	0.052 (0.251)	0.297
other	0.465*** (0.188)	3.942
in an apprenticeship program last year	0.188 (0.292)	1.228
received other training last year	0.115 (0.114)	0.692
<u>other variables</u>		
elementary school	0.121 (0.238)	0.745
some high school	0.256 (0.179)	1.699
high school	0.192 (0.158)	1.064
some college	0.326** (0.159)	2.209
college	0.423*** (0.155)	3.086
exp <=1 yr	-0.022 (0.149)	-0.116
1< exp <=4	-0.076 (0.083)	-0.401

(cont'd)

7< exp	-0.075 (0.087)	-0.411
nonwhite	0.138** (0.063)	0.819
female	0.179*** (0.061)	0.980
married	-0.137** (0.059)	-0.753
unemployment rate	0.018* (0.012)	0.099
employed	-0.020 (0.082)	-0.111
AFQT score x 10	0.028** (0.014)	0.155
Pseudo R^2	0.032	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date. The first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.

b. "classroom training - job skill" is defined as "vocational instruction in a classroom setting, designed to teach work-oriented tasks of a particular job group, e.g. clerical training etc."

c. "classroom training - basic skill" is defined as "academic instruction in a classroom setting leading to specific certification for a GED or academic instruction in basic educational subjects like English grammar or mathematics."

d. "on-the-job training" is defined as "institutional instruction in a work setting intended to enable an individual to learn a skill and/or qualify for a particular occupation through demonstration and practice."

e. "job search assistance" is defined as "any service that helps a person seek, locate, apply for or obtain a job, e.g. referrals to openings and relocation assistance."

f. "work experience" is defined as "short-term or part-time work to enhance one's employment ability through the development of good work habits and basic work skills."

***, **, * denote significance of 1%, 5% and 10% respectively.

regression similar to the one in specification I of Table 27, except that the company training dummy is replaced by a series of dummies reflecting the different types of skills involved.[54] We see that both basic skill training, on-the-job training, and "other" training have significantly positive coefficients.[55] The finding for basic skill training is particularly intuitive, since classroom training in basic skills are likely to be complementary to later formal schooling. The lack of significance for the classroom training - job skill category is perhaps not so surprising, because according to the definition given at the end of the table, it may represent relatively self-contained programs.

Since training and formal schooling are possibly complements, and given the evidence that those who received training in the prior year are more likely to remain employed during the subsequent year while in school, and are more likely to be with the same employer, the next issue to explore is whether the employer who provided the training also provided the funds for the schooling. Unfortunately, no questions on the source of funding for schooling are asked in the survey. The only question that may provide some information on the issue of employer financing is:"(Does/Did) your employer make available to you training or educational opportunities including tuition reimbursement?" I therefore created a dummy which equals one if the respondent

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[54] The following are the number of people enrolled in each of the types of training: job skill (941), basic skill (188), on-the-job training (414), job search assistance (32), work experience (115), and other (152). Note that these numbers exceed the total number of people who received company training because more than one type of skill training may be involved in a company training program.

[55] Although the "other" category seems to have the strongest effect on return likelihood, there is unfortunately no information in the survey concerning the types of skills represented by this category.

answers yes to this question. The problem with this question, though, is that it does not allow us to separate out employer payments for educational investments versus training investments.[56] Also, this question is only asked of the CPS job,[57] while the other training dummies are constructed using information on all jobs, not just the CPS job. (This is the reason for the smaller sample size for the regressions in Table 31.)

Nevertheless, taking these reservations into account, we see in specification I of Table 31 that the coefficient on employer sponsorship of investments is positive but insignificant. When a dummy for receipt of company training is included in specification II, the coefficient becomes even smaller. These results suggest that it is unlikely that employers provide the funding for additional schooling, which is not surprising given the general, easily transferrable nature of the skills acquired.

Chapter Summary

In this chapter, I investigate the effects participation in different types of training programs has on an individual's likelihood of returning to school. I find that participation in company training (regardless of its duration) increases return likelihood, participation

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[56] It is also possible that the dummy will simply reflect unobserved characteristics of the individual, since we do not know if the employer pays for other employees' education or training. We only know if he/she is paying for the respondent's training. As such, if the individual answers yes to this question, it might indicate that the employer has specifically selected to pay for this employee's schooling and/or training because he/she is an individual who is particularly talented, diligent, and so forth.

[57] The CPS job is defined as the current job if the individual had only one job since the last survey. Otherwise, if more than one job was held, the CPS is the main job held by the respondent during the year.

Table 31: Employer Provision of Training or Educational Opportunities (n=12,669)
Mean of Dependent Variable = 0.026[a]

	I[b]		II	
<u>training variables</u>				
employer provided ed. or training opportunities[c]	0.085 (0.066)	0.492	0.054 (0.068)	0.307
received company training last year			0.273*** (0.082)	1.872
in an apprenticeship program last year	0.195 (0.287)	1.344	0.217 (0.289)	1.498
received other training last year	0.146 (0.115)	0.949	0.151 (0.115)	0.970
<u>other variables</u>				
elementary school	0.129 (0.240)	0.830	0.147 (0.241)	0.948
some high school	0.217 (0.179)	1.461	0.239 (0.180)	1.607
high school	0.178 (0.158)	1.031	0.197 (0.159)	1.126
some college	0.319** (0.158)	2.245	0.328** (0.159)	2.289
college	0.407*** (0.153)	3.059	0.398*** (0.154)	2.930
exp <=1 yr	-0.098 (0.149)	-0.509	-0.101 (0.151)	-0.516
1< exp <=4	-0.088 (0.085)	-0.489	-0.091 (0.085)	-0.494
7< exp	-0.100 (0.089)	-0.572	-0.106 (0.090)	-0.594
nonwhite	0.138** (0.063)	0.853	0.143** (0.064)	0.873
female	0.159*** (0.062)	0.907	0.163*** (0.062)	0.919

(cont'd)

married	-0.135**	-0.777	-0.136**	-0.774
	(0.059)		(0.060)	
unemployment rate	0.019*	0.108	0.020*	0.112
	(0.012)		(0.012)	
employed	-0.021	-0.121	-0.039	-0.226
	(0.087)		(0.087)	
AFQT score x 10	0.026*	0.147	0.023*	0.132
	(0.014)		(0.014)	
Pseudo R^2	0.022		0.028	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.
b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.
c. "employer provided ed. or training opportunities" is a dummy which equals one if the respondent answered yes to the following question:"(Does/Did) your employer make available to you training or educational opportunities including tuition reimbursement".

***, **, * denote significance of 1%, 5% and 10% respectively.

in apprenticeships do not affect return likelihood, and participation in training programs, other that company training and apprenticeships, increases return likelihood only if they are relatively short programs. I also find that company training and additional formal schooling may be complementary to each other - not only does participation in company training increases the likelihood of returning to school, but also, people who received company training are more likely to remain employed while they are in school, and are more likely to be with the same employer who provided the training. Furthermore, I find that this complementarity may be strongest at higher levels of education.

Chapter VI THE ECONOMIC CONSEQUENCES OF RETURNING TO SCHOOL

In addition to understanding what leads people to return to school, it is equally important to investigate the impact of returning to school on wages. While it is well-established that general schooling investments systematically increase wages (Mincer, 1974), and that training also has a significantly positive impact on wages (Brown, 1989), it is not well-known if additional schooling has a significant impact on wages, and if so, how the return compares to the wage gain from the initial, continuous schooling period.[58] In order to assess this question, I estimate a number of alternative human capital earnings regressions, comparing the effects of continuous schooling and additional schooling on wages.

Sample Construction and Summary Statistics

In the analysis that follows, my empirical strategy is to estimate the effect on wages of returning to school for completed additional schooling spells. I therefore estimate 1992 cross-sectional wage regressions for people who either never experienced a return-to-school spell, or else had their first and only return-to-school spell during the survey years 1985-87, 1989, and 1990.[59,60] The return sample is thus selected from those in the

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[58] Some evidence on these questions is found in Light (1995), which appeared after I had completed the bulk of my independent investigation of these questions.

[59] Note that this is the same sample period used in Chapter IV. For a discussion of why these years are chosen, see the section titled *Sample Construction and Summary Statistics* in Chapter IV.

[60] Since the effect on wages of first spells are potentially different from that of other spells, individuals who returned to school a second time (88 observations) are excluded from the analysis.

return sample in Chapter IV who are still in the survey in 1992. In order to check that those in the return sample in 1992 (525 observations) are not systematically different from those who left (345 observations), i.e. that there has not occurred any selective attrition from the sample, Table 32 reports a probit where the dependent variable equals one if the individual is in the 1992 sample, and the explanatory variables include, in addition to

Table 32: The Relationship between Return Status and Sample Attrition[a]

	I	II[c]	III
return[b]	-0.045	-0.037	0.012
	(0.051)	(0.053)	(0.054)
female	0.086**	0.103***	0.115***
	(0.040)	(0.041)	(0.043)
nonwhite	0.836***	0.824***	0.904***
	(0.046)	(0.048)	(0.049)
AFQT percentile score x 10	0.056***	0.042***	0.053***
	(0.008)	(0.010)	(0.009)
highest grade completed		0.014	-0.009
		(0.012)	(0.007)
experience		-0.002	0.013*
		(0.011)	(0.008)
married		-0.022	0.010
		(0.044)	(0.043)
unemployment rate		-0.004	-0.017*
		(0.006)	(0.010)
employed		0.166***	0.162***
		(0.049)	(0.057)
received training last year		0.119**	0.033
		(0.060)	(0.056)

a. The dependent variable is a dummy which equals one if the individual is in the 1992 sample.
b. "return" is a dummy which equals one if the individual returned to school between 1985 and 1990.
c. The variables "highest grade completed", "experience", "married", "unemployment rate", "employed", and "received training last year" are measured in 1985 in Column II and 1990 in Column III.

individuals' characteristics, a dummy "return" which equals one if they returned to school between 1985 and 1990. Column I only includes time-invariant characteristics. Columns II and III additionally include other characteristics of the individuals, measured in 1985 and 1990 respectively. The variable "return" is not significant in all three specifications, suggesting that those who returned to school are no more or less likely to have left the survey by 1992 than those who did not return.

Table 33 reports summary statistics for the return and did-not-return sample. We

Table 33: Descriptive Statistics for the 1992 Cross-Section

	Did Not Return	Return
Full Sample	n=4,972	n=525
highest grade completed prior to return		12.846 (2.056)
highest grade ever completed[a]	13.143 (2.452)	13.685 (2.287)
elementary school	0.009 (0.095)	0.001 (0.037)
some high school	0.110 (0.313)	0.066 (0.249)
high school	0.475 (0.499)	0.347 (0.476)
some college	0.169 (0.374)	0.321 (0.467)
college	0.155 (0.362)	0.137 (0.344)
post-college	0.082 (0.274)	0.127 (0.333)
experience (years)	9.513 (3.602)	9.697 (3.490)
nonwhite	0.205 (0.403)	0.231 (0.422)

(cont'd)

	Did Not Return	Return
female	0.499 (0.500)	0.590 (0.492)
married	0.613 (0.487)	0.535 (0.499)
AFQT percentile score	46.336 (28.949)	49.914 (28.156)
local unemployment rate	7.894 (2.511)	8.025 (2.754)
employed	0.798 (0.401)	0.791 (0.407)
received training in the last year	0.736 (0.441)	0.800 (0.400)
<u>Employed</u>	n=3,826	n=395
log(wage)	2.311 (0.504)	2.333 (0.484)
tenure	4.479 (3.965)	4.025 (3.713)
full-time	0.869 (0.338)	0.883 (0.322)
<u>Not Employed</u>	n=1,146	n=130
duration of unemployment	2.513 (3.025)	2.325 (3.048)
laid off	0.363 (0.481)	0.411 (0.494)
quit	0.637 (0.481)	0.589 (0.494)

a. For the return sample, "highest grade ever completed" is equivalent to post-return educational attainment.

Cells report means and standard deviations (in parentheses).

generally see that the return group has somewhat higher education levels, are more likely to be female, nonwhite, not married, have higher AFQT scores, and have received training in the prior year.

Wage Regression Results

Table 34 reports cross-sectional wage regressions run separately for those who did not return to school (Column I) and for those who did (Column II). In addition, Column III uses the full sample and includes a vector of interactions of all covariates with D(return), which is a dummy which equals 1 if the person returned to school. All covariates have the expected signs and are generally significant at the 1% or 5% level.[61]

We see that people who returned to school have steeper wage-experience profiles, as shown by the significantly positive interaction in Column (III). The slope of these profiles reflect increases over time in productivity due to either learning-by-doing or formal on-the-job training (in additional to job search investments). As such, the steeper profiles for those who returned to school imply that these people are generally investing in human capital at a higher rate than those who did not return, and that their decision to return to school is most likely a facet of this ongoing investment process. Turning to the education effects, we see that 1) people who returned to school have a lower rate of return to education (measured as highest grade completed), and 2) this difference is statistically significant, as evidenced by the negative interaction term ("grade x returned")

[61] Contrary to traditional human capital wage regressions, experience is entered in a linear fashion since experience squared is not significant in any of the regressions. This is not surprising given the relatively young age of the sample.

Table 34: Cross-Sectional Wage Regressions

	Did Not Return (n=3,826)	Return (n=395)	Full Sample[c] (n=4,221)
highest grade ever completed[a]	0.086*** (0.003)	0.061*** (0.010)	0.086*** (0.003)
highest grade ever completed*D(return)[b]			-0.025*** (0.010)
experience	0.036*** (0.002)	0.047*** (0.008)	0.036*** (0.002)
experience*D(return)			0.011* (0.007)
nonwhite	-0.062*** (0.018)	-0.072 (0.054)	-0.062*** (0.018)
female	-0.158*** (0.014)	-0.178*** (0.043)	-0.158*** (0.014)
married	0.102*** (0.014)	0.086** (0.044)	0.102*** (0.014)
unemployment rate	-0.007*** (0.003)	-0.003 (0.008)	-0.007*** (0.003)
full-time	0.187*** (0.021)	0.094 (0.067)	0.187*** (0.021)
D(return)			0.294 (0.192)
Adjusted R^2	0.325	0.250	0.347

a. For the return sample, "highest grade ever completed" is equivalent to post-return educational attainment.
b. D(return) is a dummy which equals 1 if the individual returned to school.
c. This regression includes, in addition to "highest grade ever completed*D(return)" and "experience*D(return)", interactions of D(return) with all the other variables, none of which are significant.

Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

in Column III.

The most graphic results are therefore lower rates of return to education, but higher rates of return to labor market experience for people who returned to school. These findings are consistent with a profile of people who stopped their schooling relatively early because they realized they were more productive in the labor market than in school. An additional factor might be that they attended lower-quality schools (hence they have lower rates of return to education) where the dropout rate was high, although this does not explain why they have higher rates of return to experience. The fact that D(return), the return-to-school dummy, is insignificant shows that people who returned to school do not earn higher or lower wages, on average, than statistically similar people who otherwise invest in continuous schooling. Yet, the interactions discussed above imply that these two groups do differ in an intuitively plausible fashion, given their schooling choices, in their relative proclivity for market-based versus schooling-based productivity growth.

Table 35 adds to the regressions in Table 34 a dummy "ever received training," which equals 1 if a respondent received any type of training prior to the 1992 interview. The sign on the training dummy is, as expected, positive and significant, and its inclusion has no substantive effect on the results reported in Table 34. Though not shown, Column III includes an interaction of the training dummy and D(return), but the interaction while positive was insignificant. This indicates that training received while in the market did not have a significantly different impact on wages for the return and did-not-return groups. A possible reason for the insignificance of the training interaction is that the experience

Table 35: Cross-Sectional Wage Regressions (incidence of previous training included)

	Did Not Return (n=3,826)	Return (n=395)	Full Sample[c] (n=4,221)
highest grade ever completed[a]	0.084*** (0.003)	0.063*** (0.010)	0.084*** (0.003)
highest grade ever completed*D(return)[b]			-0.021** (0.010)
experience	0.036*** (0.002)	0.047*** (0.007)	0.036*** (0.002)
experience*D(return)			0.011* (0.007)
nonwhite	-0.059*** (0.018)	-0.065 (0.054)	-0.059*** (0.018)
female	-0.159*** (0.014)	-0.170*** (0.043)	-0.159*** (0.014)
married	0.101*** (0.014)	0.085** (0.043)	0.101*** (0.014)
unemployment rate	-0.006*** (0.003)	0.001 (0.008)	-0.006*** (0.003)
full-time	0.185*** (0.021)	0.080 (0.067)	0.185*** (0.021)
ever received training[d]	0.096*** (0.016)	0.148*** (0.054)	0.096*** (0.016)
D(return)			0.184 (0.200)
Adjusted R^2	0.332	0.263	0.358

a, b, c: see Table 34 notes.

d. The dummy "ever received training" equals one if the individual received any type of training at anytime before the 1992 interview.

Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

interaction may be capturing much of the differential growth in productivity between the two groups that takes place during employment.

Table 36 Columns I to III additionally adds to the wage regressions the respondent's AFQT score as an attempt to control for unobserved ability that might be

Table 36: Cross-Sectional Wage Regressions (AFQT percentile scores included) and Fixed Effects Estimates

	Not Return (n=3,826)	Return (n=395)	Full Sample[c] (n=4,221)	Return (n=241)
highest grade ever completed[a]	0.061*** (0.003)	0.046*** (0.011)	0.061*** (0.003)	0.064*** (0.020)
highest grade ever completed*D(return)[b]			-0.015 (0.012)	
experience	0.031*** (0.002)	0.040*** 0.008)	0.031*** (0.002)	0.048*** (0.019)
experience*D(return)			0.009 (0.008)	
nonwhite	0.014 (0.019)	0.006 (0.058)	0.014 (0.019)	
female	-0.159*** (0.014)	-0.169*** (0.043)	-0.159*** (0.014)	
married	0.092*** (0.014)	0.074* (0.043)	0.092*** (0.014)	0.105* (0.058)
unemployment rate	-0.007*** (0.003)	0.002 (0.008)	-0.007*** (0.003)	-0.014 (0.011)
full-time	0.199*** (0.020)	0.057 (0.067)	0.199*** (0.020)	0.055 (0.063)
ever received training	0.076*** (0.015)	0.149*** (0.054)	0.076*** (0.015)	0.154*** (0.063)
AFQT percentile score x 10	0.035*** (0.003)	0.032*** (0.011)	0.035*** (0.003)	
D(return)			0.125 (0.203)	
Adjusted R^2	0.351	0.277	0.345	0.119

a, b and c: see Table 34 notes.
Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

correlated with education level and/or the receipt of training. Compared to Table 35, we see that 1) the coefficient on highest grade completed falls quite a bit for both groups, 2) the coefficients on experience and "ever received training" also fall, and 3) the interaction of highest grade completed as well as experience with D(return) in Column III are no longer significant. These results taken as a whole imply that if the AFQT score does in fact capture some component of unobserved ability, then this unobserved ability is correlated primarily with formal schooling, and to a lesser extent with the likelihood of participating in a training program and/or any unobserved ability that is generating wage growth with labor market experience.

As another attempt to control for unobserved ability effects, the last column of Table 36 reports for the return sample fixed effects estimates that control for individual-specific and time-invariant unobservables. The variables are calculated as the difference between the 1992 values and 1981 values, therefore the change in highest grade completed is the amount of additional schooling acquired during the return spell. We see that the results are actually very close to those reported in Table 35 Column II, and indeed, the result of a specification test ($\chi^2_6 = 9.25$, which is less than the critical value of 12.59 at 5% significance) indicates that if time-invariant unobservables are present, they are not correlated with the explanatory variables in Column II of Table 35.[62]

Table 37 focuses the analysis on the return sample. The wage regression specification is modified to allow the returns to highest grade completed prior to return

[62] I also performed a test on the specification reported in Table 36 Column II and the fixed effects specification. The test statistic is $\chi^2_6 = 7.83$, which is also less than the critical value at 5% significance.

Table 37: Wage Regressions for the Return Sample Allowing for Differential Effects of Education and Experience Before and After Return

	I	II	III	IV
grade prior to return	0.072***	0.075***	0.051***	0.055***
	(0.011)	(0.011)	(0.013)	(0.013)
additional schooling	0.035**	-0.079	0.032*	-0.073
	(0.019)	(0.063)	(0.019)	(0.062)
(additional schooling)^2		0.052*		0.049
		(0.032)		(0.032)
(additional schooling)^3		-0.004		-0.004
		(0.004)		(0.004)
experience prior to return	0.035***	0.035***	0.029***	0.030***
	(0.008)	(0.008)	(0.009)	(0.009)
experience since return	0.064***	0.064***	0.061***	0.061***
	(0.012)	(0.012)	(0.011)	(0.011)
nonwhite	-0.059	-0.060	0.011	0.007
	(0.053)	(0.053)	(0.059)	(0.058)
female	-0.170***	-0.171***	-0.168***	-0.170***
	(0.043)	(0.043)	(0.043)	(0.042)
married	0.092**	0.105***	0.081**	0.094**
	(0.043)	(0.044)	(0.043)	(0.043)
unemployment rate	-0.002	-0.001	-0.001	0.001
	(0.008)	(0.008)	(0.008)	(0.008)
full-time	0.051	0.050	0.028	0.028
	(0.067)	(0.067)	(0.067)	(0.067)
ever received training	0.144***	0.151***	0.145***	0.151***
	(0.054)	(0.054)	(0.053)	(0.053)
AFQT score x 10			0.032***	0.030***
			(0.011)	(0.011)
Adjusted R^2	0.274	0.278	0.287	0.290

Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

to differ from the returns to additional schooling, and similarly allows for different experience profiles before and after return. Columns I and II do not include AFQT

score, and Columns III and IV do.

Looking first at Columns I and III we see that the rate of return to additional schooling is lower than that for prior schooling.[63] These patterns might result from 1) declining rates of return to higher levels of education per se, even if education is undertaken in a continuous fashion, and 2) a certain degree of depreciation of study skills after a period of nonparticipation in schooling, possibly combined with the usual part-time nature of this schooling[64] (this will be discussed further below) and possible family- and job-based demands on one's time. We also see that the returns to experience since return is larger than that to prior experience. The larger post-return experience effect might reflect the influence of people who return to school subsequently receiving promotions, or similarly advancing in their careers through voluntary job mobility, and as a result moving into jobs that offer more rapid wage growth. In order to rule out the possibility that the coefficient on post-return experience might be picking up nonlinearities in the returns to additional schooling, higher order terms of additional schooling are included in Columns II and IV. The coefficients of both experience variables are virtually unchanged.

Comparing Column I to the estimates for the did-not-return group in the first column of Table 35, we see that 1) the rates of return to both prior schooling and additional schooling are *lower* than the rate of return to highest grade completed for people who did not return to school, and 2) the rate of return to additional experience

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[63] Angrist (1993) found a similar result for veterans who returned for additional education.

[64] See Table 5 in Chapter II.

is *higher* than the rate of return to experience for people who did not return to school, and the rate of return to prior experience is similar in magnitude. Similar results are observed if we compare Column III to the first column of Table 36 where the AFQT score is included.

As discussed above, the education and experience patterns seem to conform to what we would expect from the choices made by these two groups. Specifically, people who choose to stay in school continuously would likely be those people who, ceteris paribus, expect to have a higher rate of return to schooling.[65] A complementary factor producing this pattern might be that superior educational environments, say better colleges and high schools, tend to have higher retention rates for their students while at the same time yielding higher rates of return to education, i.e. on average, people who go to school continuously may be receiving higher quality education.

The generally higher rates of return to experience are also as expected, since people who leave school, but subsequently return, are likely on average to be relatively intelligent people. As such they will tend to be rather successful in the job market and anticipate that their comparative advantage is in the market, rather than in educational investments. It is not inconsistent, though, with this explanation that these people decide to continue to invest in schooling after a period of withdrawal from school, since once working they may discover that they require additional educational credentials in order to continue to advance their career.

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[65] Similarly, those people who stay in school continuously may have been doing better in their studies, so that the higher rates of return may be reflecting otherwise higher grades and the effect on their market prospects of academic honors and letters of recommendation.

Table 38 investigates whether there are differential returns to additional schooling acquired full-time versus part-time. Each year in the survey, only those who are enrolled

Table 38: The Wage Consequences of Part-Time vs. Full-Time Additional Schooling

	Full Return Sample (n=395)	Those Who Attended College During the Return Spell (n=290)	
grade prior to return	0.072***	0.074***	0.073***
	(0.011)	(0.015)	(0.015)
additional schooling	0.040*	0.045*	0.069**
	(0.022)	(0.025)	(0.033)
additional schooling *full-time schooling[a]	-0.014		-0.044
	(0.034)		(0.039)
experience prior to return	0.035***	0.033***	0.032***
	(0.009)	(0.010)	(0.010)
experience since return	0.063***	0.062***	0.059***
	(0.012)	(0.014)	(0.014)
nonwhite	-0.061	-0.001	-0.007
	(0.054)	(0.067)	(0.067)
female	-0.168***	-0.165***	-0.168***
	(0.043)	(0.052)	(0.052)
married	0.092**	0.082	0.072
	(0.043)	(0.052)	(0.053)
unemployment rate	-0.002	-0.003	-0.003
	(0.008)	(0.010)	(0.010)
full-time work in 1992	0.050	-0.014	-0.027
	(0.068)	(0.081)	(0.082)
ever received training	0.144***	0.212***	0.209***
	(0.054)	(0.069)	(0.069)
Adjusted R^2	0.272	0.215	0.216

a. Those enrolled in degree-granting colleges or universities (last two columns) were asked directly if they attended school full-time or part-time. For the full return sample (first column), "full-time schooling" is a dummy which is created to equal one if the individual did not work at all during the additional schooling spell. Mean (and standard deviation) of "full-time schooling" equal 0.264 (0.441) for the sample of those who attended college during the return spell and 0.243 (0.430) for the full sample.

Cells report parameter estimates and standard errors (in parentheses).

***, **, * denote significance of 1%, 5% and 10% respectively.

in degree-granting colleges or universities are asked directly if they are full-time or part-time students. Therefore, in order to make use of the responses to these questions, I restrict the analysis in Columns II and III to those in the return sample who attended a degree-granting college during their additional schooling spell. Column II provides baseline estimates for this subgroup. As an alternative way to investigate the issue, I created as a proxy for full-time schooling a dummy (for everyone in the return sample) which equals one if the individual did not work at all while he/she was enrolled in school. The mean and standard deviation of this dummy (used in Column I) are 0.243 and 0.430 respectively, which are very similar to the mean and standard deviation (0.264 and 0.441 respectively) of the variable based on actual survey responses used in Column III. Regardless of which full-time dummy is used, the interaction of the dummy with additional schooling is not significant, suggesting that the returns to additional schooling do not differ by whether it was acquired full-time or part-time.[66]

Table 39 reports the same specifications as in Table 37 Columns I and III, except that degree dummies are included in the regressions. In addition to seeing if degree effects per se impact on any of the results (Weiss, 1988), the purpose here is also to see if the lower rate of return to additional schooling, relative to prior schooling (and the lower rates generally for the return sample) is influenced by the finding in Table 17 that many of the people who return to school do not complete degrees. Columns I and II do not include AFQT score as a regressor, whereas Columns III and IV do. We see that

[66] Specifications where AFQT score is included lead to the same conclusion.

Table 39: Wage Regressions for the Return Sample Allowing for Degree Effects

	I	II	III	IV
grade prior to return	0.067***	0.061***	0.045***	0.042***
	(0.011)	(0.013)	(0.013)	(0.014)
additional schooling	0.021	0.017	0.016	0.015
	(0.019)	(0.021)	(0.019)	(0.021)
degree dummies[a]:				
any degree[b]	0.145***		0.151***	
	(0.048)		(0.047)	
GED		0.082		0.120
		(0.146)		(0.146)
high school diploma		0.147*		0.162*
		(0.088)		(0.087)
AA		0.098		0.114
		(0.085)		(0.084)
BA, BS		0.146*		0.145*
		(0.089)		(0.088)
MA, MBA, MS, MSW		0.242***		0.207**
		(0.103)		(0.103)
PhD, MD, LLD, DDS		0.219		0.275
		(0.300)		(0.298)
experience prior to return	0.035***	0.036***	0.029***	0.029***
	(0.008)	(0.008)	(0.009)	(0.009)
experience since return	0.065***	0.065***	0.061***	0.062***
	(0.011)	(0.012)	(0.011)	(0.012)
nonwhite	-0.047	-0.048	0.028	0.025
	(0.053)	(0.054)	(0.058)	(0.059)
female	-0.174***	-0.165***	-0.172***	-0.167***
	(0.042)	(0.043)	(0.042)	(0.043)
married	0.094**	0.095**	0.083**	0.085**
	(0.043)	(0.044)	(0.042)	(0.043)

(cont'd)

unemployment rate	-0.000 (0.008)	0.000 (0.008)	0.002 (0.008)	0.002 (0.008)
full-time	0.049 (0.067)	0.060 (0.068)	0.025 (0.067)	0.034 (0.068)
ever received training	0.148*** (0.053)	0.147*** (0.054)	0.150*** (0.053)	0.151*** (0.054)
AFQT score x 10			0.033*** (0.011)	0.032*** (0.011)
Adjusted R^2	0.289	0.283	0.304	0.296

a. GED - General Education Diploma
AA - Associate/Junior College Degree
BA, BS - Bachelor's Degrees
MA, MBA, MS, MSW - Master's Degrees
PhD - Doctoral Degree
MD, LLD, DDS - Professional Degrees

b. The variable "any degree" is a dummy which equals one if the individual obtained a degree (any type) upon completion of the additional schooling spell.

Cells report parameter estimates and standard errors (in parentheses).
***, **, * denote significance of 1%, 5% and 10% respectively.

regardless of whether or not AFQT is controlled for, the dummy for receipt of any degree is highly significantly positive. As for the different degrees, the coefficients for high school diploma, Bachelor's degrees and Master's degrees are significantly positive. We also see that, compared to Table 37, the effect of additional schooling declines when degrees are controlled for, and becomes insignificant.[67] These findings taken together suggest that the main payoff to additional schooling is from supplementary credentialling, i.e.

[67] It is unlikely that the declines in the additional schooling coefficients are due to collinearity between additional schooling and the degree dummies, because the standard errors of the additional schooling coefficients are essentially the same as those in Table 37.

additional schooling without degree completion may have little effect on wages.

Chapter Summary

In this chapter, I find patterns in the returns to education and experience that are consistent with people making optimal educational choices according to the relative productivity of their time in market and educational investments. For those who returned to school, the returns to education (acquired both before and during the additional schooling spell) are lower than that for people who had continuous schooling, but the returns to experience are generally higher.

I also find that for those with discontinuous schooling profiles, the returns to education acquired during the additional schooling spell is lower than the returns to initial schooling. Furthermore, while the returns to additional schooling do not vary by enrollment status, i.e. whether the individual was enrolled full-time or part-time, the main payoff to additional schooling is degree completion. High school diplomas, Bachelor's degrees, and Master's degrees have particularly strong positive effects on wages.

SUMMARY OF MAJOR FINDINGS

Data from the 1970, 1980, and 1990 Censuses reveal patterns consistent with an upward trend in adults returning to school: 1) Mean educational attainment of older cohorts has increased over time, 2) Average student age at each education level increased over time, 3) Over time a higher percentage of older people are enrolled at each education level, and a higher percentage of each older age group are enrolled as students, and 4) The negative effect of age on enrollment likelihood has declined monotonically over time.

Data from the May 1984 Current Population Survey (CPS) Adult Education Supplement show that part-time study is a more prevalent mode in which adults acquire additional schooling.

Analysis using the 1979-93 CPS Outgoing Rotation Groups File and the 1964-93 March CPS Annual Demographic Files provides supportive evidence for the hypothesis that adults responded to the rise in the college/high school wage differential from the late 70's to late 80's by returning to college.

Analysis of the determinants of return-to-school likelihood using data from the National Longitudinal Survey of Youth reveal the following major patterns: 1) Returning to school occurs at a relatively higher rate at higher education levels, 2) The relationship between labor market experience and the likelihood of returning to school is inverted U-shaped, peaking at between 4-7 years of experience, and the experience effect is stronger for women than for men, 3) Nonwhites are more likely to return to school, but this

pattern is only found among high school graduates and those with some college education, 4) Women are more likely to return to school, 5) Marriage has a negative effect on the likelihood of returning to school only at lower education levels, 6) People who received training in a prior period are more likely to subsequently return to school, 7) People with higher AFQT scores are also more likely to return to school, 8) The majority of people who return to school do so at two year colleges, with the second largest group being people at four year colleges, 9) The majority of people who return to school do not receive degrees during their first return-to-school spell, 10) Conditional on returning to school, the only significant determinants of degree completion are education level, experience, and AFQT score, 11) There is evidence that borrowing constraints lead individuals to leave school early, so that they are more likely to return after a period of work, and further that nonwhites are more likely to return because they faced stronger borrowing constraints, and 12) Among married people, only those who have children are less likely to return to school than people who are single.

As for the relationship between additional formal schooling and training, the major findings are: 1) Participation in an apprenticeship program has no effect on return likelihood, but participation in company training has a positive effect, 2) Participation in training programs, other than apprenticeships and company training, that are relatively long increases the likelihood of returning to school, but participation in shorter programs decreases the likelihood, 3) People who received company training are more likely to remain employed while in school and are more likely to remain with the same employer who provided the training, suggesting that company training and additional formal

schooling may be complementary to each other.

Finally, the analysis of the impact of returning to school on wages reveals the following: 1) For people who returned to school, the rate of return to prior schooling is higher than that for additional schooling, and the rate of return to prior experience is lower than that for post-return experience, 2) People who returned to school have generally steeper wage-experience profiles than people who had continuous schooling, 3) People who returned to school have lower rates of return to schooling (both pre-return and post-return schooling) than those who never returned, 4) There are no differential returns to part-time versus full-time schooling, 5) Degrees obtained during the additional schooling spell (high school diploma, Bachelor's degrees, and Master's degrees in particular) have significant, positive effects on wages.

CONCLUSION AND DIRECTIONS FOR FURTHER RESEARCH

Evidence from Census data between 1970 and 1990 indicate a pattern of increased enrollment by adults in school. Understanding the reasons for this pattern, and the labor market outcomes that people face consequent on completing supplemental schooling, has potentially great importance for the economy.

Results from the CPS indicate that changes in rates of return do influence people's schooling decisions. Specifically, the rise in the college/high school wage differential induced adults to re-enroll in college. Results from the NLSY further suggest that people acquire additional schooling as part of a continuous process of investment. Patterns in rates of return to pre- and post- return education and labor market experience, in conjunction with relative rates of return to education and experience for people who returned to school and those who were continuously enrolled suggest that people allocate their time to education and market activities in line with their relative talents in these different type of skill formation.

There are a number of possible extensions to the current work. An investigation of return-to-school patterns for older workers may be interesting since it is plausible that people at older ages might return to school for entirely different reasons. First, since employer would tend to be less willing to provide retraining for their older workers (see Bartel and Sicherman, 1993)[68], they are at greater risk for losing their job if technological

[68] Though seniority rights might protect their jobs and thereby mitigate incentives to be retrained through additional formal schooling.

shocks depreciate their existing skills. As a result they may be more likely to return to school in order to be retrained for a new occupation or industry. Second, for relatively older workers we might expect that decisions to acquire additional schooling contain a greater consumption component. Since the NLSY sample is relatively young, investigation of these questions will require a different data set. The most likely data source would be the PSID if it does in fact provide sufficient information to construct and identify return to school spells. For this analysis any industrial (and possibly occupational) differences in return-to-school patterns would be considered, including an attempt to quantify the influence of technological shocks at the industry level on return-to-school patterns.[69]

Another related line of investigation would be to look at the effects of the length of the period between schooling periods. As seen in Figure 1, while most schooling interruptions last between approximately 2 to 10 years, quite a few people experience longer spells -- even the density in the 2-10 range is quite disperse. It is possible that the effects of additional schooling, and the reasons for acquiring it, varies with the length of time a person has been out of school.[70] Specifically, shorter periods between schooling spells may reflect planned periods of labor market experience as part of a chosen career path, while longer periods may reflect job losses attendant on sectoral demand shifts, technological based depreciation of skills, periods of labor force withdrawal and/or desired

[69] Bartel and Sicherman (1995) investigate the related issue of the effects of technological shocks on firm investments in on-the-job training.

[70] It is also possible that each of these factors varies with the person's age when they return to school, their gender, and their education.

occupational change.[71]

In future work I also would like to evaluate multiple return-to-school spells, asking such questions as 1) do people who return to school tend to do so once, or do they have multiple returns, 2) given the relatively low rate of degree completion for the return group (see Table 17), do people who return to school tend to complete their degrees after two or more return periods, and 3) how do the rates of return to additional schooling vary for first return spells as compared to later spells.

Finally, it may be interesting to investigate the impact of return-to-school spells on other labor market outcomes, such as promotions, tenure-wage profiles, subsequent employment durations, and unemployment likelihood (including unemployment durations conditional on an unemployment spell), and the effect of divorce, death of one's spouse, and job loss by one's spouse, on decisions to return to school.[72]

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[71] Weiss (1971) shows how nontransferability of skills might lead people to return to school for retraining when changes in relative wages lead them to change occupations.

[72] Using data from the 1970 National Fertility Study, Davis and Bumpass (1976) find that women who are currently separated or divorced are more likely to return to school. Extending this analysis to more recent years should be interesting as greater labor market opportunities for women might predict an even stronger pattern of post-divorce return, though higher levels of education attainment and labor force participation by married women might produce forces in the other direction.

BIBLIOGRAPHY

Altonji, Joseph. 1993. "The Demand for and Return to Education When Educational Outcomes are Uncertain." *Journal of Labor Economics* 11(1): 48-83.

Angrist, Joshua D. 1993. "The Effects of Veterans Benefits on Education and Earnings." *Industrial and Labor Relations Review* 46(4): 637-52.

_____, and Whitney K. Newey. 1991. "Overidentification Test in Earnings Functions With Fixed Effects." *Journal of Business and Economic Statistics* 9(3): 317-23.

Ashenfelter, Orley and David Card. 1985. "Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs." *The Review of Economics and Statistics* 67(5): 648-60.

Babcock, Daniel L. 1975. "Continuing Education of Professional Employees - A Benefit-Cost Model." *The Engineering Economist* 20(4): 281-93.

Bartel, Ann and Frank Lichtenberg. 1987. "The Comparative Advantage of Educated Workers in Implementing New Technology." *The Review of Economics and Statistics* 69(1): 1-11.

Bartel, Ann and Nachum Sicherman. 1993. "Technological Change and Retirement Decisions." *Journal of Labor Economics* 11(1): 162-83.

_____. 1995. "Technological Change and The Skill Acquisition of Young Workers." Working Paper, March.

Becker, Gary. 1975. Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, Second Edition. New York: Columbia University Press.

Ben-Porath, Y. 1967. "The Production of Human Capital and the Life-Cycle of Earnings." *Journal of Political Economy* 75(4): 352-65.

Bondi, A. 1976. "Continuing Education of Professional Employees: A Comment." *The Engineering Economist* 21(1): 50-52.

Brown, James. 1989. "Why Do Wages Increase With Tenure? On-the-Job Training and Life-Cycle Wage Growth Observed Within Firms." *American Economic Review* 79(5): 971-91.

Cameron, Stephen V. 1994. "Assessing High School Certification for Women Who Dropout." Working paper, January.

Card, David. 1994. "Earnings, Schooling, and Ability Revisited." NBER Working Paper No. 4832.

Corman, Hope. 1983. "Postsecondary Education Enrollment Responses by Recent High School Graduates and Older Adults." *Journal of Human Resources* 17(2): 247-67.

Cranford, Sharon H. and James E. Connor. 1989. "Employer-Provided Educational Assistance Plans." *Journal of Compensation and Benefits* 4(5): 304-5.

Davis, Nancy J. and Larry L. Bumpass. 1976. "The Continuation of Education After Marriage Among Women in the United States: 1970." *Demography* 13(2): 161-74.

Evans, William N. and Mark D. Turner. 1995. "Minimum Wage Effects on Employment and School Enrollment: Comment." Working Paper, December.

Felmlee, Diane H. 1988. "Returning to School and Women's Occupational Attainment." *Sociology of Education* 61(1): 29-41.

Greene, William H. 1993. Econometric Analysis, Second Edition. New York: Macmillan Publishing Company.

Griliches, Zvi. 1977. "Estimating the Returns to Schooling: Some Econometric Problems." *Econometrica* 45(1): 1-22.

Jacobson, Louis S., Robert J. LaLonde, Daniel G. Sullivan, and Robert Bednarzik. 1994. "The Returns from Classroom Training for Displaced Workers." Working Paper, October.

Juhn, Chinhui, Kevin Murphy, and Brooks Pearce. 1993. "Wage Inequality and the Rise in Return to Skill." *Journal of Political Economy* 101(3): 410-42.

Katz, Lawrence, and Kevin Murphy. 1992. "Changes in Relative Wages, 1963-87: Supply and Demand Factors." *The Quarterly Journal of Economics* 107(1): 35-78.

Kenny, Lawrence W., Lung-Fei Lee, G.S. Maddala, and R.P. Trost. 1979. "Returns to College Education: An Investigation of Self-Selection Bias Based on the Project Talent Data." *International Economic Review* 20(3): 775-89.

Killingsworth, Mark. 1982. "'Learning by Doing' and 'Investment in Training': A Synthesis of Two 'Rival' Models of the Life Cycle." *Review of Economic Studies* 49(2): 263-71.

Krueger, Alan, and Cecilia Rouse. 1994. "New Evidence on Workplace Education." Working paper, July.

Lazear, Edward, and Sherwin Rosen. 1990. "Male-Female Wage Differentials in Job Ladders." *Journal of Labor Economics* 8(January Supplement): S106-23.

Light, Audrey. 1995. "The Effects of Interrupted Schooling on Wages." *Journal of Human Resources* 30(3): 472-502.

_____. 1995. "Hazard Model Estimates of the Decision to Reenroll in School." *Labor Economics* 2(4): 381-406.

Lynch, Lisa. 1991. "The Role of Off-the-Job vs. On-the-Job Training for the Mobility of Women Workers." *AEA Papers and Proceedings* 81(2): 151-56.

_____. 1992. "Private-Sector Training and the Earnings of Young Workers." *American Economic Review* 82(1): 299-312.

Marcus, Richard. 1984. "Measuring the Rate of Return to Interrupted Schooling." *Journal of Educational Statistics* 9(4): 295-310.

_____. 1986. "Earnings and the Decision to Return to School." *Economics of Education Review* 5(3): 309-17.

Mincer, Jacob. 1974. Schooling, Earnings, and Experience. New York: Columbia University Press.

_____. 1993. "The Production of Human Capital and the Lifecycle of Earnings." Paper to be presented at a conference commemorating Yoram Ben-Porath, August.

Mincer, Jacob, and Solomon Polachek. 1974. "Family Investments in Human Capital: The Earnings of Women." *Journal of Human Capital* 82(2): S76-108.

Mincer, Jacob, and Haim Ofek. 1982. "Interrupted Work Careers: Depreciation and Restoration of Human Capital." *Journal of Human Resources* 17(1): 3-24.

Murnane, Richard J., John B. Willett, and Kathryn Parker Boudett. 1995. "Do School Dropouts Benefit from Obtaining a GED? From Post-Secondary Education and Training? The Answers are Related!" Working paper, August.

Neumark, David and William Wascher. 1992. "Minimum Wage Effects on Employment and School Enrollment." *Journal of Business and Economic Statistics* 13(2): 199-208.

O'Neill, June and Solomon Polachek. 1993. "Why the Gender Gap in Wages Narrowed in the 1980s." *Journal of Labor Economics* 11(1): 205-28.

Pischke, Jörn-Steffen. 1994. "Continuous Training in Germany." Working Paper, August.

Rowan, Richard L. and Herbert R. Northrup. 1972. Educating the Employed Disadvantaged For Upgrading. Industrial Research Unit, Wharton School of Finance and Commerce, Report No. 18.

Spletzer, James. 1990. "Post-Secondary Education and Labor Supply in the Early Stages of the Life Cycle." Dissertation, Northwestern University.

Stoikov, Vladimir. 1975. The Economics of Recurrent Education and Training. International Labor Office, Geneva.

Trost, Robert P. and Lung-Fei Lee. 1984. "Technical Training and Earnings: A Polychotomous Choice Model With Selectivity." *The Review of Economics and Statistics* 66(1): 151-56.

Wallace, T., and L. Ihnen. 1975. "Full-Time Schooling in Life-Cycle Models of Human Capital Accumulation." *Journal of Political Economy* 83(1): 137-55.

Weiss, Andrew. 1988. "High School Graduation, Performance, and Wages." *Journal of Political Economy* 96(4): 785-820.

Weiss, Yoram. 1971. "Learning by Doing and Occupational Specialization." *Journal of Economic Theory* 3(2): 189-98.

Willis, Robert J. and Sherwin Rosen. 1979. "Education and Self Selection." *Journal of Political Economy* 85(5): 507-36.

Willis, Robert J. 1986. "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Function." In Handbook of Labor Economics, Vol. I, edited by Orley Ashenfelter and Richard Layard. New York: North Holland.

Appendix I LIKELIHOOD-RATIO TESTS FOR POOLING

This appendix provides evidence that the five yearly cross sections - 1985-87, 1989, and 1990 used in Chapter IV may indeed be pooled. Two specifications are reported in Table A1, the only difference is that I does not include AFQT score, while II does. The second columns for both specifications I and II report regressions similar to those in Table 12 (where the five cross-sections are pooled and return-to-school regressions are estimated for the entire sample), whereas the first columns for both I and II additionally include four year dummies and a full set of interactions of the regressors with each of the four dummies. The only difference between the two columns in each specification, therefore, is that in the second column, the coefficients on the regressors are restricted to be the same in all five years, whereas in the first column, they are allowed to vary. This means that if the coefficients on the regressors are indeed the same in all the years, then the coefficients on the dummies and interactions in the first column regressions will not be statistically different from zero.

Likelihood-ratio tests are performed and in both specifications, the hypothesis that the coefficients on the dummies and all the interactions are zero cannot be rejected. These results confirm that the effects of the regressors remain constant over the time period in question and that the pooled regressions are valid.[73]

[73] Likelihood-Ratio Tests are also performed for the simpler specification in Table 11. The results are even stronger in favor of pooling.

Table A1: Likelihood-Ratio Tests for Pooling[a]

	I[b]		II	
education	-0.004	-0.011	-0.004	-0.011
	(0.023)	(0.010)	(0.023)	(0.010)
education *D85[c]	-0.002		-0.001	
	(0.034)		(0.034)	
eduction *D87	-0.030		-0.024	
	(0.030)		(0.031)	
education *D89	0.002		-0.001	
	(0.031)		(0.032)	
education *D90	-0.011		-0.011	
	(0.031)		(0.031)	
experience	0.101**	0.074***	0.109**	0.079***
	(0.047)	(0.023)	(0.049)	(0.024)
experience *D85	0.044		0.044	
	(0.073)		(0.076)	
experience *D87	0.010		0.017	
	(0.073)		(0.072)	
experience *D89	-0.072		-0.095	
	(0.066)		(0.068)	
experience *D90	-0.090		-0.077	
	(0.065)		(0.066)	
experience^2	-0.010*	-0.006***	-0.010**	-0.006***
	(0.005)	(0.002)	(0.005)	(0.002)
experience^2 *D85	-0.003		-0.003	
	(0.009)		(0.009)	
experience^2 *D87	-0.001		-0.001	
	(0.008)		(0.008)	
experience^2 *D89	0.005		0.007	
	(0.006)		(0.006)	
experience^2 *D90	0.009		0.009	
	(0.006)		(0.006)	

(cont'd)

	I		II	
nonwhite	0.181**	0.164***	0.178**	0.167***
	(0.085)	(0.038)	(0.085)	(0.038)
nonwhite*D85	-0.014		-0.011	
	(0.120)		(0.121)	
nonwhite*D87	-0.017		-0.011	
	(0.116)		(0.116)	
nonwhite*D89	-0.031		-0.023	
	(0.120)		(0.121)	
nonwhite*D90	-0.009		-0.003	
	(0.123)		(0.124)	
female	0.192***	0.152***	0.195***	0.155***
	(0.078)	(0.036)	(0.078)	(0.036)
female*D85	-0.064		-0.067	
	(0.112)		(0.112)	
female*D87	-0.076		-0.083	
	(0.108)		(0.109)	
female*D89	0.028		0.040	
	(0.113)		(0.114)	
female*D90	-0.085		-0.091	
	(0.117)		(0.119)	
married	-0.011	-0.077**	-0.005	-0.077**
	(0.084)	(0.038)	(0.083)	(0.038)
married*D85	-0.022		-0.029	
	(0.125)		(0.125)	
married*D87	-0.076		-0.081	
	(0.117)		(0.117)	
married*D89	-0.193*		-0.191	
	(0.117)		(0.118)	
married*D90	-0.049		-0.068	
	(0.119)		(0.118)	

(cont'd)

	I		II	
AFQT score	0.035**	0.032***	0.033*	0.003***
	(0.019)	(0.008)	(0.019)	(0.001)
AFQT score x 10 *D85	-0.010		-0.007	
	(0.027)		(0.027)	
AFQT score x 10 *D87	-0.016		-0.016	
	(0.026)		(0.026)	
AFQT score x 10 *D89	0.013		0.011	
	(0.028)		(0.028)	
AFQT score x 10 *D90	0.003		0.001	
	(0.026)		(0.026)	
unemployment rate			0.002	0.012**
			(0.012)	(0.006)
unemployment rate*D85			0.001	
			(0.018)	
unemployment rate*D87			0.024	
			(0.018)	
unemployment rate*D89			0.016	
			(0.019)	
unemployment rate*D90			0.008	
			(0.023)	
employed			-0.012	-0.024
			(0.091)	(0.044)
employed*D85			-0.003	
			(0.130)	
employed*D87			-0.048	
			(0.123)	
employed*D89			0.159	
			(0.140)	
employed*D90			-0.163	
			(0.150)	

(cont'd)

	I		II	
received training			0.228** (0.098)	0.251*** (0.044)
received training*D85			-0.122 (0.141)	
received training*D87			0.151 (0.140)	
received training*D89			0.035 (0.135)	
received training*D90			0.065 (0.139)	
D85	-0.006 (0.403)		-0.001 (0.469)	
D87	0.589 (0.381)		0.305 (0.446)	
D89	0.216 (0.339)		0.057 (0.455)	
D90	0.278 (0.400)		0.291 (0.464)	
Log-Likelihood	-4276.917	-4296.844	-4242.217	-4270.459
Test	$\chi^2(32) = 39.85$ Prob > $\chi^2 = 0.16$		$\chi^2(44) = 56.48$ Prob > $\chi^2 = 0.10$	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.

b. For each specification, the first column reports the unrestricted model (with corrected standard errors in parentheses), and the second column reports the restricted model.

c. D85=1 for 1985 cross-section, and similarly for D87, D89 and D90.

***, **, * denote significance of 1%, 5% and 10% respectively.

Appendix II DIFFERENT MEASURES OF TRAINING INCIDENCE IN RETURN-TO-SCHOOL REGRESSIONS

Results in Chapter IV show that individuals who participated in training programs in the year prior to the last interview are generally more likely to return to school since the last interview. In order to investigate whether the results are dependent on the amount of time that has elapsed since training was received, Table A2 reports specifications similar to those in Table 12, except that two different measures of training incidence are used: 1) having received any training in the last *two* years (Panel a), and 2) having received any training in the last *three* years (Panel b). Comparing the results in Panels (a) and (b) to those in Table 12, we see that receipt of training is positively associated with returning to school regardless of whether the training was received within the prior one, two or three year period. Furthermore, the other covariates in the model are essentially unaffected by the use of the different measures of training incidence.

Table A2: Different Measures of Training Incidence in Return-to-School Regressions
Mean of Dependent Variable = 0.028[a]

a. Received Training in the Last Two Years

	I[b]		II	
elementary school	0.105 (0.198)	0.689	0.253 (0.207)	1.911
some high school	0.227** (0.119)	1.601	0.349*** (0.129)	2.692
high school	0.201* (0.112)	1.222	0.287*** (0.119)	1.758
some college	0.227** (0.115)	1.537	0.272** (0.118)	1.879
college	0.417*** (0.117)	3.370	0.431*** (0.118)	3.507
exp <=1 yr	-0.219*** (0.071)	-1.086	-0.206*** (0.071)	-1.028
1< exp <=4	-0.142*** (0.043)	-0.803	-0.136*** (0.043)	-0.768
7< exp	-0.086* (0.047)	-0.497	-0.095** (0.047)	-0.540
nonwhite	0.112*** (0.032)	0.712	0.162*** (0.038)	1.063
female	0.152*** (0.036)	0.909	0.154*** (0.036)	0.913
married	-0.067* (0.038)	-0.397	-0.072** (0.038)	-0.423
unemployment rate	0.012** (0.006)	0.072	0.012** (0.006)	0.070
employed	-0.025 (0.044)	-0.152	-0.028 (0.044)	-0.166
had training last 2 years	0.267*** (0.040)	1.867	0.260*** (0.040)	1.809
AFQT score x 10			0.023*** (0.009)	0.135
Pseudo R^2	0.020		0.022	

b. Received Training in the Last Three Years

	I		II	
elementary school	0.083 (0.204)	0.537	0.229 (0.213)	1.708
some high school	0.228** (0.119)	1.626	0.349*** (0.130)	2.714
high school	0.198* (0.113)	1.214	0.284*** (0.119)	1.750
some college	0.224** (0.116)	1.522	0.268** (0.118)	1.862
college	0.414*** (0.118)	3.362	0.428*** (0.118)	3.498
exp <=1 yr	-0.221*** (0.071)	-1.104	-0.208*** (0.071)	-1.046
1< exp <=4	-0.138*** (0.043)	-0.788	-0.132*** (0.043)	-0.754
7< exp	-0.086* (0.047)	-0.496	-0.094** (0.047)	-0.540
nonwhite	0.109*** (0.033)	0.696	0.159*** (0.039)	1.045
female	0.146*** (0.036)	0.880	0.148*** (0.036)	0.885
married	-0.065* (0.038)	-0.387	-0.069* (0.038)	-0.412
unemployment rate	0.013** (0.006)	0.075	0.012** (0.006)	0.072
employed	-0.029 (0.044)	-0.179	-0.032 (0.044)	-0.192
had training last 3 years	0.233*** (0.036)	1.555	0.227*** (0.037)	1.503
AFQT score x 10			0.023*** (0.009)	0.135
Pseudo R^2	0.019		0.021	

a. The dependent variable is a dummy which equals one if the individual returned to school since the last interview date.

b. For each regression, the first column reports probit coefficients and corrected standard errors, and the second column reports marginal effects x 100.

***, **, * denote significance of 1%, 5% and 10% respectively.