Gender Differences in the Labor Market Experiences of Young Workers

by

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ABSTRACT

Young women entering the labor market earn lower wages on average than young men. It is important to understand the sources of this initial wage gap because of the potential consequences for young women's futures. Wages are an important determinant of human capital investment, job choice, and labor force participation, all of which influence future labor market outcomes. This dissertation attempts to account for the gender wage gap by studying different aspects of young workers' labor market experiences. I focus on the extent to which differences in young workers' rates of job mobility, high school work and vocational education, and early spells of nonwork can explain male/female wage differentials. All three chapters use data from the National Longitudinal Survey of Youth.

Chapter 1 examines the differences in wage growth between men and women in the initial years after labor market entry. I find the gender wage gap increases over the first four years in the labor market. In examining the causes of this increase, I focus primarily on the differences between young men's and women's wage growth when changing jobs. Using a sample of new full-time labor force entrants, I find that 46 percent of young men's average total wage growth over this period is associated with job changes, while for women only 24 percent of wage growth is associated with job changes. I also find that during the first four years in the labor market, both men and women are highly mobile, and that there is little difference in their frequency of job change. Despite this similarity, women receive more than 50 percent lower wage growth than men on average when changing jobs.

To try to account for these differences, I examine characteristics of the jobs men and women change to, and in particular I consider differences in hours and occupations. I find that women's higher probability of changing from a full-time to a part-time job accounts for approximately 20 percent of the difference in wage growth with job change between men and women. However, although there are significant differences in the occupational transitions men and women make, these account for virtually none of the differences in wage growth between men and women.

Chapter 2 studies whether differences in wages in the first years after entering the labor market are related to differences in pre-market work experience. I consider the extent to which high school work experience and vocational curriculums are associated

with higher probabilities of work and higher wages after graduation. Both investments may provide young people with job skills. In addition, working in high school may increase job-finding skills, job contacts, good work habits, and may signal to employers a greater attachment to the labor force. I find that young women and men who work in high school have a higher probability of working in the first few years after school and higher wages than those who did not work previously. Both white and nonwhite women who work in high school earn 15 percent higher wages in the first year after school than women who did not work in high school.

High school work is also associated with greater positive outcomes than having been in a vocational curriculum. While there is a positive relationship between wages and vocational curriculum, the increases are small and marginally significant. I find no significant connection between vocational curriculum and post-high school employment rates. Finally, my results suggest that working in high school leads to a smaller male/female wage gap for these workers. Working in high school is associated with a 7 percentage point drop in the wage gap for white women and a 3 percentage point drop for nonwhite women, although this advantage disappears by the fourth year after high school.

Chapter 3 studies the relationship between periods of non-employment after high school and short-run future wages of young men and women. Time spent not working and not in school may have negative effects on future wages through lost experience or by signalling lack of labor force attachment. There may also be no effect or even positive effects if time not working is spent in job search and job matching processes. In this chapter, I find that more time not working has a significant negative effect on next year's wages for men and women. Working 26 weeks versus 52 weeks is associated with a 5 percent decrease in men's wages and a 6 percent decrease in women's wages the next year. However, I also find that this effect diminishes over time. Fewer weeks spent working in the first years after high school have an insignificant effect on men's and women's wages four years later.

Among young men and women who are working in the fifth year after leaving high school, there are only small differences, 3 weeks per year, in the number of weeks of nonwork since leaving school. Despite this relatively small difference, nonwork can account for 19 percent of the wage gap between young men and women in the fifth year after high school. The difference in weeks worked accounts for 8 percentage points, while the difference in returns to work in the last year accounts for 11 percentage points. Differences in returns to work in past years accounts for none of the wage differential.

Thesis Supervisor: Henry S. Farber

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Introduction

The composition of the workforce in the United States is changing. Almost half of all current workers are female and 68 percent of net new entrants to the labor force between 1988 and 2000 will be women.[1] These rising proportions of new young female workers will be entering a labor market where there have already been enormous changes in women's labor force activity. The female labor force participation rate has risen steadily over the past decades and is now higher than 60 percent. In addition to this increase in the number of women who are working at a point in time, young cohorts of women are leaving the labor force for less time than past generations of women. One example of this is that more than 50 percent of women with newborns now return to work within one year.[2] In addition, women are now more likely to hold jobs that were traditionally considered male jobs.[3] These facts illustrate that new cohorts of young women are entering into a changing labor market.

Despite these changes in women's labor force behavior, there still remains a wage gap between men and women. From the mid-fifties until the late seventies, the female

[1]These are moderate growth projections from the Bureau of Labor Statistics reported in Fullerton [1989]. Net new entrants are defined as total entrants less leavers.

[2]Goldin [1990] gives a complete history of women's labor supply.

[3]Sorenson [1990] discusses the recent trends in convergence of male and female occupational distributions.

to male ratio of full-time workers' weekly earnings remained at approximately .62. During the eighties this ratio increased rapidly to about .70 by 1987.[4] The wage gap for young workers is smaller than that for all workers, but still significant. Using the National Longitudinal Survey of Youth (NLSY), the female to male wage ratio in the fifth year after high school for workers who do not go on to post-secondary school is .80.[5] The smaller wage gap for young workers is in part due to their position in the life-cycle of work and in part due to differences across cohorts.

While these recent wage gains for all women coupled with the smaller wage gap for young workers may be good news for young women, the recent picture of wages for young people in general is less encouraging. The average real weekly earnings of young, less-educated workers fell 20 percent between 1970 and 1987. In addition, the relative earnings of high school graduates and dropouts compared to college graduates has decreased approximately 30 percent in the last decade.[6]

In this dissertation, I examine the wage differential between young male and female workers and attempt to explain this gap by studying differences in young workers' labor market experiences. It is important to understand the sources of this wage differential because wages are a determinant of young women's current labor market behavior. Even more important, however, are the potential effects of current wages on a woman's future labor market experiences and lifetime earnings. Current wage dif-

[4]These figures are from Table 3.1 in Goldin [1990].

[5]This is for workers who entered the labor market between 1979 and 1983. Similarly, Katz and Murphy [1990] using CPS data find the ratio for high school grads entering the labor market between 1981 and 1985 is .77. I also find the wage gap to be smaller between full-time young male and female workers, a difference of 11 percent.

[6]Many studies have studied the relative wage changes of workers. See for example Juhn, Murphy, and Pierce [1989], Katz and Murphy [1990], and Levy [1989]. These relative changes are important because although high school graduation rates are increasing, 20 percent of 21 and 22 year-olds in 1990 are not high school graduates (National Center for Education Statistics [1991]).

ferentials affect young workers' decisions about human capital investment, job choice, and labor force participation, all of which influence future labor market outcomes.

My study of sources of gender wage differentials of young workers is closely related to the literature on gender wage differentials for all workers.[7] This literature identifies several main explanations for the existence of the gender wage gap: differences in human capital investment, differences in types of jobs held, differences in job turnover, differences in time out of the labor force, and discrimination. The literature not only quantifies the extent to which these differences can account for the gap, it also addresses the reasons differences exist. Discrimination, described as a direct reason for the wage gap, has in one form or another also been viewed as the source of these differences. Others have argued that observed differences in human capital, jobs held, job turnover, and time out of the labor force are the result of utility maximizing behavior given different preferences and unconstrained by discrimination.

Investment in human capital generally leads to higher wage levels. Male/female differentials in human capital investment partially explain the gender wage gap. In particular, women's lower levels of training (Lynch[1990], Mincer[1991]) and experience[8] (Corcoran and Duncan [1979]) have been shown to explain part of the gender wage differential. Although years of education are not generally found to be different for men and women on average, there are differences in types of schooling represented

[7]Of course the study of gender wage differentials is also closely related to the study of racial wage differentials. However, there are important differences when focusing on the male/female wage gap. Many studies of wage differentials address gender, race and gender within race differences. The focus of most of the research I discuss here is between genders. This dissertation also draws on studies of the youth labor market. These literatures are discussed in the individual chapters.

[8]Experience levels are of course closely related to time out of the labor force and intermittent labor force participation which are discussed below.

by differences in curriculum, majors, and degrees earned that also explain part of the observed wage gap.[9]

Differences in the types of jobs women hold compared to men also are related to the wage gap. The main focus of work in this area has been on occupational segregation. Polachek [1979 and 1981], Reskin and Hartman [1986], Beller [1986], and others have all shown a significant degree of occupational segregation exists. In Chapter 1 of this dissertation, I find that there are differences between men and women even in the occupation of the first full-time job held. Occupational segregation is often associated with lower wages for women because occupations with greater numbers of women pay lower wages on average. There are many different interpretations of these facts. Polachek has argued that occupational segregation is the outcome of women maximizing lifetime income taking into account future intermittent labor force participation coupled with different rates of skill atrophy across occupations. On the other hand, the literature on equal pay for equal jobs and the effectiveness of equal employment opportunity laws explains occupational segregation as the result of gender-based barriers to entry.

Many studies of differences in job turnover rates have found that women have higher probabilities of quitting or leaving their current job.[10] These higher rates of job leaving are associated with lower wages for women. Light and Ureta [1989] find different wage outcomes for women who have different rates of turnover, and discuss the problem for women with low expected rates of turnover of signalling this fact

[9]Grasso and Shea [1979] find young women are less likely to be in vocational curriculums than men. Also see Sorenson[1990] and Altonji [1988].

[10]For example, see Viscusi [1980], Blau and Kahn [1981], and Light and Ureta [1989].

to potential employers. This area of research is related to statistical discrimination models. In these models, employers are unable to distinguish which of the individuals in a group have an undesirable characteristic, such as a high probability of quitting. Given this imperfect information employers assume average characteristics for all members of a group, which results in lower average wages for women. In Chapter 1, I show that this explanation does not account for any of the gender wage gap for young workers, because young men and women do not have significantly different rates of job mobility.

Differences in time out of the labor force and the effects of the length of time out of the labor force have also been studied as explanations for women's lower wages.[11] Women, especially older cohorts of women, have significantly higher amounts of time out of the labor force throughout their lives than men. Loss of experience as well as depreciation of human capital while out of the labor force are possible causes of lower wages. Although there is disagreement over whether human capital depreciation is an important factor in wage profiles, the question may be less important for current and future cohorts of young women because the amount of time spent out of the labor force over the lifetime is decreasing.

However, women still have lower rates of labor force participation and higher probabilities of leaving the labor force at some point in their careers than men. Differences in expected future participation, influenced by personal choices as well as knowledge and perception of discriminatory barriers, continue to be a concern in understanding

[11] See for example Mincer and Polachek [1974], Corcoran [1979], Mincer and Ofek [1982], and Sundt [1987].

the gender wage gap. I find in Chapter 3 that young women work fewer weeks on average than men in the first years after leaving school and this accounts for part of the wage gap.

Finally, theories of discrimination formulate reasons that pay differentials may persist. The literature[12] tries to explain why discrimination exists as well as posit models of discrimination that are consistent with empirical facts. Actually measuring the effects of discrimination versus other explanations has proven to be difficult. In practice, labor economists have interpreted some proportion of the unexplained residual from estimated wage equations as discrimination. However, given the difficulty of finding data on many individual characteristics that may affect wages, it is difficult to know what percent of the unexplained wage difference is in fact due to discrimination.

This dissertation extends the literature by examining the empirical relevance of several of these explanations in accounting for the gender wage gap of young workers. In particular I focus on the extent to which differences in young workers' rates of job mobility, high school work and vocational education, and early spells of nonwork can explain male/female wage differentials.

Chapter 1 examines the differences in wage growth between men and women in the initial years after labor market entry. The first year after labor market entry the female to male wage ratio of full-time young workers is .89. This gap increases over the first four years in the labor market. In examining the causes of this increase, I focus primarily on the differences between young men and women's wage growth when changing jobs. Using a sample of new entrants[13] who are mainly full-time workers

[12]See Cain's [1986] survey of the discrimination literature.

[13]All of the chapters in this dissertation use data from the National Longitudinal Survey of Youth

I find that 46 percent of young men's average total wage growth over this period is associated with job changes, while for women only 24 percent of wage growth is associated with job changes. I also find that during the first four years in the labor market, both men and women are highly mobile, and that there is little difference in the men's and women's frequency of job change. However, I find that women receive more than 50 percent lower wage growth than men on average when changing jobs.

To try to account for these differences, I examine characteristics of the jobs men and women change to, and in particular I consider differences in hours and occupations. I find that women's higher probability of changing from a full-time to a part-time job accounts for approximately 20 percent of the difference in wage growth with job change between men and women. However, although there are significant differences in the occupational transitions men and women make, I find that these account for virtually none of the differences in wage growth between men and women.

Chapter 2 studies whether differences in wages in the first years after entering the labor market are related to differences in pre-market work experience. I consider the extent to which high school work experience and vocational curriculums play a different role in early labor market wages of men and women, either through differences in amount of high school work, or differences in the impact on future wages. Given important concerns about less-educated workers, I use a sample of high school graduates who did not go on to post-secondary schooling. I find that young women and men who work in high school have higher probabilities of work after high school. Young women who work in high school have higher post-school wages than young

(NLSY) for the years 1978 through 1988.

women who do not work in high school. This relationship diminishes over time.

In addition, I find that high school work is associated with greater positive outcomes than having been in a vocational curriculum. While there is a positive relationship between wages and vocational curriculum, the increases are smaller for women and nonwhite men than the increases associated with working 20 hours per week in high school. There is no significant positive connection between vocational curriculum and post-high school employment rates. Finally, my results suggest that by providing an edge for young women, working in high school may lead to a smaller male/female wage gap for these workers.

Chapter 3 studies the relationship between periods of not being employed and short-run future wages. I use a sample of recent high school graduates and dropouts. The female to male wage ratio is .80 in the fifth year after leaving school. I find that fewer weeks of work have a significant negative effect on wages in the next year for both men and women. Working 26 weeks in the second year after school versus 52 weeks is associated with 5 percent lower wages for men and 6 percent lower wages for women in the third year. I also find that fewer weeks spent working in the first year after high school have an insignificant effect on men's and women's wages four years later.

Young women in this sample have greater numbers of weeks of nonwork than young men in general. However, there are smaller differences in amounts of nonwork when considering the subsample of youth who are working in the fifth year after high school. Despite these relatively small differences in amounts of nonwork and insignificant effects of past work on current wages, differences in returns to work in the past year can account for 19 percent of the wage gap in the fifth year.

In conclusion, this dissertation presents some interesting results about differences in labor market experiences of young men and women. Just five years after entering the labor market, young women are already behind. At a point in time when young men are taking part in job matching processes that contribute to rapidly increasing wages, young women are either not part of these processes or are not reaping the benefits. Even at labor market entry, before traditional measures of experience and tenure can possibly differ, young women earn lower wages than young men. This is due in part to differences in pre-market human capital investment. Investments such as working in high school can increase women's general and specific work skills, improve job-finding skills and job contacts, and relay positive signals to employers about labor force attachment. All of these factors may contribute to higher wage levels. In addition, periods of not being employed in the first years after leaving school, which may be a time for maturing, decision-making and job search, seem to have no permanent effect on the future wages of men and women. However, differences between men and women in returns to work in the short-run can account for a significant percent of the wage gap. Although these periods of nonwork may be voluntary and not have permanent wage effects, they will still to some degree affect women's lifetime earnings. Taken together these results add considerably to our understanding of young women's current labor market status and the possible implications of current gender wage differences.

Chapter 1

Job Mobility and Wage Growth

1.1 Introduction

Although the gap between male and female earnings has fallen over time, the male-female wage differential increases with workers' time in the labor force. We might expect this differential growth for older workers, given differences in experience by gender due to time out of the labor market.[1] The fact that the female to male ratio of earnings falls with time for younger workers, starting with labor market entry, indicates the need to look for additional explanations.

This fact can be seen in CPS data. Table 1.1 contains female/male ratios of weekly earnings for full-time workers in three different age groups at different points in time. The narrowing wage gap for workers ages 16-19 from 1973 to 1983 is apparent looking across the first row. However, following cohorts diagonally from the upper left to lower right corner, we can see the ratio of female to male wages of full-time workers falls over time within a cohort. In 1979, the female-to-male ratio of usual weekly earnings of full-time workers ages 16-19 was .87 and in 1983 for the same

[1] For research on the effects on wages of time out of the labor force see Mincer and Polachek [1974], Corcoran [1979], Corcoran and Duncan [1979], Mincer and Ofek [1982] or Sundt [1987].

cohort of workers now 20-24 it was .84. For workers ages 20-24 in 1979 the ratio was .76 and for ages 25-34 in 1983 the ratio was .73.[2]

In this chapter I use panel data to follow male and female new labor market entrants to try to explain this increasing differential. I focus on the differences between men's and women's patterns of job mobility and wage growth during their first four years in the labor market. In particular, I study the differences between men and women in wage growth associated with job changing.

The question of why wage growth is less for young women than young men is especially important in light of evidence showing that the early period of young men's careers is one of very high wage growth. Fully two-thirds of life-time wage growth of men is gained during the first ten years of experience [Murphy and Welch, 1990]. If women's wage growth is low during this period it may have large effects on their lifetime earnings.[3] In addition the early period in the labor market is often considered formative for young workers' labor market behavior. Depending on the reasons for initial lower wage growth, it may have consequences for the future labor force experience of women, e.g. future labor force participation.

There is much evidence that job changing plays an important role in the wage growth of young men. Bartel and Borjas [1981] find that voluntary job changes produce positive wage returns, which decrease with labor force experience. Mincer

[2]Goldin [1990] finds a similar result for clerical workers in 1940. These workers started at very similar wages at the beginning of their careers. Over time wages diverged as young women received positive but much lower returns to experience than men did. Goldin attributes this to women being in dead-end jobs while men were promoted within employers.

[3]Cain [1985] calculates a measure of lifetime earnings using 1980 Census data that implies a female to male ratio for full-time workers ranging from .61 to .87. He finds most of the difference in male and female lifetime earnings comes from differences in early labor market earnings. The range of ratios results from different measures using either household income or per person earnings.

[1986] finds that young workers who move to new jobs ("movers") receive positive wage gains, both for quits and layoffs. Topel and Ward [1988] find that young men are very mobile with a large percentage of wage growth, 40% over the first ten years in the labor market, coming with job changes. Much of the work studying women's labor force mobility has concentrated on women's probability of job separation compared with men (e.g. Blau and Kahn [1981], Viscusi [1980], and Light and Ureta [1989]) and on the effects of time out of the labor force on earnings growth (see footnote 1). There is little research on how women's mobility from one job to another effects wage growth.

In the rest of this chapter I explore to what extent differences in job mobility and returns to job mobility can account for the differences between men's and women's wage growth. Using a sample of new entrants who are mainly full-time workers I find that for young men 46 percent of average total wage growth over this period is associated with job changes, while for women only 24 percent of wage growth is associated with job changes. During the first four years in the labor market, both men and women are highly mobile. Women change jobs in this sample approximately as frequently as young men. However, women receive lower wage gains when changing jobs. Women receive more than 50 percent less annual wage growth than men on average when changing jobs.

To try to account for these differences, I examine characteristics of the jobs men and women change to, and in particular I consider differences in hours and occupations. I find that women's higher probability of changing from a full-time to a part-time job is able to account for approximately 20 percent of the difference in wage growth with job change between men and women. However, although there are significant differences in the occupational transitions men and women make, I find that these can account for virtually none of the differences in wage growth between men and women.

1.2 The Data

Although the difference in wage growth between men and women persists throughout worker's lives, it is natural to study this phenomena by looking at new entrants to the labor force. Human capital theory predicts that early differences in training and experience (specific and general human capital formation) will have cumulative effects throughout a worker's career. Studying the early career allows us to examine differences that may effect later wage growth as well. Using young workers is also beneficial because it is possible to construct a complete labor force history. This allows calculation of actual labor market experience and determination of labor market entry.

The data used in this chapter from the National Longitudinal Survey of Youth (NLSY) allow me to study young workers as they enter the labor force and to have a detailed work history from entry. The survey is ongoing, but the data used here are from January 1, 1978 through 1987. There were 12,686 young people in the initial survey. To study wage growth of young workers I use a sample of workers that had demonstrated full-time entrance into the labor market, i.e. not merely summer jobs or occasional work. An individual was defined as having entered the labor force when they had worked three consecutive years for more than 26 weeks each year and an average of at least 30 hours per week. Full-time labor market entry is defined here as the beginning of the first year meeting these criteria.

The sample is therefore made up of young workers who are "attached" to the labor market, basically full-time workers.[4] This is a very different sample than simply using the average young worker, who is likely to have large amounts of time not working. This "attached" sample is important for several reasons. First, we can think of these young workers as truly at the beginning of their careers in the labor force, not simply in very short job spells, between periods of schooling. This is important for the assumption that these workers are considering this first job as the beginning of a period of steady work. Second, we are looking at a group of women who are approximately equally attached to the labor force as men during the period studied. Thus, the differences we see for men and women are less likely to be due to women who are not fully participating in the labor market.[5] Of course, it may still be true that this sample of women may have different expectations of future labor force participation than the men in the sample which could affect their present labor market behavior. However, choosing this sample at least limits direct differences from less time worked during the period studied.

The NLSY contains nine years of data, but because many of the participants are very young at the beginning of the sample (the age range is 14-21 in 1978) and therefore enter the labor market later in the survey, this study follows workers for only their first four years of labor market experience. Starting with the 6111 individuals in the 1979 representative subsample[6] of the NLSY, 2,971 individuals who do not

[4]This does not mean that there are no part-time jobs in the sample, as long as the worker worked more than 26 weeks and on average at least 30 hours a week for the year.

[5]Differences in experience and part-time versus full-time work are discussed later in the chapter.

[6]The other 6,575 observations are divided into two subsamples: one which over-represents low-

have three consecutive years of work that meet the above hours and weeks worked criteria were dropped. Another 505 individuals who met this criteria but did not have a fourth year in the sample were also dropped. Since I want to observe individuals from labor force entry, 622 individuals who were considered to be in the labor force in 1978 by the above definition and who had held a job prior to January 1, 1978, the beginning of the survey, were not included in the sample. Another 426 individuals were dropped because of missing data. The final sample I use contains 1,597 young men and women, 52 percent men and 48 percent women.

The workers in this sample are working for most of the four years studied. Listed below are the distributions of percentage of weeks working by sex for this sample. In this sample, approximately 85% of the individuals, both men and women, are working at least 85% of the weeks in the four years after entering the labor force.[7]

	Men	Women
75% or less	6.73	6.79
75 % to 85%	8.29	8.24
85 % to 95%	18.51	17.39
100%	66.47	67.58

For some of my analysis, I stack the four years I observe for each individual creating a pooled sample consisting of 6,388 distinct individual-years. Mean sample characteristics of the data are presented in Table 1.2. The top panel gives means for individuals, with marriage, divorce, and birth being the percentage of individuals who experienced these events at some time during the entire four-year sample. The bottom

income and non-white individuals, and another subsample of military personnel. The subsample used is a representative sample in 1979. Because of attrition, the sample is not precisely representative in future years. However, attrition in the NLSY is not high.

[7]It is possible to work less than 50% of the time because the fourth year was not required to meet the full-time work criteria. However, in the sample the numbers working less than half the time are very small, .6% of men and .78% of women.

panel gives means for the pooled sample. These averages are across all individual-year observations.

The use in this analysis of the wage data from the NLSY requires certain assumptions. Wages reported at the interview date and used here, are for the job at the interview date or the most recent previous job held. The wage reported is in answer to the question "What was the usual hourly wage for this job?" For jobs spanning more than one interview date, there is more than one wage observation. I assume that the wage reported at the interview date refers to the usual hourly wage at the time of the interview date. In other words, if a job continues across two interview dates, t and $t+1$, the first wage reported w_t will be the wage at the interview date t and the second wage w_{t+1} will be the wage at time $t+1$. All wages are real wages, deflated by the CPI.

1.3 Wage Growth

Wage growth for new entrants over the first four years in the labor market differs for men and women. The initial female/male wage ratio is greater for new workers than the ratio for the whole labor force. The ratio of first year wages is .89 in my sample without controls, compared to approximately .65 using CPS data for the whole labor force ages 16 and over in 1982 (O'Neil [1985]).[8] Yet over time, even in the first years of labor force participation of full-time workers, the wage profile diverges for men and women. Table 1.3 shows wage growth for men and women for each of the first four years in the labor market and for the entire four-year period. Annual average wage

[8]This difference could be due to several factors including different cohort affects as well as different age effects.

growth is calculated as the average of the difference in log real wages for each sex,

$$\frac{\sum_i \Delta w_{it}}{N_T} = \frac{\sum_i(\log(w_{it+1}) - \log(w_{it}))}{N_T},$$

where N_T is the total number of men or women in the sample and i is an index for each individual. The last column gives average cumulative wage growth for the four years, which is calculated as the sum of the four average annual wage growths. Over the entire four year period, young men have average log wage change of .276 percent and young women have average log wage change of .225 percent. The corresponding real average wage growth over the four years is 35.6 percent for men and 29.1 percent for women, a difference of 1.6 percent per year.

A large part of the answer to where the difference in wage growth comes from seems to lie in the different consequences of job mobility for men and women. Young men are very mobile, changing jobs often in the early part of their careers [Topel and Ward, 1988]. However, far from these being random job changes representative of immature lack of attachment to the labor force, job change can be seen as part of a young man's search for better jobs. Evidence of this search process is seen in the wage growth young men attain from job changing.[9]

Topel and Ward in their 1988 study find that a considerable amount of wage growth of young male workers comes with job changes. They use the LEED, Longitudinal Employee-Employer Data, containing social security earnings data extending from 1957 to 1972 and follow young men entering the labor force for ten years. Average cumulative wage growth for this sample of young men was 31.6 percent over the

[9]Of course even if job change was random we could still expect to see some wage growth as a return to the individual's greater experience. However, job change accounting for a large percentage of total wage change suggests more systematic search for better jobs or job-worker matches.

first 2.5 years of experience and 95 percent over the first ten years in the labor force.[10] Wage changes with job transition account for about 40 percent of young men's total wage growth over ten years and 53 percent over the first 2.5 years.

These results suggest that mobility plays an important role in wage growth of young men. In order to discover whether wage gains with job changes are as important for the more current sample studied here, calculations similar to Topel and Ward's were made for both young men and women. A comparison of these measures for men and women is made to ascertain if differences along this dimension are a significant factor in the difference in total wage growth.

Because wages here are for the job at the interview date, the precise wage change at transition is not available. The wage reported at the interview date is the usual wage for that job for the previous year. Therefore, it is impossible to separate wage growth on that job up to the interview date from the intitial wage on the job. Instead of using the actual wage change at job transition, I use the annual wage growth with job change, calculated as the difference in log real wages at consecutive interview dates for periods in which a job change occurred. The average of these annual wage changes is reported as average annual wage growth with job change and is used as a measure of wage growth between jobs. Similarly, if there was no job change over the year, the total wage change for that year was attributed to "staying" and the average annual wage growth on the same job is calculated. Therefore, wage growth

[10]The percentage for the first four year interval is not reported in the paper. Comparing the 2.5 year interval of wage growth to the first three years in the labor force in the sample used here we see that wage growth is considerably lower in the NLSY sample used here, .233 versus .316. The period of time studied may well be the explanation for this discrepancy. The NLSY sample covers a period, 1978-1987, that includes a serious recession and generally falling real wages. The late fifties and early sixties was a period of greater wage growth.

is decomposed into two parts, wage growth on the same job and wage growth with job change, which sum to give total wage growth:

$$\text{Total wage growth} = \sum_{n=1}^{4} \frac{(\sum_k \Delta w^n_{kt,job\ change})}{N_T} + \sum_{n=1}^{4} \frac{(\sum_j \Delta w^n_{jt,no\ job\ change})}{N_T},$$

where k stands for each individual who changes jobs in a given year and j stands for individuals who stay on the same job for the entire year. Again, N_T is the total number of men or women in the sample, and n stands for the sample year, 1 through 4. Also, the data does not include job changes with the same employer. Throughout the chapter reference to job change is synonymous with employer change.

This measure of wage change with job change is a biased measure of overall wage growth when a job change occurs. For example, if there is one job change six months after the interview at time t with no break in work, then the measure of annual wage growth with job change ($\Delta w_{t,job\ change}$) used here will include wage growth on the last six months of the job and the first six months of the new job as well as the wage change between jobs.[11] Thus, there is some upward bias in the measure of how much of wage growth is associated with job change. However, it is possible that wage gain associated with job transition may not be so clearly separated from the very early wage growth (several months on average) of the new job. Both may well be part of the attractiveness of a new job in the search process. This would mediate against the bias in the measure used here.

Calculations decomposing total wage growth into growth associated with job staying and changing as described above are presented in Table 1.4. The numbers for total

[11]There may of course be more than one job change over the course of the year. This information is lost by the above system of accounting, but the same issues as in the discussion above apply.

wage growth from Table 1.3 are reproduced on the first line of each panel Table 1.4 for convenience. The second line reports annual average wage growth on the same job and the third line reports annual average wage growth with job change. Men's wage growth over the four year period attributable to staying on the job is 14.9 percent.[12] Men's average four-year wage growth associated with changing jobs is 12.7 percent. Fully 46 percent of total wage growth for men over this four year period came with job changes.

While average four-year wage growth is somewhat lower than Topel and Ward's findings,[13] its composition is qualitatively the same suggesting that job changing accounts for an important part of wage growth for young men. Also, wage growth with job changing seems to be falling over time which is also suggested by some search models (see for example Burdett [1978].)[14]

Looking at the same numbers for young women we see a very different pattern. Young women have on average significantly lower wage growth with job change than young men. Wage growth associated with changing jobs is only 5.4 percent for women compared to 12.7 percent for men. However, average four-year wage growth when staying on the job is 17.1 percent, and not significantly different than men's 14.9 percent. Only 24 percent of total wage growth for women over this four-year period came with job changes as compared to 46 percent for men.

[12]This calculation is the average wage growth for staying over a year, cumulated for the four years. This is not the same as the average wage growth over four years for workers that never changed jobs. This number is 25.6 percent for men and 24.3 percent for women.

[13]These results suggest 47.6 percent of wage growth over three years was associated with job change, compared to 53 percent for the first 2.5 years of experience in Topel and Ward.

[14]Average annual wage growth with job change for year 0-1 is not significantly different from year 1-2, and year 2-3 is not significantly different from year 3-4. The first two years' averages are significantly different from the second two years' averages.

1.4 Differences in Job Mobility

W'.y is the wage growth associated with job change so much lower for young women than young men? The first step in finding an answer to this question is to decompose the lower wage growth associated with job changes into two parts: the wage gain when changing jobs (the return to changing jobs), and the rate of mobility or amount of job changing occurring. Several scenarios are possible. Women who change jobs may be receiving similar wage gains to men, but are changing jobs less than men. Alternatively, women may change jobs as often as men, but receive a lower wage gain when changing compared to men.

We must also consider that the above measures provide no controls for possible differences in experience, schooling, tenure on the job up to the point of change, and demographic characteristics. Differences along these dimensions may have important implications for growth and could provide explanations for lower wage growth with job changes.

1.4.1 Rates of Job Mobility

I first consider differences in the rates of job mobility of men and women. The difference in rates of mobility between men and women in this sample is surprisingly small.[15] Using all years in the pooled sample Table 1.5 shows young men changed jobs on average 36 percent of the time (i.e. 36 percent of all year-to-year intervals included a job change.) Young women changed jobs on average 33 percent of the time. These

[15]The following analysis considers job changes as years with at least one job change during the year. There may however, be more than one job change during the time from one interview to another. I do not use this information.

rates of job changing are similar even when considering only voluntary job changes.[16] Women are less likely to be laid-off, so a higher percentage of their changes are voluntary, (74% versus 62%). As a percentage of all years, women voluntarily change jobs 24 percent of the time compared to 22 percent for men.

It is possible, however, that some individuals are more likely to move in a given year than others. Table 1.5 does not take these "movers" into account. If one sex is more generally "movers" than the other the above comparison would be skewed. I can take this into account by looking at the number of years per individual in which there was a job change. The maximum number of years with job changes each individual can have is four. Table 1.6 contains a breakdown by sex of the number of years with job changes. The distributions show women are slightly less likely than men to have 3 or 4 years with a change, and slightly more likely to have 0 or 1 years with a change. Overall, men on average changed jobs in 1.66 out of the 4 years and women changed jobs in 1.47 of the 4 years. A chi-squared test cannot reject that the distributions shown in Table 1.6 are independent of sex. (The associated p-value is .232.)

In order to look at mobility controlling for characteristics of the job, the individual, and the labor market, I estimate the probability of separation controlling for these factors. In Table 1.7, probit equations estimating the probability of separation overall and the probability of voluntary separation are shown. A log-likelihood ratio test of the null that all the coefficients in the probit equation are the same for men and women except for a different constant against the alternative that all the coefficients

[16]Voluntary changes are quits; lay-offs, discharges, end of seasonal employment and other are classified as involuntary job separations. All job changes include both voluntary and involuntary separations.

are different for men and women, cannot reject the null for the quit equations (p-value=.314) but does reject for the equations using all separations (p-value=.001). In the equation estimating the probability of changing jobs allowing only an intercept to differ for women, I find that women have a significantly lower probability of separating from their job than men. Adding in controls for the occupation of the job that is left has virtually no effect on the coefficients reported.

I calculate the predicted probability of separation separately for men and women using the estimates from the probit equation reported in column two of Table 1.7, and using mean male and female characteristics. The difference in these predicted probabilities of separation is approximately 1 percent. Considering only voluntary job changes, I find that women have a marginally statistically significant higher probability of quitting than men in a similar equation. The difference in predicted probability of quitting between men and women calculated using the estimates in column one of Table 1.7 and mean male and female characteristics is approximately 1.5 percent. Women are 1.5 percent more likely to quit than men, and 1 percent less likely to separate for any reason. I conclude that overall, women's mobility rates, both voluntary and for all separations are approximately the same as men's.

The main characteristics differentially affecting men's and women's probability of separating or quitting are marriage and birth. Women who got married during a year have a significantly higher probability of changing jobs, while marriage has an insignificant affect on men's probability of job change. However, women have a significantly lower probability of changing jobs if they have a baby during the year. Again this factor has an insignificant affect on men's probability of change.

1.4.2 Returns to Job Changes

Given similar mobility rates, the explanation for low wage growth with job change for women would seem to lie with the returns associated with job change. To study these returns I first examine average wage changes with job changes conditional on having changed jobs. Table 1.8 shows the conditional average annual wage growth for changing jobs and for staying on the same job. The annual average wage growth conditional on having changed jobs is calculated as

$$(\Delta w_t \mid job\ change) = \frac{\sum_k (\Delta w_{t,job\ change})}{N_{job\ change}},$$

where $N_{job-change}$ is the number of men or women who changed jobs in that interval, and k indexes individuals who had a job change between interview dates. Average annual wage growth when staying on the job is computed similarly. The last column in Table 1.8 gives the average annual wage growth over the entire pooled sample of all individuals and years.

This last column shows that men have over twice the annual average wage growth of women when changing jobs, .087 compared to .041. The difference between these wage growths, .046, is statistically significant. Women have slightly higher annual average wage growth when staying on the job. However, the difference, .005, is not statistically significant.[17]

Using averages over the pooled sample of individuals and years, total average annual wage growth can be broken down into its components as follows:

[17]The standard error of the difference between men and women's wage growth when changing is .006. The standard error for the difference when staying on the job is .007.

Average annual total wage growth =

$$Prob(job\ change) * (\Delta w_t \mid job\ change) + Prob(no\ job\ change) * (\Delta w_t \mid no\ job\ change).$$

The means for men and women are

$$men: \qquad .069 = .36 * (.087) + .63 * (.059)$$

$$women: \qquad .056 = .33 * (.041) + .67 * (.064).$$

The numbers on the left-hand side of the equations are annual log wage growth averaged over the pooled sample for men and women. The probabilities of changing jobs and staying on the job are taken from the top row of Table 1.5. The average wage growth conditional on staying on the job or changing jobs is from the last column in Table 1.8.

These breakdowns illustrate that much of the difference between men and women's wage growth is coming from differences in wage growth when changing jobs, versus differences in rates of mobility. To further demonstrate this point, if we assume women had the same wage growth as men and that women and men each had their actual rates of job change, then women would have approximately the same total wage growth as men, 6.8 percent versus 6.9 percent. In reality young women have on average 19 percent lower annual total wage growth than men, but more than 50 percent lower annual wage growth on average when changing jobs.

The results of this section pose somewhat of a puzzle. Women, with similar rates of job switching as men in this sample, receive much lower gains when changing jobs. In the next section, I examine some possible explanations for these facts. In particular, I focus on the differences in the characteristics of the jobs men and women are changing to in order to see if this can explain the differences in wage growth with job change between men and women.

1.4.3 Job Characteristics: Hours and Occupations

Significant differences exist between men's and women's wage growth when changing jobs. Why do these differences exist? A standard model of job search such as Burdett [1978] that allows for search while holding a job gives an explanation for job mobility. Such a model suggests that individuals remain on their current job unless they receive a wage offer whose present discounted value is greater than the present discounted value of their current wages. In this framework, if men and women had similar characteristics and faced similar wage distributions and offer rates, they would change jobs with the same frequency and receive the same wage growth with job change on average. However, there are several reason why this may not hold.

First, if men and women on average have different job "preferences" which involve making different trade-offs between wages and non-pecuniary aspects of the job this could lead to lower wage growth for women. Women may on average change more frequently to jobs that require fewer hours or have more flexible schedules than men because of different household responsibilities. Also, as Polachek [1981] has noted, women may choose jobs or occupations that involve lower skill atrophy if they plan to be out of the labor force at some time in the future. Because such jobs or occupations have desirable characteristics, some women may make the tradeoff between these characteristics and wages, leading to lower wage growth with job change.

Second, women may not have access to certain higher paying jobs because of discrimination. If employers perceive women in general as more likely to leave a job, then jobs involving training that is costly to the employer will be less accessible to women even if an individual women is not planning to leave. Also, women may not be considered for certain traditionally male jobs which may be higher paying.

Both of these sets of reasons may result in lower wage growth with job change for women. It is difficult to distinguish between these reasons for women's lower wage growth given the data available. However, both suggest that men and women may on average change to different jobs. As a first step in understanding the differences in wage growth with job change, I study the differences in characteristics of the jobs men and women change to. I concentrate here on two major differences in job characteristics, hours worked and occupation.

1.4.4 Hours and Part-time Work

It is possible that over time in the labor market women may be willing to trade-off wages to work less hours or to move to part-time jobs. Although, the average weekly hours worked over the year for workers in this sample is at least 30, it is still possible that the job at the interview date is a part-time job.[18] We would expect lower or negative wage growth if a worker changes from a full-time job to a part-time job, given part-time jobs in general pay lower hourly wages than full-time jobs.

[18]Blank [1988] shows using CPS data that female household heads choose how many hours and how many weeks to work separately, although these two decisions are related. For the sample used here this could mean that women who choose to work a majority of weeks of the year (more than 26 weeks) may at the same time choose to work part-time hours.

Altonji and Paxson [1988] looking at the PSID find some evidence that relaxing over-employment constraints (defined as the worker working more hours than desired) is associated with a reduction in the wage gain the worker requires to quit the current job. While Altonji and Paxson were studying only male household heads, we may expect a similar result for women. If women are more likely than men to make this type of trade-off, then this could account for some of the difference in wage growth with job changes. Using a more traditional definition of full-time and part-time jobs, in what follows we define part-time as working on average less than 35 hours a week on that job.

In this sample women change from full-time to part-time jobs more often than men, looking at both voluntarily changes and all separations. Table 1.9 gives the percentage breakdowns for men and women by the four possible transitions between full and part-time hours and the average log wage change for each category. The last column of the table reports the differences between men's and women's average log wage changes, column four subtracted from column two. Switches from full-time to part-time jobs make up 7.9% of all men's job separations compared to 12.7% of all women's job separations.[19] For every hours transition type, women have lower wage growth (or a greater decline in wage growth) than men. Concentrating on the change from a full-time to a part-time job, women and men both have negative wage growth on average, but women have a more than eight percent larger decrease than men. The last column in Table 1.9 shows that the differences between men and women are statistically significant for the full-time to part-time category and the full-time to

[19]These numbers are similar for quits, 7.0% for men and 12.3% for women.

full-time category, but are not significant for the other two categories.

1.4.5 Occupational Transitions

Another dimension along which men and women's jobs differ is their occupational classification. An extensive literature exists studying occupational segregation of the sexes (e.g. Beller[1986] and Reskin and Hartmann[1986]) Theories accounting for the existence of this pattern are varied and include historical precedence, societal gender roles and socialization, differing physical characteristics, protective legislation, individual optimal choice, and discriminatory barriers. Many studies have attempted measuring the percentage of the male/female wage differential that can be attributed to occupational segregation. One fact that is consistently clear in all of these studies is that occupations with higher percentages of women pay on average significantly lower wages than other occupations (Treiman and Hartman [1981]).

There are several ways that the existence of occupational segregation may be related to women's lower returns to job changing. First, it is possible that wages may be lower in predominantly female occupations because those occupations provide other valued attributes, such as greater flexibility, for which women may be willing to forego wages. If this is true, it is possible that over time, as in the discussion on part-time jobs above, women may move into these occupations, and therefore receive lower wage gains. If women are more likely to follow this pattern than men, this can explain some of the differences in wage growth.

Alternatively, women may start out in lower wage occupations. This would explain differences in wage growth if women stay in these occupations over time and these occupations have lower wage *growth*, or if entering the labor force in a particular occupation is actually proxying for an individuals expectations of future labor force participation. That is, if certain women enter lower paying occupations in expectation of leaving the labor force, this expectation may be revealed to employers in ways we cannot observe in this data. In this case, initial occupation will in part measure future lower wage growth.

Table 1.10 presents a breakdown of the initial 1-digit level occupation of the job held at the first interview date after labor-market entry by sex.[20] There are some significant differences in the occupational distribution of men and women when first entering the labor force. A higher percentage of men than women are employed in the craftsman, operators, and laborers occupations. A higher percentage of women are employed in the clerical, service, and professional occupations. There are also large differences in the percentage female within a given occupation in the sample.[21]

A second way occupations may be related to differences in wage growth is through differences in the occupational transitions when changing jobs. Occupational change is frequent in this sample for men and women. 85 percent of men and 82 percent of women who change jobs are in a different 3-digit occupation on their new job. Even using more aggregated categories based on 1-digit occupation codes, the percentage of men and women changing occupations is high, 66 and 54 percent respectively. These percentages calculated using quit rates are very similar to those using all separations.[22]

[20] Occupation in the sample is in 1970 Census codes. These are used rather than the newer 1980 Census breakdowns for consistency, since data are from both before and after 1980. The NLSY presents 1970 codes for early sample years, and 1970 and 1980 codes for later years.

[21] The differences in occupational distribution reported here remain qualitatively the same when the distribution is examined at different levels of experience in this NLSY sample.

[22] Of course these numbers include some measurement error. Occupational codings are based on

1.5 Estimation

How much of the male-female differential in wage growth with job change can be accounted for by differences in job characteristics? To address this question, I estimate a determinants of wage growth with job change equation for men and women. The estimated equation is based on the time difference of a standard wage equation, where XIND are individual characteristics, XJOB are job characteristics and XLM are labor market characteristics.

$$w_i = \alpha_1 + XIND_i\alpha_2 + XJOB_i\alpha_3 + XLM_i\alpha_4 + \epsilon_i$$

In differencing this wage equation to study wage growth, all non-time varying characteristics drop out of the equation. However, I include some of these not-time varying characteristics in the estimation because they may influence wage growth as well as wage levels. The not-time varying variables I include are race, schooling level attained, and gender. Also, instead of including the difference between tenure on the current job and tenure on the job held at the last interview, current tenure and the previous job's tenure are included. These variables are more easily interpretable. The following equation is estimated:

$$\Delta W_t = \beta_1 + TEN_t\beta_2 + TEN_{t-1}\beta_3 + \Delta EXP_t\beta_4 + \Delta DEM_t\beta_5 + \Delta UNEM_t\beta_6$$

$$+\Delta UNION_t\beta_7 + BLACK\beta_8 + FEMALE\beta_9 + SCHOOL\beta_{10} + ENTRY\beta_{11} + \nu_t$$

ΔW_t = log real wage change for intervals in which the individual changed jobs

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the workers description of the major activities on the job. Depending on the description, the same job may be coded as a different occupation at different interview dates. Given the broader coverage of 1-digit occupations this could be less of a problem, but may still occur to some extent.

TEN_t = tenure on the current job (tenure at time t)

TEN_{t-1} = tenure on the previous job up to the last interview date (tenure at t-1)

ΔEXP_t = the change in experience between interview dates[23]

ΔDEM_t = change in individual demographic characteristics. These are three dummy variables for whether the individual was married ("married"), divorced ("divorced") or had a baby ("birth") since the last interview date[24]

$\Delta UNEM_t$ = the change in the regional unemployment rate. Since the unemployment variable is not continuous but is reported in categories, this change is represented by two dummy variables. The first ("increase in unemployment") is equal to 1 if the unemployment rate increased to a higher category, and the second ("decrease in unemployment") is equal to 1 if the unemployment rate decreased to a lower category.

$\Delta UNION_t$ = the change in coverage by a collective bargaining agreement. This is represented by two dummy variables, "nonunion to union" which is equal to 1 if the individual moved from a non-covered to a covered job, and "union to nonunion" which is equal to 1 for the opposite movement.

$SCHOOL$ = a set of dummy variables for education level. Dummy variables for high school, some college, and more than college are included.

$ENTRY$ = a set of dummy variables for the year of labor market entry.

The pooled sample of individual-year observations is used in the estimation. Al-

[23]The change in experience, measured in months, is not always equal to 12 due to variation in the length of time between the interview dates and the possibility of some time not working in between jobs.

[24]These variables capture a demographic change during the previous year. The change may not necessarily have occurred before the separation from the previous job, but even if it happened early on the next job or between jobs, if the change was anticipated which seems likely, then it may still have an effect on the next job taken.

though pooling increases the precision of the estimates due to larger sample size, it introduces bias into the estimates of the standard errors of the coefficients. Because the dependent variable is the change in log wages, the error from a level wage equation for one time period is directly part of the error in two consecutive wage change observations. If the wage growth equation is $\Delta W_t = \Delta X \beta_t + \Delta\epsilon_t$, and $\Delta\epsilon_t = \epsilon_t - \epsilon_{t-1}$ then the correlation across wage growth observations is

$$E(\Delta\epsilon_t, \Delta\epsilon_{t+1}) = E(\epsilon_t, \epsilon_{t+1}) - E(\epsilon_{t-1}, \epsilon_{t+1}) - E(\epsilon_{t-1}, \epsilon_t) - E(\epsilon_t, \epsilon_t).$$

The last term of this correlation is nonzero.

To correct the standard errors, I estimate the change in log wage equation specified above using generalized least squares. I assume that error terms across individuals are uncorrelated, and that the correlation of errors across two time periods are the same for all individuals. That is

$$\begin{aligned} E(\epsilon_{it}, \epsilon_{jt+k}) &= 0 \\ E(\epsilon_{jt}, \epsilon_{jt+k}) &= E(\epsilon_{t,i}, \epsilon_{it+k}) \end{aligned}$$

where k= [0,3] and i and j index individuals, i$\neq$j. Using these assumptions, the covariance matrix for estimation on a sample of individuals each having four years of observations would be a block diagonal matrix with identical 4x4 blocks. However, because the pooled sample used here only includes observations for an individual when a job change occurs, not every individual has an observation for each of the four time periods. In order to use GLS, I need to estimate the covariance matrix of this "unbalanced" sample.

I do this by first estimating a 4x4 block covariance matrix where each element is the variance or covariance between respective years' observations. That is, the element in row 4, column 1 is the covariance between the residuals of year 1 and year 4. These elements are calculated as averages of the OLS residuals from estimation of the log wage change equation averaged over individuals that had job changes in the respective years. I then create the full covariance matrix, a block diagonal matrix where the blocks contain only elements corresponding to the actual years with job changes. For example, an individual who changed jobs in year 1 and 4 would have a 2x2 block, with the off-diagonal element being the covariance between years 1 and 4, taken from the estimated 4x4 covariance matrix. An individual with only one year with a job change would have a 1x1 block. In this way, I build up the whole covariance matrix which I then use to calculate GLS estimates.

I estimate this equation including controls for differences in hours transition and occupation transitions separately. Despite the relative homogeneity of the sample on labor supply characteristics by construction, there are individual differences in the sample that may be able to account for some of the differences in wage growth with job change. Therefore, I first estimate the equation without controlling for either the hours or occupation transitions characteristics.

In Table 1.11 I report the results of this estimation. Results using OLS and GLS are shown for the pooled sample of men and women in columns 1 and 2 and the GLS results for men and women separately in columns 3 and 4.[25] The null hypothesis that

[25]The separate equations for men and women and all other estimation shown in the chapter are using the GLS estimation described above.

the determinants of log wage change with job change equation differs for men and women only by a constant tested against the alternative of two separate equations for men and women cannot be rejected, despite differences in some coefficients in the separate equations.

The GLS estimates in column 2 show that differences in these controlled for characteristics can account for some of the difference in wage growth with job change.[26] Using the estimates shown in column 2 of Table 1.11, these characteristics account for 33 percent of the difference in average log wage grwoth. This is a substantial amount, but still leaves a large percentage of the difference unexplained. Additional differences in the characteristics of the jobs men and women change to may be able to account for some of this "unexplained" portion of the differential.

To ascertain to what extent differences in hours can explain the differences in wage growth when changing jobs I re-estimate the previous equation for determinants of log wage change with job change, controlling for the hours transitions with job change. Dummy variables for if the job change was full-time to part-time, part-time to full-time, or part-time to part-time are included. Table 1.12 reports the results of this estimation. Only the coefficients of the specific variables of interest are presented. A test of whether the equations for men and women are the same except for a constant and the hours transition dummies fails to reject (the p-value is .48), so only the results for the equation pooling men and women are shown. The hours transitions are allowed to differ for men and women by including interaction terms between a

[26]The OLS results show that the controls explain relatively little of the difference in wage growth with job change between men and women. The difference in means is -.046 and the coefficient on the female constant is -.043.

dummy variable for female and the hours transition dummies. An F-test cannot reject the null that these female interaction terms are jointly equal to zero with a p-value of .94. Therefore, results are presented in column two for the regression without interactions, as well.

The results without interactions show that there is a decrease in annual wage growth associated with changing from a full-time to a part-time job of 9.4 percent compared to wage growth when changing from a full-time to a full-time job.The intercept shift associated with the female dummy variable is still significantly negative but reduced when compared to the regression not controlling for these hours transitions.[27] Results of the equation including interaction terms show the decrease in wage growth associated with a move from full-time to part time is 4 percent for men and 13.9 percent for women. However, the full-time to part-time coefficient is not significantly different from zero.

There is some question as to whether the dummy variables for demographic changes over the interval (marriage, divorce, and birth), should be included in the estimated equation given they may be part of the reason for changing to a job with lower hours. If, for example, marriage was associated with lower wage growth because it made a change from full-time to part-time hours more likely, then the dummy variables for marriage and full-time to part-time job change would be trying to measure the same effect. In this case we would expect the coefficient on the full-time to part-time variable to decrease (increase in absolute value) if the dummy for marriage was removed. However, a joint F-test of whether these three demographic change

[27]This coefficient reported in Table 1.11 is -.031.

variables' coefficients are significantly different from zero in the estimation shown in the second column of Table 1.12 rejects this hypothesis. Estimation of a similar equation without these three variables has very little effect on the hours transitions variables' estimated coefficients. Overall, the decrease in wage growth associated with changing from full-time to part-time for both men and women is *lower* without these demographic variables, not higher as suggested above.

How much of the difference in annual average wage growth with job change can be explained by differences in men and women's changes from full-time to part-time jobs? I break the difference in the average annual wage growth between men and women into two parts: the difference due to changing from a full-time to a part-time job and all other factors.

$$(\Delta w_t \mid \textit{job change})_m - (\Delta w_t \mid \textit{job change})_f$$
$$= (\textit{Prob(full to part)}_m * (\Delta w_{t,m} \mid \textit{full to part}) - \textit{Prob(full to part)}_f * (\Delta w_{t,f} \mid \textit{full to part}))$$
$$+ (\textit{all other factors})$$

$$.046 = [.079 * (-.049)] - [.127 * (-.099)] + \textit{all other factors.}$$
$$= .009 + \textit{all other factors.}$$

The left-hand side, .046, is the difference between men and women in average annual wage growth with job changing. The probabilities are from Table 1.9 and the estimate of wage growth conditional on changing from a full-time to a part-time job is from the first column of Table 1.12. The overall intercept shift associated with the female dummy is included in "all other factors". According to the above calculation, the differences between men and women in changing from a full-time to a part-time job account for 19.6 percent of the difference in total wage growth with job change. This comes in part from the fact that women are more likely to make this transition and in part from the larger wage decrease associated with this change for women. While this is a significant percentage of the difference in men and women's wage growth with job change, it leaves a large amount of the difference to be accounted for.

Having discussed earlier the difference in initial occupations and rates of occupational change, I turn to estimating the extent to which these differences can account for differences in wage growth with job change.

First, given these differences in initial occupation, I want to examine whether they are significantly related to difference in wage growth with job change. I do this by controlling for the initial occupation using a dummy variable for the 1-digit occupation category of the job held at the first interview date after entry. This initial occupation dummy is the same across all four year intervals for an individual. The results of this estimation, not shown here, suggest that initial occupation does not have large effects on subsequent wage growth. In separate equations for men and women, none of the occupation dummies were statistically significant at even the 85 percent confidence level. A test of the joint significance of all the occupation dummies fails to reject the null that their coefficients are jointly equal to zero.[28] However, initial occupation

[28]This equation contained all of the same variables as shown in Table 1.11, as well as the 10 initial occupation dummies.

does not capture the difference in occupational transitions which may be relevant for wage growth with job change.

High mobility across occupations discussed earlier represents numerous different occupational transitions.[29] Using 1-digit occupation codes in 1970, there are 10 different occupation groups, translating into 100 possible transition cells. To make this number more manageable and to increase individual cells' size for estimation purposes, I aggregate the ten 1970 Census 1-digit categories into seven different groups. "Professional" was combined with "managers" (jointly referred to as professionals in what follows), "farmers" was combined with "laborers" (laborers), and "private household workers" was combined with "service workers" (service). The 1-digit classifications "sales", "clerical", "craftsmen", and "operatives" remained unchanged. There are 49 occupation to occupation transitions possible between these categories.

Women's occupational changes are concentrated in fewer transition cells than men. Of the 49 possible transition cells, 25 included 5 or fewer women, but only 4 included 5 or fewer men. Table 1.13 lists in columns two and four the percentage of men and women in several of the largest occupational change categories. The largest single category for women is remaining in a clerical occupation, with 25.5 percent of all women making this "transition". The largest category for men is staying in a craft occupation, with 11.1 percent of all men making this "transition". The largest category with actual occupational change for women is service to clerical, accounting for 6.7 percent of women's job changes. For men the largest category of occupational

[29] I use occupational transitions to include all occupation changes, from occupation i to occupation j when changing jobs, including when occupation i is the same as occupation j. Staying in the same occupation when changing jobs are the most frequent "transitions". This is discussed further below.

change is laborer to operator, representing 4.2 percent of men's job changes.

To ascertain whether different occupational transitions are related to differences in log wage growth with job change, I estimate an equation of the determinants of log wage growth with job change using dummy variables to control for each of the possible occupational transitions.[30] The dummy variable equal to 1 for the transition from professional to sales is withheld.[31] A listing of the coefficients of some of the most frequent transitions is given in Table 1.13, including all the job changes with no change in occupation. Separate equations are estimated for men and women. However, a test of whether all the coefficients including the occupational change dummies were the same for men and women and only the constant differed failed to reject, with p-value equal to .96. Therefore, the results from the equation combining men and women together are reported as well in the last column of Table 1.13.

Few of the transition category coefficients are significantly different from zero. Of those shown, only the service to clerical transition is even marginally significantly different from zero. However, the joint test of whether all the occupation transition dummies are equal to zero in the equation with men and women combined strongly rejects this hypothesis. A similar test for the equations for men and women separately also rejects that the coefficients on the occupation dummies are jointly zero.

The coefficient on the female dummy in the combined male and female sample estimation provides a summary of the connection between the difference in occupational transitions and difference in male female wage growth. This coefficient represents the

[30]This equation includes all the variables in Table 1.11 as well as the controls for occupational change.

[31]Despite the aggregated categories several occupational change cells were empty.

within occupational transition cell difference in log wage growth with job change. If men and women receive different returns to the occupational transitions they make, then this coefficient would be smaller (less negative) when controlling for these different transitions. However, the within occupational transition cell log wage growth difference between men and women is -.035, numerically more negative and statistically insignificantly different from the average difference in log wage growth without occupational change controls, -.031. This can be interpreted as difference in returns to occupational transitions do not account for any of the differences in wage growth with job change between men and women.

One problem with this approach is that it only allows for relatively aggregate occupational classifications. It is therefore unclear whether occupational changes truly do not explain any of the difference in men and women's wage growth, or whether the finding is due to the fact that women and men hold different occupations within the aggregate classifications I use. An empirical approach that allows for finer occupational categories is to use an "index", or one-dimensional measure, of occupational change that can give us some idea as to how different changes effect wage growth.

The index I create is based on the concept of inter-occupational wage premiums which follows Krueger and Summers' [1986] research on inter-industry wage differentials.[32] They demonstrate that after controlling for human capital variables, a significant relationship remains between an individual's industry and occupation

[32]Krueger and Summers measure both inter-industry and inter-occupation wage premiums, but are primarily interested in explaining inter-industry wage differentials.

and their wage level. To look at the relationship between differences in occupational transitions and differences in wage growth with job change again but on a more disaggregate level I create an index that is the difference in the occupational premiums associated with the occupation before and after job change.

I estimate these occupational premiums using the following log wage level equation:

$$log(wage) = X\beta + \sum_j (industry_j)\gamma_j + \sum_i (occupation_i)\delta_i + \epsilon$$

where δ_i is the premium to holding a job in occupation i. I use CPS[33] data to estimate this equation. The larger sample size allows me to estimate the premium more precisely and to break occupations down into less aggregate categories. The sample consists of 34,070 young men (18-29 years old) in 1981 and 1982 who had worked at least 30 hours in the interview week.[34] The explanatory variables X include age, and dummy variables for if completed high school, some college, college or more, nonwhite, ever married, and live in an smsa. The vector industry includes dummy variables for 11 1-digit industry classifications.

The occupation breakdown used is a grouping of the 3-digit occupation categories into 42 different occupation categories. These categories are listed in Appendix A.[35] The number of categories was chosen as a balance between disaggregated categories and reasonable cell sizes for estimation. Because youth tend to be concentrated into

[33]The data is from 1981 and 1982 merged outgoing rotation groups of the CPS only.

[34]These years were chosen because they overlap with my NLSY sample and they are coded using 1970 Census occupation codes as in my sample. Results reported are for individuals whose wages were not imputed. Results of estimation using the slightly larger sample (39,480 observations) including imputed wage observations look similar.

[35]The results from the estimation of this wage equation are not shown because of the large number of regressors. However, the individual coefficients are not of primary interest here.

certain occupations, using more sample years did not increase the size of many of the smaller occupational cells.

The index of occupational premium changes was created for all individuals, both men and women, in the NLSY sample using the changes in the estimated CPS coefficients corresponding to the occupation on the previous and current job. If an individual changed from occupation i to occupation j the premium is $\delta_j - \delta_i$. The average value of the index is .0045 for men and .0053 for women and they are significantly different. This index and the interaction of this index and a female dummy variable were included as a regressor in the log wage change equation. If women receive the same change in premium as men who make the same occupational transfer then there will be no difference in the return to this index for men and women. However, if the change in premium for a similar occupation change is different for women, the interaction term will be significant and account for some of the difference in wage growth.

The results of the estimation of the log wage change equation are shown in Table 1.14. Only the coefficients of interest are included. I find that the coefficient on the occupation index is large, .723, and strongly significant. The coefficient on the interaction, however, is small and insignificant. The female dummy coefficient, -.031, is still significantly negative. Again, after controlling for occupational transitions the female dummy is not significantly different than without these controls. These results suggest that even at this finer level of occupational classification, differences in wage growth associated with particular occupational changes can not explain any of the difference in wage growth with job changes between men and women.

1.6 Conclusion

This chapter began with the fact that young men and women have different wage growth over the early years of labor force participation. In the sample of full-time young workers from the NLSY used in this analysis, there is an average difference in annual wage growth between men and women of 1.6 percentage points. Both men and women have high rates of job changing in their initial years in the labor force. For men, a large amount of total wage gains can be explained by the wage gains associated with these job changes. However, young women do not have these large wage gains with job change. For young men, 46 percent of average total wage growth over the first four years in the labor market is associated with job changes. The same figure for women is only 24 percent. The differences between men and women in wage gains with job change are an important part of the explanation of why women have lower early wage growth.

This study goes on to show that women have rates of job changing that are similar to men's, but do not receive the same returns to job change. Women are found to have only marginally significant differences from men in their probabilities of separating from or quitting their jobs. However, women receive much lower returns to job changing. Women have 50 percent lower wage growth than men on average when changing jobs. After controlling for individual, job, and labor market characteristics, women still have statistically significant lower wage growth with job change than men.

To find an explanation for these facts, some of the characteristics of the jobs men and women are changing to are examined, in particular the hours and occupation of the jobs changed to and from. Differences in the hours worked on jobs are studied by examining changes from full-time to part-time jobs. Both men and women experience wage decreases when changing from full-time to part-time jobs, but women are more likely to make this transition, even in this sample of mainly full-time workers, and have a greater decrease on average than men. I estimate that 19.6 percent of the difference between men's and women's wage growth with job change can be explained by differences in the probability of change from full-time to part-time jobs.

Another difference in the jobs men and women hold examined here is the occupational classification of the job. Men and women have different initial occupational distributions when entering the labor market. However, differences in the initial occupation held are unable to account for any of the difference between men and women in wage growth with job change. It is also true that on average men and women make different occupational transitions when changing jobs. Women are found to have significantly lower average wage growth than men within occupational transition types. Despite this, overall, women are more likely to make occupational transitions that have higher wage growth than men are. The type of occupational transition alone is unable to account for any of the difference between men and women in wage growth with job change.

The early labor market years are a time of rapid wage growth. For young men, much of this wage growth comes through job changing. This chapter has shown that this pattern is not the same for women, who receive markedly lower returns to job changing than men. Some of the explanation for these differences lies in the type of jobs women are changing to. However, much of the substantial difference between the wage growth with job change for men and women still remains to be accounted for.

Table 1.1: Full-Time Workers, Female/Male Ratio of Weekly Earnings

Age	May 1973	May 1977	Annual Average 1979	Annual Average 1983
16-19	.82	.88	.87	.94
20-24	.77	.78	.76	.84
25-34	.64	.65	.66	.73

Source: CPS data, taken from Table 3 in O'Neill [1985].

Table 1.2: Mean Sample Characteristics

Individual Means

Variable	Men (N=832)	Women (N=765)
% Nonwhite	16.11	15.03
% Married During Sample	32.1	34.1
% Divorced During Sample	5.7	10.5
% Birth During Sample	24.7	22.6
% Less than High School	24.19	12.88
% High School	45.37	47.12
% Some College	18.56	25.53
% College or more	11.87	16.47
age at entry	19.94 (2.01)	20.20 (2.02)

Pooled Sample Means

Variable	Men (N=3328)	Women (N=3060)
tenure (months)	18.66 (15.44)	18.73 (14.38)
experience (months)	28.89 (13.46)	29.14 (13.47)
real wage	6.40 (3.17)	5.45 (2.20)
% Unionized	17.5	15.2

Note: Standard errors in parentheses. Individual means are averages over the 1,597 individuals in the sample. The pooled sample means are averages over the pooled sample of all 6,388 individual-years (4 years for each individual). Here, and throughout the chapter, tenure and experience are measured in months. Wages are real wages deflated by the CPI.

Table 1.3: Log Real Wage Changes with Job Changes

	Years in Labor Market				
	0-1	1-2	2-3	3-4	Cumulative Years 0-4
Men (N=832)					
Average Annual Wage Growth	.086 (.014)	.084 (.013)	.063 (.014)	.043 (.015)	.276 (.018)
Women (N=765)					
Average Annual Wage Growth	.076 (.014)	.044 (.013)	.037 (.016)	.067 (.015)	.225 (.017)

Note: Standard errors in parentheses.

Table 1.4: Decomposition of Log Real Wage Changes with Job Changes

Men (N=832)					
	Years in Labor Market				
	0-1	1-2	2-3	3-4	Total 0-4
Average Annual Wage Growth	.086 (.014)	.084 (.013)	.063 (.014)	.043 (.015)	.276 (.018)
Average Annual Wage Growth on Same Job	.038 (.009)	.036 (.009)	.049 (.008)	.026 (.011)	.149 (.016)
Average Annual Wage Growth With Job Change	.048 (.011)	.049 (.010)	.014 (.011)	.016 (.011)	.127 (.017)
Percent of Total Wage Growth Due to Job Change	55.8	58.3	22.2	37.2	46.0

Women (N=765)					
	Years in Labor Market				
	0-1	1-2	2-3	3-4	Total 0-4
Average Annual Wage Growth	.076 (.014)	.044 (.013)	.037 (.016)	.067 (.015)	.225 (.017)
Average Annual Wage Growth on Same Job	.047 (.008)	.037 (.010)	.027 (.011)	.059 (.010)	.171 (.014)
Average Annual Wage Growth With Job Change	.029 (.011)	.007 (.009)	.010 (.011)	.008 (.011)	.054 (.017)
Percent of Total Wage Growth Due to Job Change	38.1	15.9	27.0	11.9	24.0

Note: Standard errors are in parentheses.

Table 1.5: Job Changes as a Percent of Pooled Sample Individual-Years

	Men (N=3368) Number (Percent)	Women (N=3060) Number (Percent)
All Job Changes	1207 (36%)	1009 (33%)
Voluntary Job Changes	746 (22%)	741 (24%)
Voluntary Changes as a Percent of All Changes	62%	74%

Note: Numbers and percentages are calculated out of the pooled sample of individual-years, N, for men and women. See text for definition of voluntary changes.

Table 1.6: Breakdown by Sex of Number of Years With Job Changes

Number of Years with Changes	Men Number (Percent)	Women Number (Percent)
0	230 (27.6)	236 (30.85)
1	231 (27.8)	220 (28.8)
2	188 (22.6)	175 (22.9)
3	132 (15.9)	97 (12.7)
4	51 (6.1)	37 (4.9)
N	832	765

Note: The maximum number of changes is 4, one for each year of the sample. Percentages are out of the total number of individuals, N, for men and women.

Table 1.7: Probability of Job Separation

	All		Men		Women	
	Quits	All Changes	Quits	All Changes	Quits	All Changes
tenure	-.016 (-10.61)	-.024 (-17.23)	-.017 (-17.22)	-.027 (-13.62)	-.014 (-6.58)	-.022 (-10.32)
experience	.002 (1.55)	.004 (2.77)	.002 (.78)	.003 (1.39)	.003 (1.51)	.005 (2.59)
high school	-.137 (-2.84)	-.212 (-4.67)	-.151 (-1.81)	-.150 (-2.62)	-.187 (-2.40)	-.305 (-4.08)
Less than college	-.015 (-.26)	-.183 (-3.48)	.023 (.32)	-.152 (-2.17)	-.073 (-.852)	-.232 (-2.83)
college	-.153 (-2.45)	-.401 (-6.70)	-.123 (-1.41)	-.420 (-4.96)	-.201 (-2.16)	-.418 (-4.68)
black	-.138 (-2.84)	-.055 (-0.92)	-.224 (-2.39)	.038 (.467)	-.058 (-.637)	-.170 (-1.93)
union	-.347 (-6.61)	-.254 (-5.41)	-.285 (-4.06)	-.155 (-2.50)	-.427 (-5.36)	-.398 (-5.44)
unem>9%	-.160 (-4.38)	-.087 (-2.55)	-.179 (-3.53)	-.076 (-1.62)	-.142 (-2.69)	-.100 (-1.99)
married	.127 (2.08)	.103 (1.77)	.031 (.353)	.057 (.701)	.218 (2.55)	.144 (1.72)
divorced	-.006 (-.05)	.039 (.34)	.089 (.447)	.128 (.678)	-.071 (-.455)	-.032 (-.216)
birth	-.230 (-3.09)	-.246 (-3.58)	-.090 (-.095)	-.079 (-.906)	-.442 (-3.60)	-.524 (-4.53)
female	.051 (1.41)	-.069 (-2.04)				
Log Likelihood	-3338.2	-3857.7	-1704.7	-2022.0	-1626.6	-1819.6
N	6388		3328		3060	

Note: T-statistics are in parentheses. Estimated probit equations are on the pooled sample of individual-years. The dependent variable for separations is 1 if individual changed jobs during the interval. For the quit equations, the dependent variable is 1 if there was a voluntary job change during the interval.

Table 1.8: Wage Growth Conditional on Job Changing and Staying

	Years in Labor Market				
	0-1	1-2	2-3	3-4	Average Over All Years
Men					
Average Annual Wage Growth if Changed Job	.119 (.027)	.135 (.026)	.039 (.031)	.049 (.033)	.087 (.015)
Average Annual Wage Growth if Stayed on Job	.064 (.015)	.056 (.015)	.076 (.013)	.040 (.016)	.059 (.007)
Women					
Average Annual Wage Growth if Changed Job	.081 (.030)	.023 (.029)	.031 (.036)	.025 (.033)	.041 (.016)
Averge Annual Wage Growth if Stayed on Job	.073 (.013)	.054 (.014)	.040 (.016)	.088 (.015)	.064 (.007)

Note: The first four columns contain average log wage changes for the given year. The last column is the average log wage change over the entire pooled sample of men and women. Standard errors are in parentheses.

Table 1.9: Average Annual Log Wage Changes and Percentage Breakdowns

by Full-Time and Part-Time Hours Transitions

	Men (N=1207)		Women (N=1009)		All (N=2216)
$hours_{t-1}$, $hours_t$	Percent	Log Wage Change	Percent	Log Wage Change	Difference in Wage Change
full-time, part-time	7.9	-.016 (.061)	12.7	-.086 (.058)	-.070 (.019)
full-time, full-time	76.8	.097 (.016)	69.6	.065 (.018)	.032 (.008)
part-time, full-time	10.5	.073 (.039)	12.8	.035 (.047)	.038 (.026)
part-time, part-time	4.7	.094 (.083)	4.8	.050 (.087)	.044 (.026)
Total	100.0	.087 (.015)	100.0	.041 (.016)	.046 (.006)

Note: Standard errors are in parentheses. Data are for the pooled sample of individual-years, with $hours_{t-1}$ representing hours worked on the job at the last interview date and $hours_t$ representing hours worked on the current job. Part-time is defined as less than 35 hours worked on average per week for that job. The fifth column is the average log wage change for women (column four) subtracted from the average log wage change for men (column two).

Table 1.10: Occupational Distribution of First Job After Entry

	Men (%)	Women (%)	% Female
professional,technical & kindred	9.3	12.6	55.9
managers, officials & proprietors	5.5	5.0	46.1
sales workers	3.8	5.1	56.0
clerical & kindred	10.7	41.3	78.5
craftsman, foreman & kindred	14.9	1.8	10.3
operatives & kindred	23.0	9.4	27.7
laborers, except farm	15.0	2.1	11.5
farmers & farm managers	.11	0.0	0.0
service workers, except private household	17.8	21.7	53.5
private household	0.0	1.0	100.0
Total	100.0	100.0	47.9

Note: The data are grouped by 1970 Census 1-digit occupational codes. The third column, "% Female", refers to percent of each occupation that is female.

Table 1.11: Determinants of Wage Growth with Job Change

	All, OLS (N=2216)	All, GLS	Men, GLS (N=1207)	Women, GLS (N=1009)
tenure at t	.018 (6.26)	.016 (6.63)	.018 (5.32)	.012 (2.97)
tenure at t-1	-.003 (-3.55)	-.002 (-3.04)	-.002 (-1.57)	-.003 (-2.69)
Δ experience	-.0004 (-.370)	-.0001 (-.133)	.001 (.993)	-.001 (-.616)
married	-.084 (-2.29)	-.034 (-1.08)	.013 (.296)	-.117 (-2.37)
divorced	-.193 (-2.62)	-.155 (-2.52)	-.293 (-3.01)	-.078 (-.861)
birth	.032 (.662)	.059 (1.54)	.048 (2.42)	-.101 (-1.19)
increase in unemployment	-.042 (-1.51)	-.018 (-.756)	-.035 (-1.08)	-.006 (-.148)
decrease in unemployment	.002 (.068)	.018 (.783)	.019 (.586)	.024 (.659)
nonunion to union	.011 (.279)	.012 (.357)	.022 (.528)	-.029 (-.414)
union to nonunion	-.088 (-2.03)	-.014 (-2.89)	-.153 (-3.18)	-.025 (-.396)
black	-.022 (-.556)	-.043 (-1.79)	-.054 (-2.08)	.040 (.770)
female	-.043 (-1.94)	-.031 (-2.19)		
constant	.071 (1.60)	.034 (1.10)	.004 (.083)	.047 (.839)
R^2	.04	.03	.04	.03

Note: T-statistics are in parentheses. Dependent variable is log wage change if changed job between interviews. The second, third, and fourth columns are all estimated using the generalized least squares correction described in the text. Dummy variables for year of labor market entry and school level are included but not shown. All coefficients for both men and women were insignificant for both of these groups.

Table 1.12: Determinants of Log Wage Change Controlling for Changes in Hours

	All Workers (N=2216)	
full-time to part-time	-.040 (-.865)	-.094 (-3.05)
part-time to full-time	-.049 (-1.21)	-.021 (-.736)
part-time to part-time	-.055 (-1.11)	-.034 (-.933)
(full-time to part-time)*female	-.099 (-1.60)	
(part-time to full-time)*female	.055 (.948)	
(part-time to part-time)*female	.042 (.579)	
female	-.024 (-1.39)	-.026 (-1.84)
R^2	.04	.04

Note: T-statistics are in parentheses. The dependent variable is the log wage change if there was a job change over the interval. The pooled sample of individual-years is used. For a list of other variables included see Table 1.11.

Table 1.13: Determinants of Log Wage Changes Controlling for Occupation Change

	Men		Women		All
	β	% of Men	β	% of Women	β
prof. to prof.	-.116 (-1.23)	6.2	.039 (.226)	10.7	-.029 (-.374)
sales to sales	-.116 (-.875)	1.6	-.102 (-.455)	1.1	-.095 (-.868)
clerical to clerical	-.111 (-1.02)	4.4	.069 (.407)	25.5	1.68 (.133)
craft to craft	.002 (.025)	11.1	.100 (.320)	0.3	.042 (.542)
operator to operator	-.0003 (-.003)	7.6	-.004 (-.021)	3.1	-.013 (-.160)
laborer to laborer	-.026 (-.258)	5.6	-.330 (-.936)	0.3	-.038 (-.436)
service to service	-.019 (-.200)	4.8	.020 (.115)	11.4	-.032 (-.413)
laborer to operator	.-.026 (-.258)	4.2	.015 (..055)	0.6	1.26 (.009)
service to clerical	-.065 (-.431)	1.0	.191 (1.07)	6.7	.138 (1.58)
female					-.035 (-1.80)
R^2	.08		.10		.07
N	1207		1009		2216

Note: T-statistics are in parentheses. The β columns refer to coefficients on dummy variables equal to 1 for the named occupation change in an equation with dependent variable log wage change if a job change occurred during the interval. All equations are estimated for the pooled sample of individual-years, N. For the other variables included see Table 1.11. The column labeled % of Men (Women) refers to the percent of men (women) making the given occupation change.

Table 1.14: Determinants of Log Wage Changes using Occupation Premium Index

Average value of occupation premium index	
Men	.0045 (.0001)
Women	.0053 (.0001)
Occupation premium index coefficients	
occ-index	.723 (5.38)
occ-index*female	.-.031 (-.154)
female	-.031 (-2.23)
R^2	.05

Note: T-statistics are in parentheses. Predictions are from a log wage change regression on the pooled sample of individual-years, men and women, N=2216. For a description of occ-index see text.

Appendix A: CPS Occupational Categories

The following are the 42 occupational categories used in the estimation of the occupational change premium index. The numbers following the categories refer to the 3-digit census codes included in each category.

	Number in Cell in CPS data
Professional/Technical	
Engineers (6-23)	210
Physicians, dentists, related (61-73)	47
Nurses, physical therapists (74-76)	97
Health Workers (80-85)	178
Teachers,except college (141-145)	50
Engineer. & Sci. Technicians (150-162)	878
Other Professional (all other codes)	888
Managers & administrators (201-245)	1178
Sales workers (260-280)	1143
Clerical workers	
Bookkeepers,banktellers,billing clerks (301-305)	123
Office machine operators (341-355)	217
Stenog.,typists, & secretaries (370-372,376,391)	40
Postal and mail workers (331-332,361)	257
Cashiers (310)	325
Shipping and receiving clerks (374)	513
Other clerical workers (all other codes)	1179

Craftsmen and kindred	
Carpenters (415-416)	1229
Electricians (430-431)	672
Plumbers (522-523)	477
Other construct. craft (410-412,421,436-440, 510-512,520-521,534,550,560)	1346
Foremen (n.e.c.) (441)	583
Machinists & job setters (454,461-462)	649
Metal crafts (403-404,442,446,504-504,514,533, 535-540,561-562)	507
Mechanics - auto (472-474)	1204
Mechanics - other (470-471,475-495)	1876
All other craft (all other codes)	1661
Operatives	
Precision machine operators (650-666)	805
Textile operators (670-674)	147
All other, non-transport (601-645,680-695)	7431
Drivers & deliverymen (703,705,714-715)	1985
All other, transport (701,704,706,710-713)	554
Nonfarm Laborers	
Freight and stock handlers (753,760,762,763)	2188
Warehousemen, n.e.c. (770)	429
Construction (750-751)	1420
All other (all other codes)	1722
Service workers	
Cleaning, private household (901-903,980-984)	1194
Food service (910-916)	2042
Health service (921-926)	287
Personal service (931-954)	279
Protective service (960-965)	694
Farmers, managers & laborers (801-824)	770

Chapter 2

Gender Differences and High School Work

2.1 Introduction

In the previous chapter I show that young women's wage growth is on average 1.6 percent lower each year than young men's wage growth, resulting in a widening wage gap over time. However, there is also a significant wage gap between men and women when they first enter the labor market. For the full-time workers in the previous chapter the initial female to male wage ratio was .89. For high school graduates in the first year after high school the same ratio is .83. In this chapter I study some possible reasons for this initial wage gap.

Measures of human capital investment undertaken while in the labor market, including on-the-job training and work experience, have been used to explain some of the difference in men's and women's wages generally. Yet to explain wage differentials in the early years of labor market participation, particularly wages at labor market entry, it is necessary to consider "pre-labor market" characteristics. The obvious and most frequently used measure is years of schooling. However, for many of the same reasons that schooling is related to later wages, work experience during school should also be considered as a determinant of post-schooling wages.

Currently there is concern over the predicted low skill levels and productivity of workers entering the U.S. workforce in the next decade and beyond. Women and minority workers will comprise an increasing percentage of these new entrants in the future. In response to these concerns, attention has been focused on vocational and commercial curriculums in high school as potentially important in preparing young workers for post-high school jobs. High school work experience as a form of "pre-market" training has received comparatively less attention and study.

In this chapter I examine the relationship between work experience during high school and the post-high school wages and employment of young workers. I want to know whether differences in high school work can account for any of the male/female wage gap. In order to answer this question, it is also necessary to examine whether high school work has a positive relationship with future labor market outcomes of workers at all. In addition, because of vocational curriculums' similarity to high school work in its potential to prepare students for the labor market, I also contrast the impact of these curriculums on post-school wages and employment and the male/female wage gap.

High school work can be viewed as a human capital investment. As with schooling, there are many ways working in high school can be beneficial in the post-school labor market. Learning general "good work habits" such as punctuality, responsibility, and how to work well with others is important. There is also the possibility of acquiring specific job skills that may be useful on future jobs. In addition, the experience of looking for a job may in itself help young people in finding jobs after they leave school, and high school jobs may provide contacts for finding future jobs.

All of these potential benefits from high school work can be important for both women and men. However, it is possible that men and women receive different returns to investing in high school work. The benefit of this investment to women who work in high school over women who do not work in high school may be greater than the benefits to men who work in high school over men who do not. This would be true if some of the benefits of high school work such as job-finding skills and job contacts are more easily achieved without working in high school by men than by women. This could be because of societal differences in the expectations of future work of young women and men generally or differences in access to information. It is also possible that high school work can serve for women as a signal to employers of greater labor force attachment, leading to higher probabilities of work and higher wages than those women who do not work in high school.

Many studies examine the returns to years of schooling and other aspects of how schooling is related to workers' wages.[1] However, there is relatively less research studying the returns to high school work experience. Meyer and Wise [1982] study the effects of work in high school on the wages and labor supply of workers for four years after high school using the National Longitudinal Survey of 1972 High School Seniors. They find persistent positive significant effects of high school work over these four years and little effect of vocational training in high school, again suggesting that high school work may be a more important avenue to increasing future labor market

[1]Besides the many studies of returns to schooling (Griliches[1977], Willis and Rosen[1979], etc.), quality of schooling and school curriculum have also been analyzed as factors in workers' wages.(Card and Krueger[1990] and Altonji[1988] are examples.)

prospects. Their study, however, looks only at young men. Meyer and Wise [1984] replicate this study looking specifically at differences between black and white young men's post-school labor supply and again find a strong relationship between high school work and post-school labor supply, but no striking differences in these effects between blacks and whites. Another study of the effect of high school work on future outcomes done by Stephenson [1981] shows similarly strong effects of high school work on future wages and labor supply for young men using the NLS Young Men's survey data from 1966 to 1971.

These studies use data from the sixties and mid-seventies, and focus only on young men. It is unclear whether similar results exist for women or whether high school work has different effects on women's probability of working and wages.[2]

Given these findings of strong connections between high school work and the wages and employment of young men, I consider whether being in a vocational curriculum in high school also has a positive relationship to future labor market outcomes. Vocational curriculums and high school work are not necessarily substitutes. Not only is it possible for individuals to do both, vocational study does not expose students to general work skills or to job-finding skills that high school work may. Vocational curriculums teach specific job skills and in this way potentially lead to higher wages. The effects for men and women of being in a vocational curriculum may vary due to the different job skills being taught. Of course, there are differences in the occupational program within gender as well.

[2]Stephenson[1982] looks at the effects of women's high school work on the transition rate from high school to work, using the NLS young women's sample. He finds significant negative effects of high school work on the duration from school to first job for young white women, but no effect for young black women.

In contrast to these findings of strong effects of high school work, many studies have found small or insignificant effects of vocational curriculums on post-school wages. One example of these findings is a study done by Daymont and Rumberger [1982] using 1979-1980 data from the National Longitudinal Survey of Youth (NLSY). They look at the impact of being in a vocational curriculum in high school on post-high school hours, unemployment, and wages. They find being in a vocational curriculum versus an academic curriculum has no significant effect for men or women on weeks of unemployment or hourly wages, and no significant effect on hours worked per week for women. The only significant effect they find is a positive impact on men's hours.[3] These findings are similar to much of the recent literature on vocational education.[4] Given that studies of high school work and vocational education find different impacts, I consider both as forms of pre-market training.

To understand the importance of high school work experience, it is necessary to know how prevalent high school work is. A large percentage of young men and women work while in high school, and work a relatively large number of hours per week and weeks per year. Table 2.3 shows the employment rates of high school students, their average hours per week, and the average weeks worked per year in 1979 by grade level, sex, and race using the NLSY. All numbers are weighted by the NLSY individual sample weights to provide numbers representative for the United States in 1979.[5]

[3]Daymont and Rumberger define being in a vocational curriculum as having taken at least 3 credits of vocational courses, using data from the high school transcript section of the NLSY. The reported effects are for 1980 labor market observations.

[4]Meyer and Wise [1982] and Grasso and Shea [1979] find no significant effects of vocational curriculum on men's labor market outcomes. Grasso does find a significant effect on women's wages when considering commercial (business) curriculums.

[5]1979 is the first year of the survey and contains the largest number of high school students. I discuss differences across time later when describing the sample I use. Hours is taken from the answer to the CPS-type question "How many hours did you work at all jobs last week?" The employment

Over 50 percent of all twelfth graders in 1979 worked. Of all white twelfth grade[6] students, 59 percent of men and 58 percent of women worked. Nonwhite students had lower but still relatively high employment rates, 42 percent for men and 38 percent for women. Both male and female high school students who worked put in on average nearly half a regular 40-hour work week in twelfth grade. High school students also worked a relatively large number of weeks per year. Of twelfth grade students who worked at least one week during the year, 69 percent of men and 58 percent of women worked more than 26 weeks of the year. Considering that working only during the summer would mean from 8 to 10 weeks of work, these numbers show that a large percentage of high school work is taking place during the school year.

High school work is not only widely prevalent, rates of high school employment are higher than the percentage of students taking a commercial or vocational program in twelfth grade. Using the 1979 self-reported data from the NLSY of what type of curriculum a student was taking, 21 percent of white male twelfth graders and 19 percent of white female twelfth graders reported they were in a primarily vocational or commercial curriculum. For nonwhite students these numbers are 22 and 26 for men and women respectively.[7]

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rate is defined as all those who reported positive hours in answer to this question divided by all young people in the appropriate cell. Weeks worked per year is for the year prior to the interview date. Average hours are calculated conditional on positive hours in the last week and average weeks worked are conditional on positive weeks worked during the year. Both the cross-section and poverty samples of the NLSY are included.

[6]Employment rates increase from ninth through eleventh grades. White men, who have the highest employment rates of all race/sex groups, have a 28% employment rate in ninth grade and a 59% employment rate in eleventh grade. Nonwhite women have an employment rate of 8% in ninth grade which increases to 23% in eleventh grade.

[7]These patterns persist from ninth through twelfth grades. Percentages working are higher than percentages in vocational or commercial curriculum for all groups in all grades except nonwhite women in ninth grade.

High school work is prevalent among men and women. In this chapter I examine whether differences in high school work and the return to high school work can account for differences in the early labor market wage gap between young men and women. As we saw above, there are large differences by race in the amount of high school work. Therefore I examine the male/female differences within race. Before I can examine the extent to which high school work can account for male/female wage differences, I first study the relationship between high school work and young workers' post-school wages and probability of work. Given vocational curriculums also are a form of pre-market training I study and contrast the impact of these curriculums on post-school wages and employment as well.

In this chapter I focus on high school graduates who do not go on to post-secondary school. The third section of the chapter discusses some reasons for this choice. However, I first examine briefly in the next section the connection between high school work and attending school immediately after high school. I find that working in high school, ignoring the amount of work, has no significant relationship to the probability of continuing schooling after high school. However, controlling for hours worked in high school, I find that the number of hours worked is significantly negatively related to continuing school. Those primarily in a vocational curriculum in high school also have a lower probability of future schooling, and this is much lower than the probability for individuals who worked 20 hours per week in high school.

The fourth section of the chapter describes summary statistics on the amount of high school work and the connection between working in high school and post-school employment rates and wages. These numbers indicate the differences in high school work between men and women are not large. They also suggest that there is a positive relationship between high school work and future labor market outcomes in the initial years after high school. Given this finding, I turn to estimating these relationships controlling for vocational curriculum and other characteristics.

I estimate a probability of work equation and a wage equation for each of the first four years after high school. The fifth section discusses the estimation results. I find that both men and women who worked in high school have a higher probability of working in the first two years after leaving school. Working 20 hours per week in high school is associated with a 10 percentage point increase in the probability of future work. There is no difference in this relationship for women. By the third year, the benefits of high school work disappear. There is no positive association of high school work and future work in the third or fourth year.

I also find that working in high school is associated with higher wages in the first and second year after school for women and nonwhite men. White women who worked 20 hours per week in high school have 15 percent higher wages than women who did not. In the third and fourth year after school, there is no longer a greater association between high school work and wages for young women. However, there is a positive association with high school work for all workers in these years. In terms of future work and wages, high school work seems to ease the transition from school to work.

Finally, I explore the consequences of these findings for the wage gap between men and women. High school work is associated with a decrease in the wage gap for white women of seven percentage points and a decrease of three percentage points for nonwhite women in the first year after high school. Differences between men and women in the amount of labor market work done in high school account for very little of the wage gap. The last section summarizes and provides some conclusions.

2.2 Post-Secondary Schooling and High School Work

Although this chapter focuses on high school graduates who do not go on to post-secondary schooling, I first address whether there are differences in a student's major post-high school activity, depending on whether he or she worked in high school. To study this question and throughout this chapter, I use data from the National Longitudinal Survey of Youth (NLSY) for 1979 to 1988. This data allows me to observe students in high school and follow their labor market experience over time after leaving high school. I include both the cross-section and poverty sample of the NLSY, which together include 11,406 young people in 1979.

My initial sample includes all individuals who are in high school at some time in the survey. This means dropping individuals who have either completed high school before the first survey interview or who drop out of school before having entered high school (before ninth-grade), which leaves 5192 individuals. Since there are significant differences in the high school experience and labor market outcomes of students who graduate from high school and those who do not finish high school, I only include high school graduates in my sample.[8] The final sample of high school graduates includes 3723 young people.

I separate the post-high school activities of these young people into three mutually

[8] In the next section I discuss further my reasons for limiting the study to high school graduates.

exclusive categories: "enrolled in school", "working", or "not working and not in school." The percent of students in each of these categories grouped by whether they worked in high school are presented in Table 2.1.

The percentage of students attending post-secondary school in the first year after high school is similar for students who worked in high school and for students who did not. For white and nonwhite women there is no difference in the percentages attending school by high school work status. A greater percentage of nonwhite men who worked in high school were attending school the next year, 33 percent, versus nonwhite men who did not work in high school, 31 percent. White men are the only group with a higher percentage attending school of those who did not work in high school than of those who did work, 42 versus 39 percent. Overall, there seems to be relatively little relationship between working in high school and immediately attending post-secondary schooling. However, the relationship between high school work and later schooling is not necessarily so simple.

There are several possible connections between high school work and attending college. If a high school student first decides to go to college and then decides to work in high school, for instance to defray costs, there would be a relationship between work and college, but high school work would not be directly affecting the decision to go to college.

Also, the decision to work in high school and the decision to go to college may both be influenced by a characteristic such as family income or parents' level of education, or by an individual attribute, such as "aptitude for schooling." In this case again, high school work does not have a direct impact on the decision to go to college, but an empirical relationship exists.

These considerations are also relevant when interpreting the connection between vocational education and future schooling. A negative relationship does not necessarily mean vocational education has a negative impact on the decision to go to college, but can mean that those less likely to go to college based on their "aptitude for schooling" are channelled into vocational education curriculums. Therefore, to get a clearer picture of the connection between high school work or vocational education and post-secondary school attendance it is important to control for these other characteristics that influence both decisions. However, even after controlling for other characteristics, working in high school may have a direct negative impact on the schooling decision if working in high school had a negative effect on study time and therefore on high school performance.

I attempt to get some picture of the relationship between high school work and the probability of attending school in the first year after high school by estimating a probit equation, controlling for individual, background, and labor market characteristics. The results of this estimation are reported in Table 2.2.

As in the tabular results reported above, this estimation shows no significant relationship between working in high school and the probability of attending school the first year after high school. Specification 1 in Table 2.2 shows the estimates of a probit with high school work measured by a dummy variable if the individual worked positive hours per week in high school. The coefficient on this variable is insignificant. Interactions of high school work with the dummy variables for female, nonwhite, and both female and nonwhite, also are not significant. However, when measuring high school work by a continuous hours per week variable, reported as specification 2 in Table 2.2, I find a significant negative relationship between hours worked in high school and the probability of attending post-secondary schooling.

The fact that there is a negative relationship between hours of work ("hs work hrs") and the probability of attending school, but not between the dichotomous work variable ("hs work") gives some credence to the notion that the numbers of hours worked in high school is an important factor and larger numbers of hours worked in high school may have a greater negative impact on high school performance and therefore on the probability of future schooling. However in the context of the preceding discussion, this interpretation must be qualified. I am unable to completely control for characteristics that may influence both decisions to work in high school and to attend school. In particular, even though I have controlled for family income with poverty status while in high school and have controlled for background variables such as parents' grade level and work status in 1978, I have not been able to control for the students "aptitude for schooling" at all. Therefore, if those students with a lower aptitude for schooling decide to work more hours in high school and to not go on to college, it may not be that high school work itself is having a negative effect on the probability of college.

The probability of attending post-secondary school is higher for women than men and for nonwhites than whites controlling for other characteristics. Although the unconditional correlations in Table 2.1 show fewer nonwhites than whites attending school, the estimates in Table 2.2 control for differences such as poverty status.

The probability of attending post-secondary school is also negatively correlated with having been in a vocational curriculum. Again, it is possible to interpret this result in two ways. Vocational curriculums may have a direct negative impact on future schooling, possibly by being poorer preparation for this outcome, or those students with less aptitude for schooling may be more likely to be in a vocational curriculum. Keeping in mind the relationship of high school work and future schooling, I now turn to focusing on high school graduates who do not go on to school.

2.3 The Data and Sample

The sample used in the remainder of this study is limited to those individuals who do not go on to post-secondary education.[9] There are several reasons for this choice of sample. I am concerned here with the impact of high school work experience on future wages and labor supply. For those who go on to higher levels of education, the effects of post-secondary education are difficult to separate from the impact of high school work experience on labor market outcomes.

Another reason for focusing on students who do not go on to further schooling is the differences in these two groups. In recent years the gap between the wages of high school and college educated workers has increased. Katz and Murphy [1990] document that from 1979 to 1987 college graduates gained 11.7 percent on high school graduates in real wages and 14.4 percent on high school dropouts. The increase in college versus high school graduate or dropout earnings was greatest for young workers with 1 to 5 years of experience. The large differences between these groups calls for separate analysis, as well as pointing to another reason for focusing on ways to enhance the

[9] I only know individuals do not attend post-secondary schooling during the course of the survey up to 1988. For 90 percent of my sample this is at least 6 years.

earnings of young workers' who do not go to college.[10] Finally, given individuals are young (14-22) in the first year of the NLSY, I will have fewer post-schooling labor market observations for college students.

In addition to dropping from my sample individuals who go on to college, I do not include individuals who drop out of high school. There are significant differences in the high school experience and labor market outcomes of students who graduate from high school and those who do not finish high school. Only including high school graduates avoids having to disentangle whether higher wages are due to graduating or due to high school work. I also want to avoid the possibly complicated relationship between the decision to drop out and high school work. In the sample of individuals who do not go on to post-secondary schooling, 36 percent or 1226 are dropouts, meaning they are not in school for at least two years and the last previous year of schooling they did not graduate from high school. Of the 1226 dropouts 35 percent were in the twelfth grade but did not finish high school.[11] Excluding dropouts leaves me with a sample of 2192 high school graduates, 1107 men and 1085 women.

Given the construction of my sample, the last year of high school for different individuals occurs in different calendar years, from 1979 to 1985. This is of some concern, since the early 80s was a period of serious recession which we would expect to have a negative effect on the availability of jobs for high school students. These effects

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[10]Katz and Murphy conclude that changes in the relative supply of college to high school graduates coupled with the increasing demand for more skilled workers accounts for most of these earnings ratio changes. Therefore, increasing the relative skills of a high school graduate through high school work may improve his or her relative earnings position.

[11]Given the definition of dropout used here it is possible for these students to obtain a high school degree later in the survey. 27 percent of individuals I define as dropouts receive their degree by 1988.

may be limited in my sample because the numbers in high school drop precipitously as the survey progresses. Only 2.7 percent of the sample defined above attends their last year of high school in 1984 or later. Over 50 percent of the sample finishes their last year of high school before 1981, and 97 percent before 1984. To limit differences in the last year of high school due to differences in the calendar year, I only include in my sample individuals who were in their last year of high school from 1979 through 1983. This leaves a sample size of 2158 individuals.

Even limiting the sample in this way, students who finish high school in different calendar years in the sample have different probabilities of working in high school. Table 2.4 shows the employment rates, the average hours and the average weeks worked of male and female twelfth grade students for the years 1979 to 1983. The definitions used are the same as in Table 2.3.[12] The numbers are for the all twelfth grade students in the NLSY and are weighted by the individual sample weights for the appropriate year. These numbers show that there was indeed a larger percentage of students working in 1979 than in 1983. The employment rate for men in 1979 is 56 percent and for women 54 percent. The high point of unemployment in the recession in the early eighties was 1982. By 1983 the employment rate for high school students was 46 percent for young men and 32 percent for young women. The average number of hours and weeks worked also fall over time. To control for some of the differences that are present due to individuals finishing high school in different years, I include dummy variables for the calendar year of an individual's last year of high school in

[12]Again, as in Table 2.3 working is defined as having positive hours last week. Hours are hours worked the week prior to the interview and weeks worked are for the year prior to the interview.

all estimation.

In the analysis presented here I measure high school work as work done in the final year of high school. This measure has the advantage of being the year closest in time to post-school labor market work. Using all four years of high school proved to be impractical given the available data. Few individuals are in the survey from ninth grade up until twelfth grade. For the rest of this chapter I use the phrase "worked in high school" to mean the student reported positive hours in the week before the interview date in their last year of high school.

2.4 High School Work

Working in high school may provide general and specific skills that can prepare an individual for future work. Holding a job may teach a young person general skills such as punctuality, responsibility, and how to work with others, as well as teaching more specific job skills. Young people who work in high school may then have an easier transition to work in the labor market, represented by a higher probability of working in the years immediately following high school, and may earn higher wages than their counterparts who did not work in school. High school work may also be a signal to some employers that an individual is a "hard worker" or will have greater labor force attachment. The latter may be more important for young women than young men. High school work as a signal may lead to better jobs with higher wages for those who work in high school and may also close the wage gap relative to those men and women who did not work in high school.

This section examines some of the correlations between high school work and post-high school labor market outcomes. In the first part of this section, I examine how prevalent high school work is in my sample, and the differences in high school work between men and women. In the second part, I study the differences in employment rates and wages of those who worked in high school and those who did not for the first four years after graduating. I also study whether there are differences between men and women in these outcomes by high school work status.

2.4.1 Amounts of High School Work

I have already shown in the introduction to this chapter that high school work is widespread among a representative sample of twelfth grade students from 1979 alone. I show here that working in high school is also prevalent in my more selective sample of high school graduates from 1979 to 1983 who do not go on to college. I also show there are only small differences between men and women in amounts of high school work. Table 2.5 shows by sex and race the non-weighted percent of students working.[13] Employment rates again show large numbers of students work in high school. Over half of white men and women and almost 40 percent of nonwhite men and women work. On average these students work twenty hours per week and, as discussed earlier, over half the weeks in the year.

Within race, differences by sex are very small. The difference in employment rates is only 1 percentage point for white and nonwhite twelfth grade men and women. 58 percent of white women and 59 percent of white men work in high school, and 38 per-

[13] A comparison of the representative sample of all twelfth grade students in 1979 (in Table 2.3) that I discussed earlier compared to my sample of graduates who do not go on to more schooling shows largely the same results. The largest differences are that nonwhite men have lower employment rates and all groups have lower weeks worked per year in my sample. This could be due to my sample being graduates, oversampling people in poverty, and including years after 1979.

cent of nonwhite men and 37 percent of nonwhite women work in high school. Women on average work significantly fewer hours per week than men, but the difference is only about 2 hours for whites and 3 hours for nonwhites. Average weeks worked per year is similar as well, with only approximately a 2 week difference in weeks worked per year between men and women.

The percentage of men and women primarily in a vocational or commercial curriculum also differs only slightly by gender. The same percent of white men and women are primarily in these curriculums. These numbers are reported in Table 2.5. Nonwhite women are in a vocational curriculum more frequently than nonwhite men, but less frequently than white men or women.[14] Fewer nonwhite men are in these curriculums than white men or women as well. The percentages of men and women are similar due to combining vocational and commercial programs. Women are more likely to be in a commercial curriculum and men are more likely to be in a vocational curriculum.

The idea that high school jobs may provide preparation for post-schooling labor force participation either through specific or general skills gained depends on the job held. It may be more likely that "steady" jobs that are worked at regularly provide more of the benefits discussed above as opposed to jobs that are done on a less regular or infrequent basis. We would not necessarily believe that babysitting or occasional lawn-mowing would provide specific skills that will be valuable in the labor market after high school, although it is possible that these jobs provide more general job

[14]Again, this differs from the representative 1979 numbers in Table 2.3, where more nonwhites were in a vocational curriculum.

skills.

Are most high school jobs of the regular or infrequent type? If a large fraction of high school jobs are "odd" jobs than high school work may have less impact on future wages or employment. The difference between steady and infrequent jobs can be measured by looking at the hours of work. However, the NLSY in survey years starting in 1981 asks individuals directly about whether the job held during the interview week is an odd job. The question asked is

> Some jobs are odd jobs -that is , work done from time to time like lawn-mowing and babysitting. Others are regular jobs– that is jobs done on a more or less regular basis. Is this a job done on a more or less regular basis or is this an odd job?

The percent of individuals in my sample who responded that their job was an odd job is shown below. For both men and women, a relatively small percentage of jobs were classified as odd jobs by the job holder.[15] In addition odd jobs were worked at for fewer hours per week on average than regular jobs as expected.

	Total	Men	Women
% Odd Jobs	6.6	7.5	5.3
Average Hours per Week on Regular Jobs	21.3 (.44)	22.6 (.62)	19.6 (.61)
Average Hours per Week on Odd Jobs	10.9 (1.33)	12.4 (1.84)	8.1 (1.38)

Most high school jobs do not appear to be odd jobs from this calculation. Because the odd job question is not asked in 1979 or 1980, a direct control for whether a high school job was an odd job is not possible. However, controlling for number of

[15] We might expect high school jobs would more likely be odd jobs during a recession. This doesn't seem to be true for the data I have. In 1981, 5 percent of jobs were odd jobs, in 1982, 13 percent, in 1983, 12 percent and in 1984, 10 percent.

hours worked versus using an indicator of any amount of high school work allows for differentiation between "regular" and "odd" jobs in hours.

Given these small differences between men and women in amounts of work in high school and numbers in vocational programs, differences in these characteristics are unlikely to account for much of the male/female wage differential. In order for high school work to account for wage differences, men and women must receive different returns to high school work or there must be different probabilities of work after graduating associated with working in high school. These relationships are discussed in the next subsection, and estimated controlling for differences in other characteristics in the subsequent section.

2.4.2 Post-High School Probability of Work and Wages

The potential positive effects of high school work all suggest higher employment rates and wages for students who worked in high school, particularly in the first years after high school. In this section I examine whether this is true in my sample before controlling for individual differences in other characteristics. I find that average employment rates and average wages of men and women who worked in high school are higher than those who did not. I also find differences across men and women in these results.

Average employment rates of white and nonwhite men and women who worked in high school are higher in the first year after high school than students who did not work. These results are reported in Table2.6. Employment rates range from 9 to 31 percentage points higher for those who worked in high school. For women, these rates remain higher for all of the first four years after high school.

The differences in employment rates between men and women are smaller for high school workers than non-workers. While overall there is a 10 percentage point difference in the employment rates of nonwhite men and women, there is only a 2 percentage point difference in employment rates for those who worked in high school and a 13 percentage point difference for those who did not in the first year after high school. There is almost no difference in employment rates for all white men and women in the first year after high school, but women who worked in high school have an 8 percentage point higher employment rate than men, and those who did not work have a 5 percentage point lower employment rate than men who worked.

These results suggest first that there is a significant relationship between high school work and work in the first year after graduating. This may mean that high school work may lead to an easier school-to-work transition for young people by providing work and job-finding skills. The differences across men and women also suggest there may be differences in the relative benefits of high school work to men and women. Alternatively, it may mean that certain characteristics that increase the probability that young people work in high school also increases the probability of work after high school. The extent to which this is true may also differ across genders.

Although the relationship between high school work and employment is strong in the first year after high school, it diminishes over time. Employment rates of white men who worked in high school increase slightly over the four years after graduating, while the employment rates of those who did not work rise much faster. The employment rates of nonwhite men who did not work in high school also rose over the fours years, but the rates of those who worked in high school fell over the four years. The result is that at the end of these four years, men's employment rates have converged and are very similar whether they worked in high school or not.

For women, the initial positive relationship between high school work and employment decreases somewhat over time as well. The employment rates of both white and nonwhite women who did not work in high school rise faster than the rates of those who did. However, four years after leaving high school, the employment rates of those women who had worked in school are still substantially higher than those who had not.

Over time as the employment rates of men and women who worked in high school begin to look similar to the rates of men and women who did not work in high school, there continue to be differences in the relative employment rates of men and women by high school work status. The employment rates of women and men who did not work in high school rate converge over the four years. White women have the same employment rates as men and nonwhite women have closed the gap. However, for high school workers, the employment rates of white and nonwhite women remain higher than the employment rates of white and nonwhite men in all for years.

Although the employment rates of women who worked in high school are similar or even higher than men's employment rates, these numbers do not reflect differences in the hours of work per week. Women are much more likely to work part-time after high school than men, regardless of their work experience in high school. Differences in average hours worked are reported in the second half of Table 2.6 in the form of percentage of individuals working part-time. Part-time is defined as less than 30 hours per week. The difference between men and women is greatest in the first year, approximately 33 percent versus 20 percent, but relatively high numbers of women are working part-time relative to men over all four years.

Over time, the percentage of both men and women working part-time decreases. For men, the percentage working part-time falls from approximately 20 percent to 10 percent four years later. For women the percentage also falls to about half the initial level, but given the high numbers in the first year, the percentage in year four remains higher at approximately 32 percent.

The difference in frequency of part-time work between men and women does not depend on high school work status. Women who did and did not work in high school both have a higher probability of working part-time than men. Since more women work part-time regardless of high school work status, this difference may merely reflect different choices by men and women that are unrelated to high school work. However, when interpreting differences in employment rates across high school work status, it will be important to control for whether the individual is currently working part-time.

In addition to employment rates, wages earned after graduation are also generally higher for those students who worked in high school. Table 2.7 lists the average real wages per hour of white and nonwhite men and women for the first four years in the labor market, as well as the ratio of female to male wages. Average wages are conditional on working. For all groups except white men, individuals who worked in high school earn higher wages in the first year after high school than those who did not. White women who worked in high school earn 16 percent higher wages per hour than white women who did not work in high school. This same comparison for nonwhites shows 12 percent higher earnings for men and 11 percent higher earnings for women. These differences persist over the first four years after high school. White men who worked in high school have lower average wages in the first year after school, but higher wages in each of the next three years. Generally, working in high school is associated with higher future wages.

The second panel of Table 2.7 shows two different comparisons of ratios of female wages to male wages. First, I compare the the ratio of female to male wages for students who worked in high school compared to the ratio for those who did not. Second, I compare the wage ratio of women who worked in high school and all men to the wage ratio of all women to all men. The first comparison allows examination of whether wage ratios are closer for men and women holding whether worked in high school constant. The second comparison reveals whether women who work in high school are closing the wage gap compared to all women.

For whites, the ratio of female to male wages the first year after graduation is higher for those who worked than those who did not work in high school. Over time, the wage ratios for those who worked and those who did not work in high school become more similar. The female to male wage ratio for individuals who worked in high school is .87 in the first year after school and falls to .82 in the fourth year. For those who did not work in high school the initial ratio is .78 which rises to .81 by the fourth year. For nonwhites, there is no clear pattern in wage ratios for nonwhites by high school work. This may be partially due to the fact that I am not controlling here for hours worked or other possible differences in characteristics.

Why the female/male wage ratios of high school workers decrease and the ratios of those who do not work increase over time depends on both the relative benefits of high school work to men and women, and how this relationship changes over time. If high school work provides a higher return to women than to men, then initially the female to male wage ratio will be greater for high school workers. As described earlier, this would be consistent with men being more likely than women to acquire job skills, job-finding skills and contacts through means other than high school work. In some sense this means that women who do not work in high school have on average the lowest levels of these skills. Over time, however, women who did not work in high school may acquire some of these skills from being in the labor market, and their wages may begin to look more similar to men who did not work in high school. This would mean an increase in the female to male ratio. For students who did work in high school, the decrease in the ratio over time shown here may not be related to high school work, but merely reflecting the general trend of women's lower wage growth than men.[16]

Although the difference across high school work status in female to male wage ratios decreases over time. women who worked in high school earn wages more similar to men's wages than women do on average. The second set of wage ratios lists the female to male wage ratio of women who worked in high school to all men, and the wage ratio for all workers. For white and nonwhite women, working in high school is associated with a much smaller wage gap with men in all four years. In the first year after high school, the ratio of the wages of white women who worked in high school to

[16]This phenomena was studied in Chapter 1 of this dissertation. There I showed that wage growth rates for continuous workers were higher for men than women.

the wages of all men is .85 compared to the wage ratio of all white workers which is .81. The comparable ratios for nonwhites are .89 compared to .85. In the fourth year there is still a large difference in these two ratios. White women who worked in high school earn 84 percent of men's average wages versus 80 percent for white women on average. For nonwhite women the difference is even larger. Nonwhite women who worked in high school earn 91 percent of nonwhite men's wages versus 83 percent for nonwhite women on average.

There are clear differences between working and not working in high school. While employment rates of all young people rise with time out of high school, those who did not work in high school are generally less likely to work after graduating and have lower average wages conditional on working. A gap between men's and women's wages exists for all groups considered. However, the difference between men's and women's wages in the first years after graduating is smaller for those who worked in high school. Those who worked in high school have more positive labor market outcomes and despite the similarity in the amounts of high school work done by men and women, high school work may account for some of the average wage differential of young male and female workers.

2.5 Estimation and Results

These summary statistics indicate a relationship does exist between high school work and young workers early labor market outcomes. In this section I test whether a significant relationship between high school work and the probability of employment and wages in future years still exists after controlling for differences in human capital, personal, and labor market characteristics. I also study whether this relationship is different for men and women. Given men and women on average work similar amounts in high school, differences in the return to the investment of high school work for men and women will be important for whether high school work can account for differences in the wage gap. To answer these questions I estimate the probability of employment after high school and a post-school wage equation for the sample of high school graduates who do not go on to additional schooling. I also compare these relationships to the impact of vocational education on employment and wages and possible differences between men and women and consider whether any of these effects persist over time. Finally, I consider the consequences for the male/female wage gap of any differences between men and women in these relationships.

The wage equation, written below, shows that wages are determined by observed factors X and unobserved factors ε. Underlying the decision to work is the reservation wage, w^*, which is determined by observed and unobserved characteristics. If an individual is offered a wage greater than w^* then she or he will work, and hours are positive and wages are observed.

$$w = X\beta + \varepsilon$$

$$w^* = Z\gamma + u$$

$$work = 1 \; if \; w > w^*$$
$$= 0 \; otherwise.$$

I estimate the probability of working (of $w > w^*$ or $H > 0$) in the years after high school using the following probit specification:

$$\begin{aligned} Prob(work = 1) &= 1 - F(-X\beta) \\ &= \Phi(\beta_0 + X_{HC}\beta_1 + X_P\beta_2 + X_{FB}\beta_3 + X_{LM}\beta_4 + HS\beta_5) \end{aligned}$$

where Φ stands for the standard normal cumulative distribution function. I also estimate a log real wage equation for the years after high school by OLS using the following specification:

$$E(w|H>0) = \alpha_0 + X_{HC}\alpha_1 + X_P\alpha_2 + X_{FB}\alpha_3 + X_{LM}\alpha_4 + HS\alpha_5 + \nu$$

where for both equations:

work=1 if an individual reported working positive weekly hours measured by usual hours per week[17]

w = Log real wage per hour[18]

HC = human capital variables including experience and tenure on the current job both measured in months, a dummy for part-time work and an interaction with the female dummy, a dummy equal to 1 if the current employer is the same as the high school employer,[19] and a dummy variable for if primarily in a vocational or commercial curriculum in twelfth grade

P = personal characteristics, including gender, race, health status, a dummy variable for being married and one for having children, both interacted with the female dummy variable

FB = family background measures, including mother and father's grade level, and whether mother and father worked in 1978

LM = labor market characteristics, including the local unemployment rate, if the

[17]I use usual hours per week here because the answer is for either the job held at the interview date, or the most recent job. This allows work to equal 1 if any work was done during the year in question.

[18]Wages are deflated by the CPI.

[19]Part-time work and whether your current employer is the same as your high school employer are not included in the probit estimation. Part-time work is defined as less than 30 hours per week.

region of residence was the south, whether reside in an smsa, and dummy variables for the calendar year of the last year of high school

HS = a measure of high school work.

The means for the data used are shown in Table 2.8 by work status in the first year after high school.[20] Most of the variables used in the estimation are self explanatory. Tenure and experience are measured in months. Experience includes months worked on all jobs since leaving high school.

The probability of work equation is estimated on the entire sample for each year.[21] The wage equation is estimated only on the sample of individuals who are working in that year, those with $w > w^*$ or $H > 0$. The group of individuals who are working are not representative of all potential workers. One example of this is that individuals with a greater value of non-work time will have higher reservation wages, w^*, and be less likely to work, all less equal. Therefore the sample of working individuals will have lower than average values of non-work.[22] Directly estimating the effect of high school work for individuals who are not working is impossible since we do not observe their wages.

One way to try to control for this selection bias in the wage equation estimation is to use results from the probability of work estimation, following the two-step procedure outlined in Heckman (1979). From the probability of work estimation we can calculate expected values of the residuals for individuals who do not work. Includ-

[20] For means of the dependent variables see Tables 2.6 and 2.7.

[21] The numbers fall slightly due to attrition from the survey.

[22] It is also possible that those who work positive hours earn higher wages due to some unobserved factor. In this case the sample of only workers has higher than average value of this factor leading to biased estimates.

ing these residuals in the wage equation should give consistent estimates of the wage equation coefficients.[23] If the coefficients in the corrected equation do not differ from the uncorrected, or differ only slightly, this is an indication that selection bias is less of a problem.

In estimating both of the probability of work and wage equations I consider several measures of high school work. Using a dummy variable equal to one if hours worked per week in high school are positive allows me to test if a relationship exists between working any number of hours in high school and labor market outcomes. I expect that "odd" jobs or jobs worked at for only a few hours per week may prove to be less of an investment for students than working a more steady job. To allow for differentiation between the effects of working different numbers of hours, I use a continuous hours work variable. I report results using both measures.

In addition to testing for a significant relationship between high school work and labor market outcomes, I am also interested in comparing vocational education to high school work as another way of gaining "pre-market" job preparation. To estimate the association between vocational education and the probability of working after high school and wages, I include a dummy variable for whether an individual is primarily in a vocational or commercial curriculum. To be able to determine if the possible effects of high school work or vocational curriculums are different for men and women, in both equations vocational education and the measure of high school work used are interacted with female, nonwhite, and nonwhite-female dummy variables to capture

[23]The variables not included in the estimation of the probability of work but included in the wage equation are part-time work and whether the present job is the same as the high school job.

differences across groups.

In the previous sections I found that differences in employment and wages by high school work status decrease over time. In addition, by the fourth year after high school the female to male wage ratio is similar for students who did and did not work in high school. Given these findings, it is important to test whether any initial relationship between high school work and employment and wages persists over time.

To do this I estimate the equations for the probability of work and for wages above for each of the first four years in the labor market. The estimation for the different years allows for differences across time, but does not account for differences across individuals in the number of years worked. Controlling for experience addresses this concern in part, but differences in continuous spells of non-work are not accounted for.

Before discussing the results of these estimations, it is important to address a major concern in interpreting the results of the next two sections. Any estimated relationship between high school work and the probability of work or between high school work and wages may not be causal. It may be the result of omitted unobserved individual differences that effect the probability of working in high school as well as either the probability of working later on or future wages. Examples of possible heterogeneity bias include motivation or whether an individual is a "hard worker", an individual's ability, expectations of future labor supply or other personal characteristics. There is also the possibility of omitted unobserved characteristics that affect the probability of being in a vocational curriculum as well as future labor market outcomes.

Since I cannot observe any of these factors directly, I try to include some possible proxies for these types of individual differences. I include in the estimation several family background controls which include the grade level of the worker's mother and father as well as whether the mother and father were working in 1978. The extent to which these background characteristics are related to high school work gives some indication of the extent to which they will be able to control for heterogeneity. Below I list the coefficients of a probit for the probability of work in high school and an OLS regression for the hours worked per week in high school with these background controls as explanatory variables for men and women.

These results show that these some of these controls are significantly related to high school work. In particular, having a father who worked in 1978 is associated with

	Prob(HS work)		Hours HS work	
	Men	Women	Men	Women
mother's grade	.029	.026	.223	.127
	(1.66)	(1.43)	(1.20)	(0.77)
father's grade	.027	.009	.264	.183
	(1.84)	(0.61)	(1.68)	(1.31)
mother worked	.091	.227	.841	1.46
	(1.12)	(2.72)	(0.97)	(1.92)
father worked	.532	-.089	3.09	-.135
	(3.72)	(0.61)	(2.10)	(0.10)

working a significantly higher number of hours in high school for men, and having a mother who worked in high school is associated with working more hours in high school for women. Therefore, including these variables in the estimation for probability of work and future wages may control for some of the unobserved characteristics that lead to higher work in high school and higher wages or future probability of work. However, together they will probably proxy for only a part of the total impact of the unobserved factors. Because of this, the results must be interpreted with the caution that high school work is not necessarily causally increasing future work or wages.

2.5.1 Probability of Work After High School

The probability of working was estimated separately for each of the four years after high school using the probit specification described above. I discuss the results for the first year after high school and then look at the probability of work over time. The results of these estimations are shown in Tables 2.9 and 2.10. All estimation is for the combined sample of white and nonwhite men and women.[24]

I find that working any positive number of hours in the last year of high school is not associated with any significant increase in the probability of working in the first year after high school. The first estimation results reported in the first column of Table 2.9 measure high school work using a dummy variable equal to 1 if in the week previous to the interview the student worked positive hours ("hs work"). The coefficient on this measure is insignificant. The coefficients for the nonwhite and female interactions are also insignificant. This suggests that working in high school does not have an effect on future work.

Despite this finding, it is still possible that a relationship between high school and

[24]Tests of whether the estimated equations are different when white and nonwhite equations are estimated separately reject that they differed by more than the interactions included. Only selected coefficients are listed. Variables included in the estimation but now shown are married, children, health, tenure, experience, unemployment, if region south, smsa, mother's and father's grade, mother's and father's 1978 work status, and dummy variables for calendar year of entry. Interactions for female with married, children and nonwhite are also included.

post-school work exists. The value of high school experience in providing skills and preparation may depend on the number of hours worked. Working more hours may positively affect the probability of future work if it increases the likelihood that a student will learn useful skills, or is indicative of holding a "better" job. Employers may then be more likely to hire, or the student may have better information about job opportunities. This ties in with the notion that odd jobs or less steady work may not provide students with the human capital, job finding skills or contacts that jobs worked at for more hours may. Working more hours in high school may also have a negative effect on the probability of working, if working many hours has a detrimental impact on high school studies and employers are concerned with academic performance.

I allow the high school work relationship to vary with hours by controlling for continuous hours worked in high school ("hs work hrs"). Results are reported in column 2 of Table 2.9. Working more hours in high school is associated with a significantly higher probability of work after high school. Each additional hour worked is associated with a roughly .5 percentage points increase in the probability of future work. These results point to the interpretation of working more hours in high school as providing a greater investment for a young person than a less steady job or than not working in high school. Of course, these results must be interpreted keeping in mind the possibility of heterogeneity bias. If a young person is more likely to work in high school for some reason that I cannot observe, they may be more likely to work after high school as well.

As a check on how much hours alone matters over and above any positive effect of just working in high school, the same equation was estimated including both the dichotomous and continuous hours measures of high school work. The results of this estimation are reported in column 3 of Table 2.9. The results are very similar to the previous results. The probability of working rises significantly with the number of hours worked in high school. Simply working at all in high school is not significantly related to the post-school probability of work. The relationship between other controls and post-school work probability is also similar.

In all three of these specifications there are no significant differences for white or nonwhite men and women in the relationship between high school work and the probability of work the first year after high school. If high school work provides training or specific job search skills, there is no greater benefit to women in terms of the probability of work. The theory that women may benefit more from high school work than men because they potentially have less access to job-finding skills or contacts does not seem to be supported by these results. However, all students who work in high school do have a higher probability of working later on. Working 20 hours per week in high school is associated with a 10 percentage point higher probability of work in the first year after high school. While this may not be a causal relationship, these significant results give some indication that working in high school at least does not have a detrimental effect on the probability of future work.

Working in high school is associated with a higher probability of work after graduating regardless of gender and race, all else equal. If this is due to high school work providing experience that makes employers more likely to hire, then it is possible that this should be true for those who participated in vocational curriculum as well. However, I find no significant relationship between being in a vocational curriculum and the probability of work in the first year after high school for any category of students in any of the three specifications.[25] This difference between vocational curriculum and high school work suggests that there may be differences between these two types of pre-market "training". Vocational curriculums teach some specific skills, but this does not outweigh the benefits of high school work which can provide not only job skills, but possibly job finding skills and general work skills.

Another possible interpretation is that vocational curriculums do have positive effects on the probability of work, but this relationship is overwhelmed by unobserved individual differences. If a characteristic such as low motivation or ability makes it more likely a student is in a vocational curriculum as well as more likely he or she does not work later on, than despite positive effects of vocational education on work, I may estimate an insignificant relationship.

To demonstrate clearly the differences in the probability of work in the first year after graduation between students who did and did not work in high school, I report below probabilities for a "base case" individual. This allows comparison of the different probabilities of work across white and nonwhite men and women who have the same characteristics, separating out the differences by race and gender in other characteristics. The base case individual has the following characteristics: the av-

[25]Along the lines of the findings for high school work, it could be possible that being part of a vocational curriculum is not significantly related to future outcomes, but the number of vocational courses taken is related. Daymont and Rumberger [1982] find that the number of vocational credit hours taken has a positive effect on women's wages (an increase of 3 vocational credit hours increase earnings 3 percent). However, they find similar results for academic curriculum credits. Furthermore, the effect of increased vocational credits on men's earnings is insignificant. They conclude from this that there is no systematic advantage to vocational curriculum over other types of curriculum.

erage value over the whole sample of mother's and father's grade level, tenure, and unemployment, and lives in an smsa, mother and father worked in 1978, and finished high school in 1979.[26] Of course, the actual percentage of students who did or did not work in high school differs across race and gender as do the average characteristics of individuals in these groups differs.

The probabilities of work for the base case student who did not work in high school and who worked 20 hours per week in high school are listed below with standard errors in parentheses.[27] They are calculated using the estimates in column 2 of Table 2.9.

	White Men	White Women	Nonwhite Men	Nonwhite Women
no hs work	78.8	85.8	80.5	81.3
	(3.5)	(2.3)	(3.4)	(3.8)
work 20 hours per week in hs	85.1	91.1	85.1	83.4
	(2.3)	(1.2)	(2.5)	(3.3)

The probability of work in the first year after high school, for individuals with these characteristics, is not significantly different across race and sex with the exception of white women who have a significantly higher probability of work. White women with these characteristics have a higher probability of work than men, regardless of whether they work in high school or not. This is not necessarily true on average since other characteristics, such as being married or having a child, have a significantly negative effect on the probability of work for women but not for men.

[26]The differences in probability due to differences in the average value of these characteristics by race and gender is small. For instance, for white women who did not work in high school, the difference in probability of work using male versus female characteristics is less than 1.5 percentage points.

[27]Twenty hours per week worked in high school is assumed rather than the actual averages for high school workers. The actual averages by group are close to 20 hours per week for those working in high school.

Working 20 hours per week in the last year of high school is associated with a significantly higher probability of working in the first year after high school for these white men and women and nonwhite men. A white man's probability of work is 6.3 percentage points higher if he worked 20 hours per week in high school and for white women the probability of work is 5.3 percentage points higher. Nonwhite men have a 4.6 percentage point associated increase in the probability of work. Although for nonwhite women the point estimate of the probability of work given 20 hours per week of work in high school is higher than for not working in high school, the difference is not significant. Basically, controlling for average differences in characteristics across race and gender demonstrates that working in high school is associated with large increases in the probability of work for most workers.

In interpreting the positive relation between high school work and post-school work, it is necessary to consider the possibility of heterogeneity bias discussed earlier. I cannot control for characteristics such as "hard worker" that may positively influence hours worked in high school and hours worked after high school. I do try to control indirectly by including some individual background characteristics, such as mother or father working in 1978 and mother's and father's grade level, that may have a positive effect on both these hours decisions. The estimation results show that having your father or mother working in 1978 is associated with a higher probability of working after high school, a 78.8 percent probability of work for white men if both parents worked versus a 57.5 percent probability if neither worked.

It is also possible that characteristics that decrease the likelihood of working in high school have a similar effect after high school, especially in the first year after high school. Being married or having children are both possibilities I control for.[28] I find that for women, both of these controls are significantly negatively related to the probability of work after high school. For white women with at least one child who did not work in high school, the probability of work in the first year after high school falls from 85.8 percent to 51.2 percent, and for nonwhite women from 81.3 percent to 44 percent. Even after including these controls, number of hours worked in high school still has a positive relationship with probability of work. However, these are imperfect controls for the possible unobserved factors affecting high school and post-school work.

The same relationship between high school work and the probability of post-school work persists into the second year after high school. However in the third and fourth year there is no significant relationship between high school work and post-school work. Results for the estimation of the probability of work for years two through four using the continuous hours measure of high school work are reported in Table 2.10. In the second year after high school, working in high school is still associated with a greater probability of work. White men who worked 20 hours in high school have an almost 10 percentage point higher probability of work than those who did not work in high school.[29] This increase is higher than even the first year after high school. However, there is no significant relationship in the third and fourth years.

The significantly higher probabilities of future work for individuals who worked in

[28] I do not control for both marriage and children in high school and after high school since these are highly correlated. The results I discuss are for being married or having children the year after high school. Results are similar when I only include being married or having children in the last year of high school.

[29] This probability is calculated as above.

high school in only these first two years may reflect a transition period in moving from high school to the labor market. Those individuals who worked in high school may be more valued in the labor market or more accustomed to working so they can make an easier transition, or they simply may be the type of individuals that can make a faster transition. It is also possible that having a job makes it easier to find a new job because of increased access to job information and contacts. The transition period seems to be over in a few years, and the positive relationship with the probability of work after high school related to working in high school disappears.

The interpretation of the results from the second through fourth year after graduation are also open to the critique of unobserved individual differences leading to an estimated effect when there is no true effect. However, to be consistent with the change over time in the significance of the estimated effect of high school work, the relationship of the unobserved factors and post-school work must also change over time. If an individual is a hard worker and therefore more likely to work in high school and later, it is hard to see why this relationship with post-school work would diminish. However, it is possible that there are other unobserved factors that do show this time pattern.

Overall, high school work, specifically working more hours in high school, is associated with a higher probability of work in the first two years after graduating. This relationship disappears in the third and fourth year and there is no difference between men and women in this relationship in any year. In addition being in a vocational curriculum has virtually no relationship on future work probabilities in these four years. These results indicate that high school work may make the school-to-work transition period easier.

2.5.2 Wages

Estimation of the log real wage equation allows for study of whether those who work in high school have higher wages after graduating than those who did not work and those who were in a vocational curriculum in high school. It also allows comparison of this relationship for men and women. I can then consider in the next section the question of whether working in high school increases women's wages relative to men's, thereby decreasing the wage gap.

I find that working in high school is associated with higher future wages for women and nonwhite men, but has no significant connection to white men's post-school wages. Table 2.11 gives the results of estimation of the log real wage equation for the first year after high school. The first column measures high school work with a dummy variable for if the individual worked in high school, and the second column reports results using a continuous hours measure. I find that women and nonwhite men who worked in high school earn higher wages than their counterparts who did not work in high school. The largest differential is for white women. White women who work in high school make 65 cents per hour higher wages than white women who did not work in high school, an 18 percent increase. Nonwhite women who worked in high school make 7 cents an hour more than those who did not work in high school, a 2 percent increase, and nonwhite men make only 2 cents an hour more.

Using the continuous hours measure of work, I find that working more hours per week in high school is also associated with significantly higher wages in the first year after high school for white women and nonwhite men and women. White and nonwhite women who work 20 hours a week earn 15 percent higher wages than women who do not work in high school and nonwhite men who work this amount in high school earn 25 percent higher wages than nonwhite men who do not work in high school. Again, there is no significant relationship for white men.

It is possible that hours of work are significant in the specification in column 2 of Table 2.11 only because the variable for any work in high school is not included. To test whether there exists a significant effect of the number of hours worked in high school over working any amount, I estimate the equation including both measures of high school work. These results, reported in column 3 of Table 2.11, show that wages do increase with the number of hours worked in high school. Although standard errors are higher for most estimates, a somewhat smaller but still positive relationship between hours women worked in high school and post-school wages exists. In addition, the coefficient of the dummy variable for high school work interacted with female decreases by more than half and is insignificantly different from zero. These results suggest that the hours worked in high school are more important than simply having worked in high school. The more hours worked, the higher are post-high school wages.

To demonstrate the differences in wages across race and sex controlling for differences in average characteristics, I evaluate the wage equation for an individual with a fixed set of characteristics, the same as in the previous section. [30] I refer to this as the base case.

[30]These characteristics are average value of tenure, mother's and father's grade level, unemployment, lives in an smsa, both parents worked in 1978 and left high school in 1979.

Evaluating the wage equation shown in column 2 of Table 2.11 using these characteristics, I list below the average wages for those who didn't work and those who worked 20 hours per week in high school with standard errors in parentheses.[31]

	White Men	White Women	Nonwhite Men	Nonwhite Women
no hs work	4.30	3.46	4.18	3.49
	(.41)	(.41)	(.42)	(.44)
work 20 hours per week in hs	4.30	3.97	4.53	4.01
	(.41)	(.44)	(.46)	(.52)

Both white and nonwhite women who work an average of 20 hours per week in high school earn 15 percent higher wages than women who did not work in high school. A similar calculation for nonwhite men shows 8 percent higher wages for those who worked 20 hours per week.[32] For all workers except white men, estimates for working 20 hours a week are significantly higher than estimates for not working in high school. For this base case and on average, high school work is associated with higher wages for women and nonwhite men.

Why does high school work have this positive significant estimated relationship with wages for white and nonwhite women and nonwhite men? These results are consistent with several explanations. For all of these groups, especially white women, signaling labor force attachment may be an important advantage of high school work.

[31]The differences in these results due to differences in average characteristics are small. The difference between using these average total characteristics and using the respective group characteristics for individuals that do not work in high school is 5 cents for white men, 4 cents for white women and nonwhite women, and no difference for nonwhite men. This is both because the average characteristics are not that different and because the returns to these characteristics are not large. Twenty hours per week worked in high school is assumed rather than the actual averages for high school workers. The actual averages by group are close to 20 hours per week for those working in high school. Using actual averages gives a difference in wage of 3 cents for white women and nonwhite men and no difference for white men and nonwhite women.

[32]These results use the nonwhite constant, even though it is only very marginally significant.

Employers see an individual has worked before and interprets this as a greater commitment to future work. Working more hours may be an even stronger signal. Also, high school work experience may give women and nonwhites access to labor market jobs they might not have been considered for or hired for because of discrimination.

If the most important benefits of high school work are job-finding skills and contacts, young white men and to a lesser extent nonwhite men may have other avenues of gaining these benefits that are not as available to young women. Given that increasing numbers of hours worked is associated with higher wages, working relatively few hours in high school may not provide these benefits to young women but more steady jobs may. The finding that women who worked in high school do not have a higher probability of work than men who worked in high school does not support this explanation for job finding in general. However, it is possible that such a difference exists, but the benefit of these skills is in helping women who worked in high school to find higher paying jobs. Finally, it is also possible that an unobserved attribute that influences the probability of high school work leads to higher future wages as well and would lead to higher wages even without working in high school.

Although women and nonwhite men who worked in high school earn higher wages, those who were primarily in a vocational curriculum do not earn significantly higher wages. The point estimate of vocational curriculum is positive but marginally different from zero with a p-value of .211. and there is no difference by race and gender. The point estimate indicates that white men who did not work in high school but were in a vocational curriculum earn 6 percent higher wages than non-workers who were not in a vocational curriculum. This is compared to the 15 percent higher wages earned by white women who worked 20 hours in high school.

As with the previous results on the probability of work, the results on the insignificant relationship of vocational curriculum and future wages suggest there may be substantial differences in how vocational curriculums versus high school work can benefit young people. While there are limited estimated wage gains associated with vocational curriculums, high school work seems to provide more directly applicable work experience, or other job market skills that benefit students after graduation, particularly women and nonwhite men. These estimates indicate that vocational curriculums and work are not substitutes, at least in the sense that they are not associated with similar labor market benefits. It is possible that there are differences in the actual vocational courses taken and that learning certain occupational skills may be more valuable than others. Breaking down vocational curriculum by type may lead to significant positive results. However, it is also possible that different types of students are in vocational curriculums than work in high school, and these two factors are proxying for different levels of some unmeasured attribute.

When interpreting all of the results from the wage equation we must consider, as discussed earlier, that the relationship between hours of work in high school and wages in the first year after high school may be biased due to selection. Since I can only estimate this wage equation on individuals who are working, the data are not randomly sampled but rely on the decision to work. I can try to correct for some of this bias by using the probability of work equation which was reported in the previous section. I include the inverse Mills ratio, the expected residuals of the probability of work, labeled lambda in the wage equation.

Results from this estimation are shown in the fourth column of Table 2.11. The coefficient on the number of high school hours increases slightly compared to the uncorrected specification in column 2. All the other interaction coefficients remain unchanged, although standard errors change slightly. Lambda itself is negative and only marginally significant. These basically unchanged results may suggest the biases in this sample are not very strong. It may also be that the correction is only approximate and there still remains biases from sample selection.

Up to this point I have only considered the relationship between high school work and the first year after graduation. A significant relationship between high school work and wages persists over the first four years in the labor market. The results from estimation of the wage equation using the continuous hours measure of high school work for the second through fourth year after high school are reported in Table 2.12. In the second year after high school the pattern of wage effects is similar to the first year. White men who worked in high school do not have significantly different wages than white men who did not. Women continue to have higher wages if they worked in high school, but there is no longer a differential for nonwhite men.

In the third and fourth years after high school, however, the results show a significant positive relationship between working in high school and wages for all individuals. There is no longer a different relationship for women or for nonwhites. In addition, the relationship is diminished in later years with coefficients falling from .007 in the first and second year after high school to .005 in the third year and .003 in the fourth year. These results indicate that there is no longer an additional wage advantage for women over men of having worked in high school, although both men and women who worked in high school continue to earn higher wages than men and women who did not. Another difference in the results of the wage equations for the third and fourth year compared to the first two years is that the unexplained male/female wage gap that is measured by the female intercept falls by half, from -.24 to -.12. As time passes, the unexplained wage gap between men and women is decreasing.

The explanations for both of these patterns over time may be connected. As noted earlier, the differentially higher return for women to high school work in the first and second year after high school may be because high school work serves as a signal of labor force attachment or because women have fewer chances than men to acquire certain job finding skills or contacts without working in high school. Both of these theories are related to acquiring work experience, not necessarily high school work experience per se. If women who did not work in high school enter the labor force after high school and gain work experience and these skills, they may be able to "catch up" to some degree to women who worked in high school, thereby reducing the differential advantage of female high school workers. The decrease in the female intercept may be reflecting that overall, women in the labor market have acquired these skills and on average are earning wages more similar to men's.

It is important to note that despite a degree of "catching up" once in the labor market, high school work continues to be associated with higher wages for male and female workers. These may be returns to specific skills learned in high school work or an overall advantage to a "faster start" that cannot be overcome by entrants who did not work in high school, at least not over the course of these four years. With the limited time span of this data, I cannot say whether any advantage to high school work will disappear.

It is also possible that the female intercept and the changing relationship for women between high school work and wages may be due to selection bias. Although I find little evidence of this bias in the first year wage equation, it may be a greater problem in later years. Women who did not work in high school and who have low expected wages may not be working in the third and fourth years after high school. This could lead to a decrease in the average unexplained difference between men and women who are working. To try to control for this possible selection bias, I again implement Heckman's two-step correction method, using the results from the estimation of the probability of work in these years.

For all three equations the estimated results after this correction change only slightly. I show the results of this correction for the fourth year wage equation in the last column of Table 2.12. The estimates are generally less precise, but are of the same magnitude in the corrected and uncorrected equations. In particular, there is no change in the point estimate of the female intercept. It appears that selection bias is not a factor in explaining this difference.[33]

Over time the relationship between vocational education and wages remains fairly constant and always only marginally significant. As the positive relation between wages and high school work falls over time, the gap between the comparative wage "gains" for these two preparations decreases. Again this points to possible differences in the function vocational education and high school work may serve. Vocational

[33]Equations for years 2 and 3 also looked very similar to the uncorrected equations. The female intercept was -0.23 for year 2 and -0.13 for year 3 in the corrected estimation. Both are significant at the 1 percent level. The value of the coefficient on lambda is similar and significant in all three equations.

education may teach a specific skill that produces a relatively constant return in the labor market. High school work may provide these specific skills but can also provide other types of investments that have a diminishing benefit over time.

I have shown that white and nonwhite women who worked in high school have higher wages than their male counterparts in the first few years after graduating. In addition all students who worked in high school have higher wages in the third and fourth year after high school. I now turn to exploring the differences in the wage gap for those who did and did not work in high school. The next section decomposes the male/female wage gap to discuss the question how much of the gap can be accounted for by differences in high school work.

2.5.3 Consequences for the Wage Gap

A wage gap between men and women exists even in the first few years after high school. Women earn only 84 percent of men's wages in the first year after graduating from high school. In this section, I explore the question of how much of this gap is accounted for by high school work using the previous results. I have discussed the difference in wages within race and sex groups in wages for individuals with high school work experience. I now look across men and women by race to see if working in high school is associated with a decrease in the wage gap.

There are two ways high school work can potentially lower the male/female wage gap. First, if high school work is positively related to wages, differences in the likelihood or amount of work in high school by men and women may account for some of the difference in the wage gap. However, we have seen that women have only a

1 percentage point lower employment rate in high school than men, and work only two to three hours less per week on average. Also, in subsequent years women who are working do not have different amounts of high school work experience than men who are working. Therefore, differences in high school work experience is unlikely to explain very much of the wage gap.

Second, returns to high school work can have impact on the wage gap. Since high school work is associated with higher wages for women than men, at least in the first year after high school, the wage gap between women and men who worked in high school will be smaller than the wage gap between men and women on average.

The average wage in the first year after high school is $4.39 for white men, $3.71 for white women, $4.22 for nonwhite men, and $3.53 for nonwhite women. I calculate the extent to which high school work is associated with a lower wage gap using the following equation:

$$
\begin{aligned}
wage_m - wage_f &= [Prob(HS=1) * hrswk * \beta_{hs}]_m - [Prob(HS=1) * hrswk * \beta_{hs}]_f \\
&+ \text{all other factors}
\end{aligned}
$$

This equation states that the probability of working in high school multiplied by the hours worked in high school and the returns to high school work all contribute to the amount of the wage gap accounted for by differences in high school work. The different elements of this calculation for whites and nonwhites are:

	Men			Women		
	Pr(HS=1)	hrswk	β_{hs}	Pr(HS=1)	hrswk	β_{hs}
whites						
$w_m - w_f = .17$	.62	21.8	-.0002	.61	19.2	.0068
nonwhites						
$w_m - w_f = .18$	.45	22.2	.0038	.50	19.5	.0068

Women worked fewer hours per week than men in high school. However, nonwhite women had a higher probability of high school work and white women had a similar probability of high school work than men. The increase in wages associated with high school work, β_{hs}, is higher for women than for men in this first year. Therefore, differences between men and women in high school work do not account for any of the wage gap in the usual sense. Instead one can think of how much high school work lowers the wage gap between men and women. I calculate what the wage gap would be if women and men had actual average amounts of work, but assuming high school work has the same effect on wages for women as it does for men, $\beta_{hs}^m = \beta_{hs}^f$. This gives a measure of the difference in the wage gap if women did not have a differentially higher estimated return to high school work.

Under this assumption, the wage ratio for white women would be .78 instead of the actual ratio of .85 and for nonwhite women the wage ratio would be .81 instead of .84. This decrease in the wage ratio reflects the differences in estimated effects of high school work on wages, not the difference in amounts of work. I can also calculate the effect of differences in amounts of high school work on wages. I assume that women work the same amount in high school as men, both the probability of work and hours worked per week, but still have women's estimated return to high school work. Under this assumption, the wage gap for white and nonwhite women decreases by less than one percentage point from the observed wage ratios. This reflects the similarity in amounts of high school work between men and women. Differences in nonwork account for very little of the wage gap, but differences in estimated returns to high school work have a large impact on the wage gap.

I found in the previous section, however, that this differentially higher relationship for women between high school work and wages disappears by the fourth year after high school. There is still, however, a gap between men's and women's wages. In fact the overall gap is larger in this fourth year than in the first year. For whites the female to male ratio is .80 and for nonwhites the ratio is .83. Although there is no longer a difference in the relationship between high school work and wages,[34] I can make a similar calculation as above to discover to what extent differences in the amount of high school work can account for the wage gap in the fourth year.

I find that the difference between men and women in amount of high school work can explain almost none of the difference in the wage gap. For both whites and nonwhites, these differences account for less than 1 percentage point of the wage gap between men and women.

Given the findings that high school work is associated with a lower wage gap, I cannot conclude that working in high school causes a reduction in the wage gap. High school work is either giving women additional skills they would not otherwise

[34] For nonwhite men and women, the point estimates are different, but they are not significantly different from zero. Therefore, these calculations use only the coefficient on high school work.

receive, or simply correlated to some unobserved characteristic that increases wages. However, even if only part of this large impact on the wage gap is causal, working in high school may be an important way to increase women's wages.

Finally, it is important to remember two facts. Women who worked in high school have higher wages than women who did not work in high school in all four years after school. White women who worked 20 hours per week in high school have 6 percent higher wages and nonwhite women have 11 percent higher wages than women who did not work in high school in the fourth year after high school. This suggests that high school work may have some lasting effect, such as increased experience, for women as well as men. Second, although working in high school is associated with a 7 percentage point drop in the wage gap for white women and a 3 percentage point drop in the gap for nonwhite women, there is still a significant difference in wages between men and women that remains unexplained.

2.6 Conclusions

Even in the first year after graduating from high school, women on average earn lower wages than men. Differences in availability of training or in time out of the labor force cannot be part of the explanation for this difference, since it exists at the beginning of labor market experience. This chapter looks to pre-market differences in training to see if this may explain some of the gap. I study whether working in high school or being in a vocational curriculum have important connections to later labor market outcomes.

Both high school work and vocational education may provide specific job skills to young people. However, high school work can potentially provide additional benefits. High school work may teach young people general work skills, such as punctuality and how to work with others, as well as provide job contacts and job-finding skills. Another potential advantage, especially for young women, is that work in high school may serve as a signal of labor force attachment to employers.

Large numbers of high school students work, and on average, they work a relatively high number of hours per week. In the senior year, there are only small differences between men and women in employment rates and number of hours worked per week. The same percentage of men and women are in vocational curriculums as well. Differences in the impact of pre-market training on the average wages of young men and women are not due to differences in the amount of high school work or numbers in vocational education.

I find that high school work is associated with a higher probability of work and higher wages for young workers. Working in high school is associated with an increase in the probability of working for all students in the first two years after high school. After this period, there is no significant relationship. Female and nonwhite male students who worked in high school earn higher wages later on than female and nonwhite students who did not work in high school. In the third and fourth years after graduating, there is no differential benefit to women or nonwhites who worked in high school over white men, but there is still a significant relationship between high school work and wages. For all of these results, the greater the number of hours worked in high school, the stronger the relationship.

In addition, high school work is associated with greater positive outcomes than being in a vocational curriculum. There is no significant positive connection between vocational curriculum and post-high school employment rates. While there is a marginally significant positive relationship between wages and vocational curriculum, the increase in wages are smaller for women and nonwhite men than the increased wages associated with working 20 hours per week in high school.

Working in high school has consequences for the male/female wage gap as well. Young women who work in high school earn wages closer to men's then young women who do not work in high school. In the first year after high school, white women earn 85 percent of men's wages, and nonwhite women earn 83 percent of men's wages. Working in high school is associated with a 7 percentage point drop in this gap for white women and a 3 percentage point drop for nonwhite women. By the fourth year after high school, differences between men and women in wages associated with high school work disappear. The differences between men and women in amounts of high school work only account for less than one percentage point of the wage gap.

Even with these estimated positive associations, I cannot conclude that high school work has a causal relationship with post-high school wages and employment. The possibility remains that high school work may be a signal of some unobserved characteristics that lead an individual to be a better worker or work harder at finding a job, both in high school and after high school. However, the strong relationship of high school work to later work and wages and the large number of individuals who do work in high school suggests that high school work may play some role in easing the school to work transition period for young workers, particularly for young women.

Table 2.1: Major Activity After High School By Race and Sex and High School Work Status

	White		Nonwhite	
	Men	Women	Men	Women
Total # Worked in HS	619	584	294	284
% In School	39	41	33	37
% Working	46	50	50	46
% NS,NW	14	9	17	17
Total # Did Not Work in HS	469	501	465	507
% In School	42	41	31	37
% Working	37	37	39	28
% NS, NW	21	22	30	35

Note: The sample is all high school graduates. NS, NW stands for not in school and not working.

Table 2.2: Probit Estimation of Probability of Attending School the First Year After High School

	Specification 1	Specification 2		Specification 1 (cont'd)	Specification 2 (cont'd)
married	-0.63	-0.63	female	0.12	0.11
	(2.20)	(2.19)		(1.84)	(1.89)
children	-0.73	-0.75	nonwhite	0.14	0.12
	(3.89)	(3.98)		(1.96)	(1.78)
poverty	-0.23	-0.24	hs work hrs		-0.01
	(3.62)	(3.77)			(2.98)
poor health	-0.22	-0.23	hs work hrs *female		-0.002
	(1.70)	(1.76)			(0.03)
mother's grade	0.06	0.06	hs work hrs *nonwhite		-0.001
	(6.07)	(6.04)			(0.25)
father's grade	0.09	0.08	hs work	-0.06	
	(9.85)	(9.69)		(0.78)	
mother worked in 1978	-0.06	-0.05	hs work *female	-0.03	
	(1.15)	(1.02)		(0.25)	
father worked in 1978	0.04	0.05	hs work *nonwhite	-0.02	
	(0.38)	(0.51)		(0.20)	
unemployment	-.0003	-.0005	constant	-2.11	-2.02
	(0.32)	(0.57)		(9.74)	(9.33)
voc. curr.	-0.88	-0.87	Log Likelihood	-2116.95	-2105.53
	(6.59)	(6.55)	N	3723	3723
voc. curr. *female	-0.02	-0.01			
	(0.13)	(0.03)			
voc. curr. *nonwhite	0.46	0.47			
	(2.33)	(2.35)			

Note: Absolute values of t-statistics in parentheses. Other variables included but not shown are smsa, if region is south, controls for calendar year of last year of high school and interactions of nonwhite and female with vocational curriculum and high school work measures.

Table 2.3: Employment Rates, Average Hours and Average Weeks Worked in High School by Race and Sex, 1979

Employment Rate

	White				Nonwhite			
Grade	Men(%)	(s.e.)	Women	(s.e.)	Men(%)	(s.e.)	Women	(s.e.)
12	59	(2.8)	58	(2.7)	42	(3.2)	38	(3.2)
All HS Years	47	(1.1)	45	(1.1)	28	(1.1)	23	(1.0)
Average Hours per Week								
12	22.3	(.96)	17.4	(.69)	21.5	(1.4)	19.6	(1.2)
All HS Years	16.9	(.48)	13.9	(.42)	18.1	(.68)	17.1	(.73)
Average Weeks per Year								
12	39.9	(1.2)	34.8	(1.2)	31.9	(1.6)	29.4	(1.47)
All HS Years	36.4	(.78)	32.4	(.81)	27.7	(.89)	24.8	(.91)

Note: All calculations are weighted by the individual sample weights in 1979. Employment rate is defined as individuals who reported positive hours last week divided by the total observations in the given cell. Average hours per week uses hours worked last week and is conditional on positive hours. Average weeks per year is calculated conditional on positive weeks worked.

Table 2.4: Employment Rates, Average Hours and Average Weeks Worked in High School for Twelfth Grade Students in the U.S. by Sex and Year

Men

Year in 12th Grade	Employment Rate	(s.e.)	Average Hours Per Week	(s.e.)	Average Weeks Per Year	(s.e.)
1979	56	(2.2)	22.1	(.77)	38.5	(.92)
1980	58	(1.1)	21.2	(.70)	33.3	(.73)
1981	54	(2.1)	18.8	(.56)	34.3	(.86)
1982	49	(2.2)	20.4	(.80)	31.6	(.86)
1983	46	(3.8)	18.7	(1.3)	30.1	(1.6)

Women

Year in 12th Grade	Percent Working	(s.e.)	Average Hours Per Week	(s.e.)	Average Weeks Per Year	(s.e.)
1979	54	(2.1)	17.7	(.59)	33.9	(.34)
1980	52	(2.1)	18.9	(.60)	30.5	(.77)
1981	50	(2.2)	18.1	(.58)	31.5	(.88)
1982	49	(2.2)	18.5	(.68)	33.9	(.94)
1983	32	(4.4)	15.9	(1.6)	29.5	(2.4)

Note: All calculations are weighted by the individual sample weights for the appropriate year. Employment rates are for all individuals in twelfth grade in the given year. Hours worked last week is used to calculate average hours per week. Averages are conditional on working positive hours.

Table 2.5: Employment Rates, Average Hours and Average Weeks Worked in High School for Twelfth Graders, by Race and Sex

	White				Nonwhite			
	Men	(s.e.)	Women	(s.e.)	Men	(s.e.)	Women	(s.e.)
Employment Rate	59%	(2.0)	58%	(2.0)	38%	(2.2)	37%	(2.2)
Average Hours per Week	21.4	(.65)	19.0	(.52)	21.4	(.83)	18.6	(.87)
Average Weeks per Year	35.8	(.77)	33.7	(.81)	29.0	(.99)	27.6	(1.1)
Percent in Vocational Curriculum	25%	(1.7)	25%	(1.7)	21%	(1.9)	23%	(2.0)

Note: Employment rate is defined as individuals who reported positive hours last week and is the rate for the given cell. Average hours per week uses hours worked last week and is conditional on positive hours. Average weeks per year is calculated conditional on positive weeks. Being primarily in a commercial curriculum is included in the percentages for vocational curriculum.

Table 2.6: Employment Rates and Part-time Work for First Four Years After High School by High School Work Status, Sex, and Race

	Worked in HS				Did Not Work in HS			
	Year After High School							
	1	2	3	4	1	2	3	4
% Working								
White Men	81	82	84	83	72	76	79	82
[# obs]	[353]	[348]	[341]	[336]	[243]	[244]	[242]	[238]
White Women	88	91	90	89	67	79	84	82
	[330]	[334]	[324]	[320]	[277]	[272]	[273]	[297]
Nonwhite Men	80	70	72	77	60	65	71	74
	[184]	[184]	[183]	[183]	[303]	[301]	[297]	[295]
Nonwhite Women	78	71	80	81	47	62	69	68
	[167]	[168]	[166]	[166]	[297]	[295]	[295]	[290]
% Part-time								
White Men	21	15	8	9	18	15	9	7
White Women	32	23	17	17	34	18	22	16
Nonwhite Men	20	14	7	10	20	18	17	12
Nonwhite Women	33	22	17	13	32	26	22	24

Note: Number of observations is the total number in each cell, both workers and non-workers. % working is defined as percent of individuals reporting positive usual hours. Part-time is defined as working less than 30 hours per week.

Table 2.7: Average Real Wages and Female/Male Wage Ratios for First Four Years After High School by High School Work Status, Sex, and Race

	Worked in HS				Did Not Work in HS			
	Year After High School							
	1	2	3	4	1	2	3	4
Average Real Wage								
White Men	4.75	5.18	5.67	5.93	4.99	4.93	5.02	5.31
White Women	4.17	4.43	4.70	4.80	3.61	3.84	4.11	4.29
Nonwhite Men	4.80	4.80	5.61	5.88	4.30	4.79	4.90	5.10
Nonwhite Women	4.04	4.42	4.45	4.88	3.65	4.10	4.11	4.14

Female to Male Wage Ratios

	1	2	3	4	1	2	3	4
By HS Work Status								
White	.88	.86	.83	.81	.72	.78	.82	.81
Nonwhite	.84	.92	.79	.83	.85	.86	.84	.81
Work in HS/All								
White	.85	.87	.86	.84				
Nonwhite	.89	.92	.86	.91				
All/All								
White	.81	.82	.82	.80				
Nonwhite	.85	.88	.82	.83				

Note: Average real wages are conditional on working positive hours. Number of observations in each cell are the percentage working from Table 2.6. Female to male wages in the three panels are as follows: women who worked (did not work) in high school to men who worked (did not work) in high school, women who worked in high school to all men, all women to all men.

Table 2.8: Means of Variables used in Estimation by Sex, Race, and Work Status in First Year After High School

Variable name	Working				Not Working			
	White		Nonwhite		White		Nonwhite	
	Men	Women	Men	Women	Men	Women	Men	Women
tenure	11.2	9.1	9.8	8.2				
% married	7.7	15.1	6.3	11.5	3.4	37.5	2.0	17.2
% with children	3.9	6.9	5.9	19.6	2.2	21.6	1.0	37.0
% in bad health	3.3	5.2	3.3	6.7	5.2	2.9	6.0	5.4
unemployment rate	8.9	8.8	7.8	8.0	6.5	8.7	6.3	8.2
% in south	29.5	28.6	47.4	45.3	29.6	37.1	41.8	49.9
% in smsa	71.4	72.9	78.7	84.5	74.7	70.7	80.1	75.6
mother worked in 78	59.5	64.0	57.6	59.5	51.5	54.7	46.7	45.6
father worked in 78	82.4	82.4	64.6	67.3	72.1	74.5	62.1	58.7

Note Working is defined as usual weekly hours being greater than zero. All means are for the first year after high school.

Table 2.9: Probit Estimation of the Probability of Work in the First Year After High School

Dependent Variable: Work = 1 if hours > 0			
	(1)	(2)	(3)
female	0.22	0.27	0.28
	(1.24)	(1.65)	(1.57)
nonwhite	-0.06	0.06	0.05
	(0.39)	(0.38)	(0.28)
hs work	0.12		-0.04
	(0.93)		(0.23)
hs work*female	-0.01		-0.09
	(0.05)		(0.29)
hs work*nonwhite	.007		-0.18
	(1.09)		(0.47)
hs work hrs		0.01	0.01
		(2.30)	(2.10)
hs work hrs*female		-0.002	0.003
		(0.21)	(0.22)
hs work hrs*nonwhite		-0.003	-0.001
		(0.39)	(0.15)
voc. curr.	-0.08	-0.07	-0.08
	(0.47)	(0.42)	(0.46)
voc. curr.*female	0.17	0.15	0.16
	(0.69)	(0.61)	(0.65)
voc. curr*nonwhite	-0.05	-0.06	-0.05
	(0.20)	(0.21)	(0.20)
constant	2.06	1.95	1.96
	(5.31)	(5.05)	(5.03)
Log Likelihood	-640.88	-638.60	-635.5

Note: Absolute values of t-statistics in parentheses. Other independent variables included but not reported here are married, children,health, tenure, unemployment, if region south, smsa, mother's and father's grade, mother's and father's 1978 work status, and dummy variables for calendar year of entry. Interactions for female with married,children, and nonwhite are also included.

Table 2.10: Probit Estimation of the Probability of Work in the Second,Third, and Fourth Year After High School

Dependent Variable: Work = 1 if hours > 0			
	Year 2	Year 3	Year 4
female	0.45	0.45	0.65
	(2.17)	(1.10)	(1.35)
nonwhite	0.16	-0.47	-0.51
	(0.87)	(1.13)	(1.34)
hs work hrs	0.014	-0.0007	.004
	(1.84)	(0.01)	(0.24)
hs work hrs*female	-.005	-0.008	-.009
	(0.37)	(0.35)	(0.32)
hs work hrs*nonwhite	-.009	.020	*
	(0.76)	(0.88)	
voc. curr.	0.40	0.25	1.06
	(1.55)	(0.81)	(0.87)
voc. curr.*female	0.21	-0.22	-0.85
	(0.55)	(0.33)	(0.71)
voc. curr*nonwhite	-0.24	.005	*
	(0.66)	(0.21)	
constant	1.74	1.92	1.76
	(3.18)	(1.37)	(1.50)
Log Likelihood	-285.98	-60.77	-48.79

*This interaction was dropped due to collinearity.

Note: Absolute values of t-statistics in parentheses. Other independent variables included but not reported here are married, children, health, tenure, experience, unemployment, if region south, smsa, mother's and father's grade, mother's and father's 1978 work status, and dummy variables for calendar year of entry. Interactions for female with married, children, and nonwhite are also included.

Table 2.11: Log Real Wage Equation Conditional on Work, for the First Year After High School

Dependent Variable: Log Real Hourly Wage	(1)	(2)	(3)	(4)
female	-0.26	-0.24	-0.25	-0.26
	(5.34)	(5.30)	(5.13)	(5.31)
nonwhite	-0.06	-0.05	-0.04	-0.05
	(1.35)	(1.01)	(0.88)	(1.10)
hs work	-0.008		.007	
	(0.22)		(0.13)	
hs work*female	0.17		.07	
	(3.22)		(0.91)	
hs work*nonwhite	0.005		0.02	
	(2.84)		(0.81)	
hs work*nonwhite*female	-0.15		-0.14	
	(2.03)		(1.34)	
hs work hrs		-0.0002	-.001	-0.001
		(0.13)	(0.34)	(0.66)
hs work hrs*female		0.007	0.004	0.007
		(3.25)	(1.85)	(3.28)
hs work hrs*nonwhite		0.004	0.004	0.004
		(1.78)	(1.66)	(1.87)
hs work hrs*nonwhite*female		-0.004	-0.0002	-0.004
		(1.20)	(0.04)	(1.19)
voc. curr.	0.06	0.06	0.06	0.06
	(1.25)	(1.25)	(1.33)	(1.32)
voc. curr.*female	-0.06	-0.06	-0.06	-0.07
	(0.91)	(0.90)	(0.95)	(1.04)
voc. curr*nonwhite	-0.11	-0.11	-0.11	-0.10
	(1.41)	(1.40)	(1.48)	(1.26)
lambda				-0.24
				(1.27)
constant	1.37	1.37	1.37	1.40
	(15.10)	(15.02)	(14.94)	(14.27)
R^2	.13	.13	.14	.14
N	1426	1426	1426	1426

Note: Absolute values of t-statistics in parentheses. Other independent variables included but not reported here are married, children, health, tenure, part-time, unemployment, if region south, smsa, mother's and father's grade, mother's and father's 1978 work status, and dummy variables for calendar year of entry. Interactions for female with married, children, part-time and nonwhite are also included.

Table 2.12: Log Real Wage Equation Conditional on Work for the Second, Third, and Fourth Year After High School

Dependent Variable: Log Real Hourly Wage

	Year 2	Year 3	Year 4	
female	-0.23	-0.12	-0.18	-0.18
	(5.08)	(2.64)	(3.98)	(3.94)
nonwhite	-0.03	0.0002	-0.03	-0.01
	(0.71)	(0.01)	(0.58)	(0.25)
hs work hrs	0.0003	0.005	0.003	0.003
	(0.17)	(3.35)	(2.06)	(1.93)
hs work hrs*female	.007	-0.0005	0.0001	-0.0007
	(3.15)	(0.02)	(0.02)	(0.30)
hs work hrs*nonwhite	.001	.0001	0.002	0.003
	(0.32)	(0.88)	(0.89)	(1.03)
hs work hrs*nonwhite*female	-0.002	.0001	0.004	0.002
	(0.44)	(0.04)	(0.99)	(0.62)
voc. curr.	0.06	0.06	0.06	0.04
	(1.33)	(1.34)	(1.29)	(0.74)
voc. curr.*female	-0.07	-0.78	-0.02	0.02
	(1.01)	(1.17)	(0.36)	(0.31)
voc. curr*nonwhite	-0.07	-.001	-0.05	-0.04
	(0.97)	(0.01)	(0.70)	(0.53)
constant	1.52	1.57	1.53	1.67
	(17.21)	(18.08)	(18.49)	(19.33)
lambda				-0.31
				(4.13)
R^2	.11	.14	.15	.15
N	1529	1602	1597	1597

Note: Absolute values of t-statistics in parentheses. Other independent variables included but not reported here are married, children, health, tenure, experience, part-time, unemployment, if region south, smsa, mother's and father's grade, mother's and father's 1978 work status, and dummy variables for calendar year of entry. Interactions for female with married,children, part-time and nonwhite are also included.

Chapter 3

Early Nonwork and Wages

In the last two chapters I have focused alternatively on young men and women who are full-time continuous workers and men and women in high school. In this chapter I turn to young workers' experiences in between these two periods, often called the school-to-work transition. This transition period is a potentially important time in the work life of young people. It is a time when individuals go through job search and job matching processes and make choices about work. For many young people this transition involves relatively large periods of nonwork, both being unemployed and out of the labor force. The question I address in this chapter is whether these periods of nonwork are harmful in terms of lower future wages or are simply a natural part of this transition and do not involve permanent labor market penalties.

I am also interested here in how differences between men's and women's school-to-work transition period may play a role in later differences in labor market experiences. This paper analyzes the effect of men's and women's early nonwork on short-run future wages, and examines to what extent these differences contribute to lower starting wages for women.

Many studies have analyzed the effects of spells or time out of the labor force on women's future wages.[1] Most of these studies have concentrated on women who have been in the labor force for a period of time already before leaving for a spell. Because these studies deal with an older group of workers and at this stage men have little time out of the labor force, these studies focus only on women. Young men and women both experience spells of nonwork in the first years after high school, so this chapter differs from these studies in its comparison of results for men and women.

Other researchers have analyzed the impact of young workers' spells of nonwork on future employment and wages. Several studies have estimated the effect of young workers' spells of unemployment or nonwork on future work.[2] These studies have typically found that even controlling for individual differences, the longer an individual is in a spell of unemployment or nonemployment the higher the probability of the spell continuing, that is the probability of re-employment falls.

Ellwood [1982] looks for evidence of a "scarring" effect of early nonwork on future employment using a sample of young men from the National Longitudinal Survey of Young Men who left school in 1965 through 1967. He finds that there is a significant relationship between early experience and short-run future experience, but the effect is small. He also finds no long term effects on employment. Corcoran [1982] studies the effects of early nonwork on women's employment using data from the NLS young women who finished high school between 1966 and 1968. She finds strong persistence in the employment behavior of young women. Nonemployment in the early career,

[1] For research on the effects on wages of time out of the labor force see Mincer and Polachek [1974], Corcoran [1979], Corcoran and Duncan [1979], Mincer and Ofek [1982] or Sundt [1987].

[2] Lynch [1989] analyzes the duration dependence of the first spell of nonwork after starting work, Stephenson [1982] analyzes women's time between school and first job, and Hill [1990] analyzes the determinants of exit from spells of work and nonwork for young women.

at least for young women, is associated with a higher probability of nonwork.

Both Ellwood and Corcoran also look at the impact of early spells of nonwork on wages. Ellwood finds a large impact of early experience on men's wages in the short-run. Each year of experience is associated with a 10 to 20 percent increase in wages in the first four years. Corcoran finds that women's early periods of nonwork are associated with significantly lower wages even in the long-run. A four year spell of nonwork lowers white women's wages by 6 percent and black women's wages by 3 percent twenty years later. These studies show strong impacts of nonwork on wages. Becker and Hill [1983], also using the NLS Young Men sample but a different estimation methodology than Ellwood, find no negative effects of teenage unemployment on white males. In fact, they find some evidence of positive effects of nonwork on future wages.

All of these studies are estimating these impacts for individuals who left high school in the 1960s. The different data sets and methods used do not allow direct comparison of the differences in the relationship between nonwork and wages for young men and women. None of these studies directly compare men and women. Using data from the National Longitudinal Study of Youth, I compare the relationship of nonwork and wages for young men and women who left high school in the late seventies and early eighties.

The rest of the chapter is outlined as follows. The next section discusses theories of why nonwork may have a negative effect on wages and the possible extent of this impact. I then discuss the sample I use in this chapter. The fourth section examines the amounts of nonwork young people experience. I find that both young men and women experience large amounts of nonwork in the first years after high school. I also find that on average young women experience more weeks of nonwork than young men. However when considering only individuals who worked at least part of the year, the difference between men's and women's nonwork is only about three weeks per year. In the fifth section I present my estimation framework. I discuss the problems of heterogeneity and endogeneity and some possible corrections. The results of the estimation to ascertain the effect of early nonwork on wages are presented in the final section. Heterogeneity bias is found to be a significant factor in the correlation between wages and nonwork.

After correcting for heterogeneity bias, I find that the number of weeks worked in the first year after high school has an initially significant effect on men's and women's wages in the following year. Working 26 weeks compared to 52 weeks in the first year after high school is associated with from 5 to 8 percent lower wages in the following year for men and from 6 to 8 percent lower wages for young women. However, I find the effect of weeks worked on wages diminishes over time. There is no effect for men or women of weeks worked in the third year on wages in the fifth year. In general, I find the effect of nonwork on wages to be the same for men and women. Although women earn on average 80 percent of men's average wages in the fifth year after high school, early periods of nonwork cannot account for any of this difference.

3.1 Why Nonwork Matters

There are several theories that predict that early periods of nonwork[3] may lead to a decrease in future wages. Human capital theory says that through work experience individuals gain general and specific capital valuable to employers that can lead to workers earning higher wages. Workers with less experience may therefore earn lower wages *ceteris paribus*, whether the period of nonwork was voluntary or involuntary. The extent of this connection between early nonwork and future wages depends on the degree to which a young worker is building up human capital on the job. If the type of job held provides very few skills to a worker, either specific to that job or more generally applicable, then the value of experience and therefore the "penalty" for lack of experience should be small. Although many of the early jobs of young workers just leaving high school are low-paying service occupations which might be characterized as "dead-end" jobs, it is unclear *a priori* to what degree this experience will be valued by future employers.[4]

A second theory says that employers may use early nonwork as a signal providing information on the type of worker an individual is. Employers may perceive nonwork to be a signal of lack of motivation, immaturity, or lack of attachment to the labor force. Employers may be more likely to interpret women's nonwork as lack of

[3]For young workers the distinction between unemployment and out of the labor force is not always clear. Especially when comparing young men and women, there may be differences in how these two groups report the same experience of nonwork. For example, there may be a greater stigma on young men to report they are out of the labor force than on young women. In addition, for young people periods of looking for work and not looking for work may be harder to distinguish. Ellwood [1982] and others confine their analysis to periods of not being employed, or nonwork. Throughout this paper I am concerned only with periods of nonwork, which I define as the total of unemployment and time out of the labor force.

[4]In chapter 2 we learned that high school work experience, which is even more likely to be accumulated at so-called "dead-end" jobs, still has a positive effect on future wages.

attachment to the labor force if it is coupled with having children. In this case, the possibility of negative signals especially applies to women in their child-bearing years. In this sample, 57 percent of the women have children by the end of the fourth year after high school.[5] Again, whether voluntary or involuntary, nonwork as a negative signal can lead to lower wages.

Dual labor market theory and theories of the underclass also lead to the conclusion that nonwork can in some cases have a negative impact on young peoples' wages. Over and above not gaining new human capital, time not employed may lead in some sense to "destruction" of human capital in young people. If young people perceive they have little chance to "make it" in the work world, spells of nonwork may lead to lower attachment to work, and to behavior (such as crime) that further reduces the chance of moving toward higher paying jobs. This theory is primarily applied to poor and minority youth who have few opportunities and may perceive they have little chance at the "American Dream"(see Wilson [1987]).

It is important to note that all three of these theories may also have the effect of decreasing the probability of future work, by making it more difficult to obtain a job, decreasing work attachment, or possibly leading workers to leave the labor force as discouraged workers. If nonwork actually has a significant effect on future wages, some individuals may also choose to stay out of the labor force after an initial period of nonwork given expected low wages relative to their reservation wage.

In addition, it is not necessarily true that all nonwork in the early labor force

[5]Although this sample over represents nonwhites, the percent of women with children is high for whites and nonwhites. Of white women, 49 percent have children by the end of the fourth year after high school and 68 percent of nonwhite women do.

experiences of young people is detrimental. Nonwork can be a voluntary decision. It may be a time for young people with relatively little attachment to the labor force to "grow up" or "mature" while holding intermittent jobs (see Osterman [1980]). It may also be a legitimate period of job search. Theories of job matching that predict high levels of turnover for young people searching for a good match may also lead to periods of nonwork (see Topel and Ward [1988]). In this case nonwork may be an integral part of movement towards steady jobs. Research by Becker and Hills [1983] on the effect of time unemployed on white and black young workers' wages found that time not working can even be associated with higher future wages. They found that there was a positive relationship between wages and previous time unemployed for white men and for black men. They conclude that time spent unemployed may be a result of job turnover and can be beneficial.[6]

An important consideration as well is that although some theories predict a negative impact of early periods of nonwork on wages, the question remains as to the extent of this impact. Is there a permanent "scarring" effect of nonwork on workers' wages? Do negative effects of early nonwork on wages diminish over time and the wages of workers who have experienced early periods of nonwork eventually "catch up" to the wages of similar workers who did not experience early nonwork? To answer this latter question effectively for the long-run requires wage data for many years after workers have entered the labor market. Unfortunately, I do not have such a long time series of data.[7] However, it is possible to look at the effect of early nonwork on

[6]Becker and Hills [1983] used data from the NLS young men's cohort for workers who left high school in the late sixties. The effects of unemployment in the first years after high school are measured on wages in 1976.

[7]My sample from the NLSY allows me to observe five years after an individual finishes high

wages in the short-run. If an initially negative effect diminishes over time, then we know the scarring effect of early nonwork is not permanent and the cost is mainly lost wages in the short-term.[8] However, if an initial relationship between nonwork and wages remains strong over time, this is evidence of a more permanent scarring effect, although I will still be unable to conclude whether wages catch up at some later time.

There are several reasons why we might expect the effect of early nonwork on future wages to diminish over time. First, although an individual who has had spells of nonwork has less work experience initially, as time passes this early nonwork becomes a smaller percentage of total "potential" experience, and is therefore less important for future wages. It is also possible that as time passes, the signal of early nonwork becomes less important to potential employers who may be more interested in recent past work experience. Long spells of work after an early spell of nonwork may mitigate against employers perceptions of nonwork as a signal of lack of attachment to work or motivation.

In addition to the effects of nonwork on future wages, I am also interested in possible differences between men and women in this relationship. There are three possible differences between men and women in this regard. First, women's and men's nonwork may have different effects on their initial wages. This different return to experience for men and women could be because employers interpret nonwork differently for men and women, or because negative effects of nonwork on "employability" are different across genders. Second, the relationship between nonwork and wages may change

school.

[8]This does not take into account potential effects of nonwork on future participation.

differentially over time for men and women. One scenario is that employers may perceive men's early nonwork as a sign of immaturity and less important as time passes, but perceive women's early nonwork as a signal of future lack of commitment to the labor force and therefore having a more permanent negative effect. Finally, even if a similar relationship between nonwork and wages exists for men and women, if men and women have different amounts of nonwork early in their work life, a difference in average wages may result.

All of these theories present reasons why nonwork may have a causal impact on future wages. However, when trying to measure this effect, it is possible to find an empirical relationship between nonwork and wages that is not causal due to heterogeneity bias. If variables that have a direct effect on both nonwork and future wages are omitted from the estimation then even if there is no true relationship we may estimate a significant relationship. One of the most common examples of this omitted variable is ability. Low ability individuals may work less early on and have lower future wages. Another example is whether an individual is a hard worker. Since I am interested in comparing the relationship between nonwork and wages for men and women, one potentially important possibility is that expectations of future work, which is likely to differ across men and women, may be a source of heterogeneity bias. In the estimation section I discuss in heterogeneity in more detail and describe some ways to try to disentangle this bias from the true effect of nonwork on wages.

3.2 The Data and Sample

The analysis in this chapter is limited to high school graduates and dropouts who do not return to school for the next five years after leaving high school.[9] The data used is from the National Longitudinal Survey of Youth from 1979 to 1988. I use observations from both the cross-section and poverty samples of the NLSY which together surveyed 11,406 young people in 1979. The NLSY allows me to observe when students leave high school and their entire labor market history through 1988. My sample is made up of high school graduates and dropouts for whom I have data for four years after high school. I only include students who left high school from 1978 through 1983.[10]

The sample is made up of individuals who do not return to school in the first four years after leaving high school. I make this restriction because I do not want to capture periods of nonwork due to schooling in my measure of nonwork. Schooling is a human capital investment that is generally expected to increase future wages. Nonwork due to schooling is not part of the concern for possible difficulties in the transition from school to work and possible scarring effects of not working. It is nonwork outside of schooling that is of primary interest here.

I include high school dropouts in this analysis because their labor market experiences as a group are an important dimension of current concerns about the school-to-work transition period. I define dropouts as individuals who left school after the eighth grade but did not graduate from high school. Including dropouts does not pose

[9]This sample is the same as the sample used in the last chapter with a few exceptions.

[10]In 1979, the first year of the survey, information was gathered for the past year, so I have work and school data for these individuals.

a problem in this chapter because the existence of spells of nonwork after schooling are not determined in connection with the decision to drop out, although some of the same factors may lead to both phenomena. In general I do not estimate separate models for high school graduates and dropouts, but I do control for being a high school graduate.

The final sample is comprised of 3,119 young people, 51 percent men and 49 percent women. Wages are the wage of the job held at the interview date, deflated by the CPI. To eliminate differences in experience between school ending dates and the first interview date, I refer to the year following the first interview date after high school as the first year after high school, or the first full year out of school. Wages are measured at the beginning of the year so that w_2 refers to the wage at the beginning of the second full year after school and wks_1 refers to the weeks worked in the year immediately preceding that wage observation.

3.3 Nonwork and the School-to-Work Transition

Before analyzing whether nonwork has an effect on wages and whether there are differences in this relationship between men and women, I examine whether men and women experience different amounts of nonwork in the early years after high school. One measure of differences in work (and therefore nonwork) is the employment rate, defined as the percentage of weeks worked in a year.[11] The first column of Table 3.1 lists the employment rates for men and women for the first four years after leaving high school.

[11] I actually define the employment rate as the number of weeks worked between interview dates divided by the total number of weeks between interview dates. This is approximately a year.

Both men and women experience a significant amount of nonemployment in the first full year after high school. Men are not employed for almost 40 percent of this year and women for almost 50 percent on average.

However, both men's and women's employment rates increase over time. On average, women worked 50.8 percent of the weeks in the first year after high school, and this increased 9 percent to 55.6 percent of the weeks in the fourth year after high school.[12] Men worked 61.7 percent of the first year after high school and this increased 16 percent to 71.8 percent of the weeks in the fourth year after high school. This pattern is consistent with the results Ellwood [1982] found for young men but in contrast to the results Corcoran [1982] found for young women. Corcoran found that the employment rates of young women who finished high school in the late 1960s fell over the first years after high school. However, despite increasing employment rates in this more recent sample, women work a lower percentage of the year than men in every year reported.

This upward trend in employment rates may indicate increasing attachment to the labor market over time. However, it may mask some of the differences in cohorts in the sample due to the recession of the early eighties. The first year out of high school for individuals in this sample ranges from 1979 to 1984. The highest rates of unemployment in the recession were in 1982 or 1983 (depending on the age and race group you are considering.) This high point ranges from being the first year to the fifth year after leaving high school for different cohorts of the sample, and therefore has conflicting effects on the employment pattern over time. Students who left high

[12]This difference is significant at the 1 percent level.

school in 1978 may have experienced more difficulty in finding jobs in the later years of our sample, and thus have a flat or even decreasing profile of employment rates and probability of employment. For students who left high school in 1982 or 1983, a profile of increasing employment may just be reflecting decreases in the total unemployment rates versus increased attachment to the labor market.

The second and third columns in Table 3.1 look at the cohort who left high school in 1978 and the cohort that left high school in 1982 and 1983. Average employment rates do decrease or remain the same for men and women over time for the 1978 cohort, but increase over time for the later cohort. In fact, for the cohort leaving school during the peak of unemployment, men and women have similar increases in employment rates over time, 27 percent. This may be a "true" pattern of increased attachment to the labor market, or it may reflect differences in how unemployment affects men and women. Either way, employment rates for women in this later cohort are still lower than those of men in every year.

Another measure of nonwork is the probability of being employed during the year, defined as the percent of individuals with weeks worked greater than zero. Table 3.2 shows the probability of employment for men and women over time. The probability for young men increases with time. Men not only work more weeks on average over time, but more men are working. Women, however, have roughly the same probability of employment over time. This steady probability of work together with women's increasing average weeks worked may indicate that there are not more women working every year, but the same group of women are working more weeks over the years. This would also mean that there is a group of women who do not work in the first year after leaving school and continue to not work. In fact, eight percent of the women in the sample do not work for pay at all in the four years after high school compared to four percent of the men in the sample.

The differences between men and women in weeks spent not working is smaller when considering only individuals who worked at least one week in each year. The third and fourth column of Table 3.2 show the employment rates for men and women who worked at least one week in each respective year. Although women's employment rates are lower than men's they are closer than when women who did not work at all were included. The employment rate for women also increases over time. Men who worked at least one week spent 27.4 percent of the year not employed and women spent on average 32.7 percent of the year not employed. This is only a difference of about three weeks.

In addition, there are significant differences in the distribution of men's and women's employment rates. Men's and women's employment rates for the whole first four year period after high school are broken into four levels in the second panel of Table 3.2, working 0-25 percent of all weeks, 26-50 percent of all weeks, 51-75 percent or 76-100 percent. Over the first four full years of work after high school, more women worked from 0 to 25 percent of the weeks than men and less women worked from 75 to 100 percent of the weeks than men. Men are concentrated in the highest of the four weeks-worked categories with 51.5 percent of men working more than 75 percent of the weeks in the first four years. Women are split between the lowest category of work and the highest category. This is further evidence that there is a large group of women who work very few weeks in the first years after leaving high school and a group who work more continuously.

Nonwork is also persistent over time for individuals in this sample. Table 3.3 shows the probability of working all of the weeks in the fourth year of high school by the percentage of weeks worked in the first, first and second, and first, second, and third years after high school respectively. It is clear that for men and women, the greater the percentage of weeks worked in previous years, the higher the probability of working all the weeks in the fourth year. This persistence of nonwork is found in other research. For example, Lynch [1989] using the NLSY data has found that negative duration dependence exists within young men's and women's early spells of nonwork.[13] I do not estimate the effect of nonwork on future nonwork in this sample, but the existence of persistence in nonwork needs to be considered in the estimation of the effect of nonwork on wages. I discuss this further in the next section.

Both women and men experience large amounts of nonwork in the first four years after high school. Women in general work fewer weeks than men. However, when only considering individuals who work at least one week of the year, the differences are smaller, on average of only 3 weeks per year. It is also true that nonwork for these young workers seems to increase the probability of future nonwork.

3.4 Estimation Framework

We can model the wages of young workers in a given year t as

$$wage_{it} = EXP_{it}\delta_t + X_{it}\beta_t + \varepsilon_{it}$$

[13]Lynch finds these results analyzing the first spell of nonwork after an individual has begun working and is out of school.

where EXP_t is the number of weeks worked up to time t since leaving high school and $wage_t$ is the wage at the end of year t. The coefficient δ_t measures the effect of a week of past work experience on the current wage. I am interested in estimating the effect of weeks not employed on wages over time.[14] I want to be able to estimate whether different years of work experience (or lack of work experience) have a different effect on wages. To allow a differential effect of experience over time, I follow Ellwood [1982] and break total experience up into weeks of experience per year. This can be written as follows:

$$wage_{it} = \sum_{j=1}^{t-1} \alpha_{t-j} wks_{it-j} + X_{it}\beta_t + \varepsilon_{it}$$

where wks_t refers to the number of weeks worked in a given year t. Here α_{t-j} measures the effect of a week of work in year t-j on wages in year t. If early nonwork has a lasting short-run effect on wages, than we would expect to see that weeks worked in the first year after high school would have a significant effect on the wage at the beginning of the fifth year after school. If the effect of weeks worked in the first year after high school has a decreasing effect on wages as time passes, that is the effect of wks_1 on $wage_2$ is greater than the effect of wks_1 on $wage_5$, then there is less evidence of a permanent "scarring" effect of early nonwork.

The least squares estimates of the coefficients on weeks worked cannot be interpreted as the true causal effect of nonwork on wages because of potential heterogeneity bias. The two-equation system determining wages and labor supply listed below il-

[14]Weeks of nonwork and work add to a constant, so I can use either measure in this estimation. I use weeks worked throughout in keeping with the standard assumption that work experience is a determinant of wages. I interpret a positive effect of weeks worked as a negative effect of weeks of nonwork.

lustrates this bias.

$$wage_{it} = \sum_{j=1}^{t-1} \alpha_{t-j} wks_{it-j} + X_{it}\beta_t + \phi_i + \varepsilon_{it}$$

$$wks_{it} = \delta_t wage_{it} + X_{it}\gamma_t + \phi_i + \mu_{it}$$

In both equations ϕ_i represents person specific factors such as ability or motivation that are unobservable in the data. These factors are related to both wages and weeks worked in a given year and as modeled here are unchanging over time. Because the weeks worked decision in past years is also affected by ϕ_i, there is a non-zero correlation between wks_{t-1} and the error term in the wage equation. If the equation is estimated by least squares the estimates of α_t will be biased. An estimated positive effect of weeks worked in a previous year on current wages may be reflecting that a more motivated person may work more weeks in a year as well as be paid higher wages, rather than a true effect of work on wages. In the extreme, weeks worked in a year may have no true relationship to future wages, even if a positive relationship is estimated.

Since I am primarily interested here in whether there is a differential effect of nonwork on men's and women's future wages, it is important to consider how heterogeneity bias may differ across genders. In particular, a concern when measuring the effect of nonwork on women's future wages is whether expected future labor supply is a potential source of this bias. Even though the difference between men and women in amounts of nonwork in the first four years after leaving high school are relatively small, on average women have lower labor force participation rates over their lives than men.[15] Therefore expected labor force attachment may differ between men and women entering the labor force.

Expecting to work less in the future may affect present labor supply decisions. Individuals with low expectations of future work may work fewer weeks now because they have a high value of non-market time and therefore a higher reservation wage. It may also be true that an individual may expect to work fewer weeks in the future because of factors such as being married or having children or plans for children and this leads to fewer weeks worked in the present. If labor supply is lower currently due to expectations of low future labor force attachment, that is ϕ leads to lower wks_t, and nonwork has a true negative affect on wages in year t+1, $\alpha_t < 0$, then this unmeasured expectation will indirectly lead to lower wages. The coefficient on wks in the wage equation will capture both the direct effect of nonwork and the indirect effect of this unobserved factor. The estimate of α_t will be unbiased if ϕ is not a direct determinant of wages.

If expectations of future labor market supply do affect wages directly, then the estimated coefficient on weeks worked in the wage equation will be biased. Expectations of low labor force attachment will affect wages directly if not only labor supply decisions are affected, but the type of job held or the career path chosen leads to lower paying jobs in the future.

One way to limit the bias due to unobserved factors is to control for characteristics that are correlated with these factors. Corcoran [1982] includes controls for labor

[15]This difference exists for older cohorts. Future labor supply differences between men and women of this cohort may not be as large.

force attachment in estimating the effect of women's nonwork on wages. She includes measures such as absenteeism due to own and others illness, voluntary restrictions on hours worked, and whether individual plans to leave work in the near future.[16] I do not have such specific controls for labor force attachment per se. However, I do include controls that may be correlated with unobserved factors and therefore remove some of the bias of the estimated effect of nonwork on wages. In estimating the wage equation I include controls for family background including mother's and father's grade level and whether mother and father worked in 1978, and occupation in the first year after high school. Both of these sets of variables may be correlated with expected future labor force participation or other unobserved factors leading to heterogeneity bias. The background variables provide some measure of the individual's family environment and possibly influences on decisions. Initial occupation may be chosen taking into account future labor supply expectations.[17] I compare the coefficients on nonwork before and after including these controls.[18]

It is likely, however, that including these controls will not eliminate all of the bias introduced by heterogeneity. Assuming the person-specific unobserved factor for an individual is constant over time, the bias can be eliminated by implementing a fixed effects correction. Because I assume the heterogeneity is constant, differencing two wage equations or removing from each wage equation the mean of all four wage

[16]In her study, these controls decrease the estimated relationship between work experience and wages and periods of time not working and wages. However, the differences are small and her study is of an older cohort of women.

[17]Polachek [1979] discusses how women who expect to work intermittently may choose occupations with lower rates of skill atrophy when out of the labor force.

[18]Other variables that I expect to affect wages directly as well as being correlated with unobserved factors are included in the equation as well. These variables are current occupation, hours worked on the job, and whether married or have children.

equations for each individual eliminates heterogeneity.

I first correct for heterogeneity by differencing two wage equations. In this estimation I allow the effect of weeks worked on wages for a fixed time difference to vary as years in the labor market increase. That is, the effect of wks_t on $wage_{t+1}$ may differ from the effect of wks_{t+1} on $wage_{t+2}$. This relationship may decrease with time because additional weeks of human capital investment may have a smaller effect on wages as the stock of human capital measured by total experience increases. On the other hand, weeks worked may have an increasing effect on wages a fixed time period in the future. Nonwork in the fourth year may have a bigger impact on wages in the fifth year than nonwork in the first year has on the second years wages if more recent periods of nonwork are a greater negative signal than nonwork which occurred farther in the past. Although I only have four years of data after entry so the time differences are not large, the possibility suggests it may be important to allow the coefficients to vary over time. The form of the differenced wage equation for two adjacent years allowing the wage effect to vary over time is

$$\begin{aligned} wage_{it} - wage_{it-1} = \alpha_{t-1} wks_{t-1} &+ \sum_{j=2}^{t-1} (\alpha_{t-j} - \alpha'_{t-j}) wks_{it-j} \\ &+ (X_{it}\beta_t - X_{it-1}\beta_{t-1}) + \varepsilon_{it} - \varepsilon_{it-1} \end{aligned}$$

where α is not restricted to equal α'. Estimation of this equation gives α_{t-1} which is the effect of wks_{t-1} on $wage_t$. All the other estimated coefficients on past weeks worked are the difference between the effect on wages in year t and year $t-1$. Differencing wage equations of greater than one year lag allows direct estimation of the effect of weeks worked on wages for more lagged values of weeks.

One of the coefficients of greatest interest is the effect of weeks worked in the first year after leaving high school on the fifth year's wages. This effect is represented by the coefficient α_{51}, where the first subscript stands for the year of the wage equation, and the second subscript stands for the year of the weeks worked variable. This is the largest lag in my data and comparing this to the effect of more smaller lags of work on wages allows me to consider the permanence of early nonwork's effects on wages for men and women. Unfortunately, estimation of a differenced wage equation does not allow me to recover this coefficient. I can estimate the difference between the fifth and second year wage equations which allows me to estimate $\alpha_{51} - \alpha_{21}$, the difference between the effect of weeks worked in the first year after school on fifth year and second year wages. This coefficient is of interest itself because it can tell us whether the effect of nonwork in the first year after high school is increasing, decreasing or remaining the same over time. If this coefficient is positive, weeks worked in the second year have greater effect on fifth year wages than on second year wages. If it is negative, than weeks worked in the first year after school have a greater effect on second years wages than on first years wages. If nonwork has a negative effect on future wages and this effect decreases over time, than I would expect this coefficient to be negative.

This estimated coefficient does not allow for a comparison of whether nonwork has a different absolute scarring effect on men and women. To be able to make this comparison, I can look at the coefficient α_{52} which is the direct affect of work in the second year after high school on the fifth year's wages. This measures a shorter lag between weeks worked and wages, but is still informative about the effect of work on wages and the persistence of this effect over time.

The differenced wage equation eliminates the problem of fixed heterogeneity. However, since weeks worked are endogenous in the differenced wage equation there are other problems in estimating this equation. First, past weeks worked, wks_{t-1}, is positively correlated with ε_{t-1} because $wages_{t-1}$ are a determinant of labor supply in year $t-1$. This bias will lead to lower estimates of the relationship between weeks worked and wages, or a smaller estimated effect of nonwork on wages. If weeks worked are exogenous, that is wages are not a determinant of labor supply there is no bias, but this is unlikely. The bias will not be as strong if wages are only weakly connected to weeks worked. In addition, if wage equations more than two years apart are differenced, all lags of weeks worked that we can estimate the coefficient directly are endogenous.

To correct the endogencity, it is necessary to instrument for weeks worked in the differenced wage equation. It is difficult to find variables that are correlated with past weeks worked but not correlated with current or lagged error term ε in the differenced wage equation. In any difference equation which uses wages more than one year apart, I need to instrument all lags of weeks worked that are contemporaneous or more current than the years of the dependent variable. For the difference equation of wages in the fifth and second years, this means instruments are necessary for weeks worked in the second, third, and fourth year. Since I do not have enough valid instruments, I cannot implement this strategy.[19]

[19]Ellwood [1982] suggests that in a differenced wage equation if weeks worked in a year previous to either wage year does not have a differential effect on wages in these two years than it can be removed from the equation and used as an instrument for future weeks worked. The two weeks worked variables are correlated and the past weeks work predates either wage so is not correlated

A second concern is that since past wages are a determinant of past weeks worked, if wages are serially correlated then wks_{t-1} worked will be correlated with ε_t. If endogeneity introduced through differencing is not a strong bias, than serial correlation will also be less of a problem since this bias also operates through wages as a determinant of labor supply. I do not control for problems introduced by serial correlation. This potential bias must be kept in mind in interpreting the results.

Another way to estimate all four wage equations is to stack the four equations and estimate a fixed effect model. The four wage equations I want to estimate are listed here, suppressing the individual subscript.

$$\begin{aligned}
wage_5 &= X_5\beta_5 + \alpha_{54}wks_4 + \alpha_{53}wks_3 + \alpha_{52}wks_2 + \alpha_{51}wks_1 + \phi + \varepsilon_5 \\
wage_4 &= X_4\beta_4 + \alpha_{43}wks_3 + \alpha_{42}wks_2 + \alpha_{41}wks_1 + \phi + \varepsilon_4 \\
wage_3 &= X_3\beta_3 + \alpha_{32}wks_2 + \alpha_{31}wks_1 + \phi + \varepsilon_3 \\
wage_2 &= X_2\beta_2 + \alpha_{21}wks_1 + \phi + \varepsilon_2
\end{aligned}$$

Again assuming the person specific unobserved factors, represented by ϕ, are constant over time, I can remove the mean of the four equations for each individual from each equation. This eliminates the heterogeneity bias in estimating these equations. However, there is still endogeneity bias for several reasons. First, if there is serial correlation in wages as described above, lagged weeks will be correlated with the current wage equation error term. Second, the mean of the individual error terms, $(\varepsilon_5 + \varepsilon_4 + \varepsilon_3 + \varepsilon_2)/4$, is correlated with lagged weeks worked. As the number of

with the error. In estimation, I find these variables to in most cases be significant, and therefore they cannot be used as instruments. Ellwood does not find endogeneity to be a problem in his sample of young men, so does not implement instrumental variables.

observations per individual increase, this sum goes toward zero. However, in this relatively small panel, the endogeneity persists. It is necessary to keep this in mind when interpreting the results.

If I allow each year of weeks worked to have a different effect on each of the four years of wages, I will have ten different parameters on weeks worked to estimate for these four equations. This is because there are different numbers of lags for different wage years. Wages in a given year after high school depend on all lagged values of weeks worked, however there is only one lag for wages in the second year while there are four lags of weeks worked determining fifth years wages. This is not a truncation problem, because these workers are just entering the labor market, and so in some sense other lags do not exist.

I cannot estimate separately all of these ten coefficients because weeks worked in the first year after high school appears in all four equations. In order to estimate the coefficients on weeks worked in the second, third, and fourth years after school, I drop one of the weeks worked in the first year variables. The estimated coefficients of effects of weeks worked in the first year on the remaining three years' wages are the difference of the actual effect and the effect of the variable that is not estimated. In this way even though I cannot estimate the actual level effects of weeks worked in the first year on future years wages, I can still examine the pattern of how weeks worked in a given year effects wages in future years.

One final concern in estimating the effect of weeks worked or nonwork on wages is the possibility that nonwork spells also have an effect on the probability of future work. In the previous section, I showed evidence indicating that nonwork in the first years after high school is associated with a greater probability of nonwork in the future. I can only estimate the effect of nonwork on wages of those individuals who are working at the time wages are observed. If nonwork in the first year after high school leads to a higher probability of not working in future years either through a lower expected wage or because nonwork itself increases the probability of more nonwork, the sample of individuals working in the fifth year will over represent individuals with lower amounts of nonwork.

The bias introduced by not including individuals with higher probabilities of nonwork is likely to be in the direction of decreasing the estimated effect of nonwork spells on future wages. If nonwork does have a negative effect on wages then those who have the largest amounts of early nonwork and are not working in the fifth year may be assumed to have even lower expected wages than those who are working. This would mean that those with the most negative relationship between early nonwork and wages are not in the sample, so that the estimates of the true effect of nonwork on wages may be biased downward.

I attempt to control for this selection bias following the two-step procedure outlined in Heckman [1979]. I first estimate the probability of working at the interview date in the fifth year, and use the inverse Mill's ratio as a regressor in the wage equation for the fifth year. I estimate the probability of work in the fifth year after high school using a probit specification and controlling for total weeks worked, schooling, race, marital status, children, local unemployment rate, smsa, south, health status, spouse's income, and indicator variables for the year left high school. I then calculate the inverse Mill's ratio, lambda, which is the conditional expectation of the residual from a labor supply equation with workers and nonworkers included. Changes in the parameters from the estimation without this selection bias correction would indicate that there are important differences across the working and nonworking sample that effect the measured relationship of nonwork and wages.

3.5 Results

3.5.1 Early Work Experience and Wages

In order to find the relationship between early nonwork and wages for men and women I first estimate the wage equation for the fifth year after high school for men and women separately.[20] The dependent variable is the log real wage at the interview date for the fifth year after high school. Weeks worked in the past four years, wkw_1 through wks_4, are included as determinants of wages. Other independent variables included in the estimation are whether the individual finished high school, is currently working part-time (less than 30 hours per week), is nonwhite, is married, has any children, lives in an smsa or in the south, the local unemployment rate, and the occupation of the current job. Also included are indicator variables for the calendar year an individual left high school. These indicator variables and the local unemployment rate attempt to control for the differences in the labor market across the years of my sample. Means of these variables are listed in Table 3.4.

The results of the estimation for the fifth year after high school are shown in Table 3.5. The estimates for men are in column 1 and the estimates for women are in column 4. The results for men show a general pattern of decrease in the effect of

[20]Separate estimation for each year was carried out and will be discussed later.

weeks worked on fifth year wages as potential labor market time, that is time since leaving high school, increases. The number of weeks worked in the first year after high school has a lower effect on wages in the fifth year than weeks worked in the fourth year have on fifth year wages. Working 26 weeks versus 52 weeks in the fifth year after high school is associated with a 4 percent decrease in wages in the fifth year, while the effect of the same difference in work in the first year is associated with only 2 percent lower wages.[21] In addition, the relationship between weeks worked in the first year and fifth year wages is not very significantly different from zero (p-value=.26).

The estimated relationship between past weeks worked and wages is generally greater for women than men, and the effect does not diminish over time. In this estimation weeks worked in the first year after school have as large an effect on wages four years later as weeks worked in the fourth year have on wages the next year, a 6 percent decrease associated with working the whole year versus half the year. A joint test for whether the coefficients of the regressions for men and women are the same strongly rejects.[22] The estimated effect of weeks worked in the first year after high school on wages four years in the future is greater for women than men.

The other determinants of wages behave as expected. Being a high school graduate is associated with higher wages for men and women, as is living in an smsa or in a region other than the south. Unemployment has a strong negative effect on wages for men and women. Being married has a positive connection with wages for men, but not for women. Having children is positively related to wages for men, and negatively

[21]This calculation is made using the average values for men of other characteristics.

[22]This test has a p-value<.001. The test for whether the two equations only differ by a female constant also rejects with a p-value of .01.

for women, although neither relationship is significant. Controls for year left high school and current occupation are also included in the estimation.

These estimates indicate that women's nonwork may have a larger effect on future wages than men's early nonwork. However, as discussed in the previous section, these results may not be causal. Working fewer weeks in the first year after school (or any of the first four years) may be determined in part by some unobserved factor which also affects future wages. I first attempt to decrease the heterogeneity bias by including other variables that may be measures of the unobserved factors. I include two sets of measures: occupation in the first year after high school, and what I will call background variables, mother's and father's grade level and whether they worked in 1978. If these controls are correlated with unobserved heterogeneity, I expect the positive relationship between weeks worked and wages estimated above to decrease. The results of estimation including these additional controls are shown in Table 3.5 in columns 2 and 5 for men and women respectively.

The results for women show that adding these controls do lead to lower estimates of the effects on wages in the fifth year of weeks worked in the previous four years. The decreases are significant, but relatively small. For men, several of the estimated relationships increase and the significance of these estimates also increase for the most part. These additional variables seem to be controlling controlling for some correlation between unmeasured factors and weeks worked. However, the relatively small changes simply be an indication that there is still unobserved heterogeneity in the equation even after including these controls.

Another concern in interpreting these results is the possibility of selection bias from not including nonworkers wages in the wage equation. I correct for this bias using the 2-step Heckman correction procedure describe in the previous section. The results of the corrected wage equation are shown in columns 3 and 6 of Table 3.5. The correction makes little difference in the estimated coefficients for men or women. The coefficients on weeks worked are generally larger but only by a small amount. The conditional expectation of the probability of work, lambda, is small and not statistically significant in either equation. These results suggests that selection bias may not be a large problem for this sample.

In order to further correct for remaining heterogeneity bias even after including controls, I assume the unobserved individual-specific factors leading to biased estimates are fixed over time and estimate a differenced wage equation. I first estimate the difference between wages in the fifth year and the second year after leaving high school. This allows me to directly estimate the effect of weeks worked in the second, third, and fourth year after high school on wages in the fifth year. The results of this estimation for the weeks worked variables are presented in Table 3.6.[23]

From this estimation I cannot find the effect of weeks worked in the first year after school on wages in the fifth year. I can, however, estimate the difference in the effect of weeks worked in this first year on second year wages and on fifth year wages. For both men and women the association between weeks worked in the first year and wages in the second year is significantly greater than the association between these weeks and fifth years wages. This suggests that for men and women, early periods of nonwork

[23]Other variables included but not reported are as in Table 3.5: whether the individual finished high school, is currently working part-time (less than 30 hours per week), is nonwhite, is married, has any children, lives in an smsa or in the south, the local unemployment rate, and the occupation of the current job.

may have a larger effect on next years wages than on wages in the future. Since I cannot measure the level of the effect, these results are consistent with nonwork in the first year having a significant negative effect on wages four years later. Also, I cannot ascertain from these estimates whether there is a difference between men and women in the extent to which nonwork effects next years wages or the degree to which this effect may diminish over time.

The coefficients on weeks worked in years two through four measure the effect of weeks worked in these years on wages in the fifth year. For both men and women the results of this estimation are similar to results in the level wage equation. The number of weeks worked in the third and fourth years have positive significant effects on wages in the fifth year for men and women. In general, the relationship between work and later nonwork for these years is greater here than in the level equation. However, weeks worked in the second year after school no longer have a significant effect on wages for women or men. These results suggest that weeks worked have a decreasing effect on wages over time. However, they must be interpreted keeping in mind that they may be biased due to endogeneity caused by the differencing of the two wage equations.[24]

In order to study the effects of weeks worked on wages for all of the years of data I have available without heterogeneity bias, I turn to estimation of all four wage

[24]Of all the lagged weeks worked variables, only weeks worked in the first year after high school is an exogenous variable. In order to correct for these biases I would need to find instruments for weeks worked in years two, three, and four since all are endogenous. Unfortunately, I do not have good instruments for these three variables. Even the possibility of using lagged weeks worked as an instrument is not feasible here. Given the significant estimate of the coefficient on weeks worked in the first year, I cannot assume that it does not belong in the equation and use it as an instrument. In theory it is possible to estimate a differenced wage equation for other years, and to use instruments to obtain unbiased estimates for several of the coefficients of weeks worked on different years wages. In practice, only a few of the lagged weeks worked values can be used as instruments.

equations with a fixed effect correction. I estimate the stacked equations allowing all coefficients of weeks worked in the four years to vary. I am able to estimate the four equations by dropping the weeks worked in the first year variable, α_{21}, from the equation for wages in the second year. Thus, all the coefficients on weeks worked in the first year in the other equations must be interpreted as relative to this unestimated effect. I can still examine the effects of weeks worked in the other years, as well as the pattern over time of weeks worked in the first year on wages in the subsequent years.

The results of this estimation are shown in the first panel of Table 3.7 for men and women. I only report the estimates of the coefficients on weeks worked. I also include in the estimation the same independent variables as in the previous equations.[25] The fixed effects coefficients on the weeks worked in the first year (the last estimate in each row) are measured relative to the omitted variable.

Comparing the fixed effect coefficients and the coefficients from the uncorrected wage equations gives us an indication of how important heterogeneity is for this sample. Table 3.9 shows the complete set of coefficients on weeks worked from the four wage equations estimated without any correction for heterogeneity. The fifth year wage equation is the same as in Table 3.5. Almost all of the estimated effects of weeks worked on wages are positive and significant. The estimates for men are generally smaller than for women. When comparing the two sets of estimates, it is important to remember that the coefficients on weeks worked in the first year after

[25]I do not allow the coefficients on the other independent variables to vary over time. Therefore, time invariant covariates drop out of the fixed effect estimation. The results for the other independent variables are not shown.

leaving high school are relative measures and are not comparable to the uncorrected estimates.

Most of the corrected estimates differ from the uncorrected estimates, some substantially, indicating that heterogeneity is a factor in this sample. Considering only the uncorrected estimates, one would conclude that nonwork has a large and somewhat persistent effect on wages for both men and women. However, for many of these separate effects nonwork as a direct causal factor is only part of the estimated effect. Unobserved factors such as motivation or expectations of future labor supply are having an effect on both wages and the number of weeks worked. Removing the constant part of the heterogeneity bias lowers many of the estimates, leaving values that more closely reflect the actual effect of nonwork. These estimates may still differ from the actual effects if there is unmeasured heterogeneity that varies over time or if my original control for selection bias was not complete.[26] It is also interesting to note that the results from the differenced wage equation for the fifth and second year are very similar to the fixed effect results shown in Table 3.6. This may indicate that endogeneity from the wage differencing is not causing a serious bias.

The main results from this estimation are that weeks of work (nonwork) have a positive (negative) effect on wages earned in the next year, but that this effect diminishes over time for men and women. The evidence suggests that the cost of nonwork for men and women is mainly current wages. Controlling for the number of weeks worked in intervening years, early nonwork has little affect on wages several years later. In addition, there are few differences between men and women in how

[26]There is also the potential of endogeneity caused bias from serial correlation, as discussed earlier.

nonwork affects wages after correcting for heterogeneity bias.

The fixed effects estimates for men and women show that working a greater number of weeks in a given year is associated with higher wages in the next year. This result is true for the number of weeks worked by men and women in the second, third, and fourth year after high school. The decrease in wages from working 26 weeks versus 52 weeks ranges from 5 percent to 8 for men and from 6 percent to 8 percent for women.[27] Although the estimates for different years are not equal, there is no clear pattern of change over time. The effect of weeks worked on the following years wages is greater for women in the second and third years, but significantly lower for women in the fifth year.

The positive effect of weeks worked on wages decreases over time. Weeks worked in the second year after leaving school have a positive and significant effect on wages in the third year for both men and women. The effect on wages in the fourth year is smaller, but still positive and significant. However, by the fifth year the effect on wages is much smaller and insignificant. For men, working 26 weeks in the second year after school versus 52 weeks is associated with 5 percent lower wages in year three, 4 percent lower wages in year four, and 1 percent lower wages in year 5.[28] For women, the same comparison is 6 percent lower wages in year three, 2 percent in year four, and 1 percent in year five.

There is also evidence that to some degree wages in a given year are more greatly affected by work and nonwork in recent years than that of years farther in the past. I

[27]These wage differences are evaluated using the average values of other characteristics for men and women respectively.

[28]The difference between the effect in year four and the effect in year three is not significant.

do not have many lagged years to examine, but concentrating on the fifth year wage equation, weeks worked in the second year after high school have a smaller effect on wages, .0003 for men and .0004 for women, than weeks worked in either the third or fourth year. Also, in the fourth year wage equation, weeks worked in the second year have a smaller effect on wages for men and women than weeks worked in the third year, .0018 versus .0031 for men and .001 versus .0033 for women.

The coefficients on weeks worked in the first year after high school are estimated relative to their effect on wages in the second year. While I cannot make direct comparisons of the coefficients over time, they provide additional evidence that the effect of weeks worked on wages declines over time. The estimated coefficient on weeks worked in the first year after school in the fifth year wage equation is equal to $\alpha_{51} - \alpha_{21}$, where the first number in the subscript stands for the year of the wage equation and the second stands for the year of weeks worked. This difference is negative and significant for both men and women. Work in the first year is associated with a greater wage gain in the second year than the fifth year. From the third to the fifth wage equation the coefficients on weeks worked in the first year become more negative, indicating that the effect of weeks worked in the first year decreases over time.

I have discussed the information about trends over time that can be learned from these coefficients, but with some assumptions I can also get an idea of the range of values the direct effect may take on. I can calculate the effect of work or nonwork on wages in years two through four by making an assumption on one of the estimates. I calculate effects under two different assumptions: that the effect of weeks worked in the first year on second years wages, α_{11}, is equal to the smallest or equal to the largest value of the other estimates of weeks worked on the following years wages, either α_{22}, α_{33}, or $\alpha 44$. While it is not necessarily true that the actual value of this effect falls somewhere in this range, there is little evidence in the three estimated coefficients of a pattern of increase or decrease over time that would indicate the actual value is outside of this range. However, these calculations can only give us an idea of what the actual effects may be. I report in Table 3.8 for men and women the values calculated under the two different assumptions.

The decrease in the effect of weeks worked in the first year after high school can now be seen clearly. Under either of these assumptions, as stated previously, there is a large decrease in the effect over time. Also under either of these assumptions, the absolute effect of weeks worked in the first year on wages four years later is very small. Even assuming the larger value of the two scenarios, the effect on women's wages in year five is a decrease of less than a penny per week worked in the first year and the effect for men is even lower. Of course, it is possible that the actual values are higher if the wage effects of first year work on second year wages are much higher than either of these assumptions.

In general, the fixed effects results are very similar for men and women. Both men and women experience a decrease in the negative effects of weeks of nonwork as time in the labor force increases. I find that neither gender has a greater negative effect of nonwork than the other. Some individual effects are greater for women than men and some are greater for men than women, but on the whole there is no pattern to these differences and they are relatively small. A test of whether the estimates from the two fixed effects regressions for men and women are the same fails to reject with a p-value of .90. The joint test of whether only the coefficients on weeks worked are the same also fails to reject.

3.5.2 Nonwork and the Wage Gap

Despite these seemingly small differences in returns to work and the small differences in the amounts of nonwork between men and women, nonwork can account for a significant amount of the wage gap. In the fifth year after high school, men earn \$5.31 per hour and women earn \$4.26 per hour, 80 percent of men's wages. I calculate the portion of this difference accounted for by differences in work, using both returns to work and numbers of weeks worked, as follows:

$$wage_m - wage_f = \sum_{j=2}^{4} \alpha_{5j}^m wks_{5j}^m - \sum_{j=2}^{4} \alpha_{5j}^f wks_{5j}^f + \text{all other factors}$$

This calculation includes the differences in weeks worked in the second, third, and fourth year after high school. The total difference in the weeks worked in these years added together is 7.6 weeks. The combination of differences in returns to work and in amount of work between men and women in these three years accounts for 19 percent of the wage differential. If women had men's returns to work but women's average number of weeks worked, $\sum_{j=2}^{4} \alpha_{5j}^m wks_{5j}^m - \sum_{j=2}^{4} \alpha_{5j}^m wks_{5j}^f$, this would decrease the wage gap by only 8 percent. The amount of the gap due to differences in the numbers of weeks worked is only 8 percent while the amount due to differences in returns is 11 percent.

However, this 11 percent difference in returns is coming solely from women's lower return to work in the fourth year on fifth years wages. Differences in weeks worked and returns to weeks worked in the second and third year account for none of the wage gap. Given my findings that jointly the returns to weeks worked are not significantly different for men and women, I can conclude that differences in the number of weeks worked account for 8 percent of the wage differential.[29] The immediate impact on wages of nonwork is greater for women than men, but differences in past weeks worked more than one year ago cannot account for any of the wage gap.

3.5.3 Interpreting the Results

These final results indicate that there is little difference between men and women in the relationship of nonwork and future wages. Men's and women's nonwork in the first four years after high school does have an impact on the following year's wages. I find this impact to differ somewhat for men and women across years. In addition, I find that the effects of nonwork in a given year decrease over time for both men and women. Finally, the difference between men and women in the amounts of time spent not working can account for about 8 percentage points of the wage gap in the fifth year after high school

These results differ from the results Ellwood [1982] found in his study of the effect of young men's nonwork on wages. In his study of young men who left high school in 1965 through 1967, he finds that there is a substantial impact of weeks of work on wages in the first four years after high school. Working the entire year versus 26 weeks increases wages between 10 and 20 percent for all lags of weeks worked in the second, third, and fourth year after high school. He finds little evidence of heterogeneity or

[29]The same calculation using female returns to work and own weeks worked also accounts for 8 percent of the male/female wage gap.

endogeneity biases.

In Corcoran's [1982] study of young women who finished high school between 1966 and 1968, she also finds significant effects of early nonwork on wages. Not working for the first four years after high school is associated with 6 percent lower earnings for white women and 3 percent lower earnings for black women even 20 years later. Estimated effects change relatively little after corrections for heterogeneity, endogeneity, and selection bias. Differences in Corcoran's methodology make it difficult to compare my results. She focuses on long-term effects of nonwork on wages measuring wages in 1975, at least ten years after workers left high school. However, having found that nonwork has little effect on wages four years later, it seems unlikely that in my sample nonwork will have positive effects ten or twenty years later.

There are several possible explanations for these differences. First, for women there are significant differences across these cohorts. Since the late sixties, the labor force participation rate of all women has risen dramatically. This may have affected the overall probability of work for women, as well as their expected future labor force participation. In turn, this may translate into employers being less likely to use early nonwork as a signal of future participation for women in this young cohort.

Another reason nonwork may be less of a negative signal for workers in this cohort is the nonwork in this sample takes place for the most part in the midst of a recession. Although I control for year left high school and unemployment rates, nonwork under these circumstances may have less of a negative effect on young workers' future wages. Employers may interpret the nonwork as involuntary due to widespread unemployment, and may not be able or willing to sort individuals using nonwork as a signal.

The loss of human capital due to nonwork may also not be as important for future wages if the work experience that young people gain does not entail much human capital investment. The types of jobs held by young workers right out of high school may only be providing minimal investment such as general work skills of how to work with others, punctuality, and generally what it is like to be in the work world. This investment may not increase with experience, but be gained by a fixed amount work. In this case, there is no permanent loss of nonwork other than immediate foregone wages. Once a student works for some period of time, her or she may gain these skills.

It is also possible that early nonwork is not detrimental because it is connected to job matching and job search. If a worker is not working because he is searching for a better job, than this time may not have negative effects. As stated earlier, Becker and Hills [1983] find positive effects of early periods of unemployment on young men's wages connected to job mobility. This possibility is interesting in light of the results found in Chapter 1 of this dissertation that women experience lower wage gains when job changing. These two results are not inconsistent, since women in this sample do earn lower wages than men in the fifth year. Job matching may be the reason nonwork is not detrimental to future wages for men and women, even if women are not experiencing as much wage growth from that process as young men.

I am unable to identify which of these explanations is correct or to what extent each may partially explain these findings. Whichever of these explanations is correct, these results show that there is little difference in the effect of nonwork on the future wages of men and women. The fact that young women who are working in the fifth year after high school have higher levels of past nonwork than young men can account for 8 percent of the wage gap. Differences in weeks worked more than a year in the past cannot account for virtually any of the gap in fifth year wages.

3.6 Conclusions

Within most age cohorts, women work for pay fewer weeks and years than men. In this chapter, I find that this fact is also true for young high school graduates and dropouts who do not go on to post-secondary school. This chapter studies how these periods of not being employed impact on future wages of young men and women and the implications for the gender wage gap.

Analyzing the first four full years of work after high school, I find that fewer weeks spent working in the first year after high school have a significant effect on both men's and women's wages in the following year. Working 26 weeks in the second, third, or fourth year after school versus 52 weeks is associated with from 5 to 8 percent lower wages for men and from 6 to 8 lower wages for women the following year. I also find that the effects of nonwork decrease over time for men and women. The effects of work in the second year after high school on fifth year wages are insignificant for men and women. In addition, my estimates indicate that heterogeneity bias is present in the estimation of the wage returns to work.

In the fifth year after high school the female/male wage gap is .80 in this sample. Differences in weeks of nonwork in past years and differences in returns to work can explain 19 percent of this fifth year wage gap. However, weeks worked in years less recent than the past year do not account for any of this wage gap.

Finally, I have addressed here the effect of early periods of nonwork on women and men who are working. I find the costs to early nonwork is mainly in immediate loss of wages. It is not clear whether this initial nonwork is voluntary nonwork and the result of choice or initial nonwork is involuntary and possibly makes it more difficult to work in the future. While corrections for selection bias indicate there is not much bias in the estimation on only workers in the fifth year, nonwork may still lead to more nonwork in the future. This possibility should also be considered in any final calculation of the total costs of nonwork for young men and women.

Table 3.1: Employment Rates and Year Left High School

Men

Year After Left HS	All Men	Left HS in 1978	Left HS in 1982-83
First	61.7	69.4	59.5
Second	62.9	67.6	64.2
Third	66.5	71.0	68.4
Fourth	71.8	69.1	75.6
N	[1598]	[354]	[351]

Women

Year After Left HS	All Women	Left HS in 1978	Left HS in 1982-83
First	50.8	56.0	45.6
Second	53.3	56.3	53.2
Third	54.2	53.8	56.5
Fourth	55.6	53.3	58.1
N	[1521]	[380]	[291]

Note: Employment rate is defined as weeks worked since last interview date divided by total weeks since last interview date.

Table 3.2: Probability of Employment, Nonemployment and Distributions of Work

	Probability of Employment		Employment Rates (Weeks>0)	
	Men	Women	Men	Women
First Year	85.3	76.0	72.6	67.3
Second Year	83.1	75.0	75.7	71.4
Third Year	84.7	75.1	78.5	72.3
Fourth Year	88.4	74.3	81.4	75.1

Distribution of Percent of First Four Years Worked

	Men	Women
0-25%	17.3	28.6
25-50%	13.4	17.2
50-75%	17.8	17.4
75-100%	51.5	36.9
Total	100.0	100.0

Note: Probability of employment is defined as percent of individuals who have worked at least one week of the year.

Table 3.3: Probability of Working All Weeks in 4th Year After HS

Men

	Percentage of Weeks Worked			
	0%	0-50%	50-100%	100%
1st Year	15.5	23.1	55.5	65.7
1st & 2nd Years	7.9	18.7	56.9	74.1
1st, 2nd, & 3rd Years	1.7	15.8	58.0	82.5

Women

	Percentage of Weeks Worked			
	0%	0-50%	50-100%	100%
1st Year	10.7	16.1	46.8	60.3
1st & 2nd Years	4.5	12.7	49.3	70.2
1st, 2nd, & 3rd Years	0.0	7.9	53.6	81.2

Note: 1st year refers to work in the first year after high school, 1st and 2nd refers to the total amount of work in these two years, and the last line in each panel refers to the total of work in the first three years.

Table 3.4: Means of Variables Used in Estimation, Fifth Year After High School

	Men	Women
weeks worked (4)	45.4	41.8
	(0.46)	(0.54)
weeks worked (3)	39.8	37.1
	(0.52)	(0.61)
weeks worked (2)	36.1	34.8
	(0.54)	(0.63)
weeks worked (1)	34.2	31.4
	(0.53)	(0.61)
high school (%)	62.0	75.8
	(1.35)	(1.33)
nonwhite (%)	45.1	49.4
	(1.39)	(1.49)
married (%)	31.2	49.4
	(1.29)	(1.55)
has children (%)	21.7	46.7
	(1.14)	(1.55)
unemployment	8.9	8.8
	(0.10)	(0.11)
smsa (%)	74.5	72.6
	(1.25)	(1.38)
south (%)	56.1	68.8
	(1.35)	(1.52)

Note: Standard errors are in parentheses.

Table 3.5: Effects of Early Experience on Wages in Fifth Year After HS

	Dependent Variable: Log Real Hourly Wage in Year 5					
	Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)
weeks worked (4)	.0018	.0017	.0020	.0020	.0015	.0021
	(1.87)	(1.68)	(2.23)	(2.09)	(1.55)	(1.75)
weeks worked (3)	.0030	.0035	.0036	.0037	.0033	.0036
	(3.21)	(3.64)	(3.36)	(3.78)	(3.30)	(3.22)
weeks worked (2)	.0015	.0017	.0020	.0008	.0007	.0009
	(1.64)	(1.69)	(2.00)	(0.76)	(0.69)	(0.97)
weeks worked (1)	.0010	.0015	.0014	.0025	.0021	.0024
	(1.13)	(1.46)	(1.55)	(2.77)	(2.08)	(2.05)
high school	.053	.031	.038	.051	.023	.021
	(1.94)	(1.09)	(1.89)	(1.53)	(0.68)	(0.65)
part-time	-.085	-.039	-.046	.061	.044	.054
	(1.90)	(0.83)	(1.00)	(1.31)	(1.65)	(1.01)
nonwhite	-.008	.039	.018	.032	.040	.039
	(0.28)	(1.25)	(0.61)	(1.07)	(1.22)	(1.19)
married	.106	.097	.093	-.026	-0.19	-0.17
	(3.04)	(2.65)	(2.55)	(0.90)	(0.65)	(0.63)
children	.059	.071	.077	-.039	-0.59	-0.62
	(1.54)	(1.76)	(1.63)	(1.23)	(1.84)	(1.97)
unemployment	-.010	-.008	-.010	-.011	-.013	-.014
	(2.31)	(1.78)	(1.75)	(2.36)	(2.71)	(2.89)
smsa	.146	.153	.111	.134	.058	.032
	(4.42)	(3.92)	(3.01)	(2.19)	(1.71)	(1.73)
south	-.056	-.047	-.050	-.043	-.046	-0.43
	(2.03)	(1.60)	(1.55)	(1.51)	(1.56)	(1.46)
constant	1.35	1.25	1.33	1.40	1.31	1.27
	(14.19)	(8.45)	(8.50)	(13.42)	(9.29)	(9.06)
lambda			.161			.067
			(1.16)			(0.61)
occupation & background controls	no	yes	yes	no	yes	yes
R^2	.16	.18	.18	.21	.22	.22

Note: Absolute values of t-statistics are in parentheses. Also included but not reported here are indicator variables for the calendar year an individual left high school and controls for current occupation category. Occupation and background controls are occupation in the first year after high school, mother's and father's grade level and whether working in 1978.

Table 3.6: Effects of Weeks Worked on Difference of Wages in the Fifth and Second Year After High School

Dependent Variable: Log Real Hourly Wage in Year 5- Year 2

	Men	Women
weeks worked (4)	.0026	.0018
	(1.95)	(1.30)
weeks worked (3)	.0041	.0036
	(3.27)	(2.60)
weeks worked (2)	.0001	-.0002
	(0.09)	(0.14)
weeks worked (1)	-.0027	-.0033
	(2.10)	(2.38)
R^2	.09	.12

Note: Absolute values of t-statistics are in parentheses. Also included but not reported here are whether in high school, married, have children, unemployment, live in an smsa, live in south, part-time, indicator variables for the calendar year an individual left high school, and controls for current occupation category.

Table 3.7: Fixed Effects Estimation of Weeks Worked on Wages

Dependent Variable: Log Real Hourly Wage in t

Men

	weeks work (t-1)	weeks work (t-2)	weeks work (t-3)	weeks work (t-4)
wage year 5	.0026	.0034	.0003	-.0029
	(4.24)	(4.64)	(0.40)	(3.65)
wage year 4	.0031	.0018	-.0020	
	(4.82)	(2.15)	(2.55)	
wage year 3	.0019	-.0007		
	(2.64)	(0.95)		
wage year 2	-			

Women

	weeks work (t-1)	weeks work (t-2)	weeks work (t-3)	weeks work (t-4)
wage year 5	.0018	.0036	.0004	-.0029
	(2.69)	(4.24)	(0.36)	(3.08)
wage year 4	.0033	.0010	-.0022	
	(4.54)	(1/06)	(2.47)	
wage year 3	.0024	-.0014		
	(2.94)	(1.57)		
wage year 2	-			

Note: Absolute values of t-statistics are in parentheses. Also included but not reported here are whether married, have children, unemployment, live in an smsa, live in south, part-time, and controls for occupation category. I do not allow these variables to have different effects over time, so time-invariant covariates are dropped.

Table 3.8: Effects of Weeks Worked in First Year on Wages Under Certain Assumptions

	Men		Women	
	smallest	largest	smallest	largest
wage year 5	-.0010	.0002	-.0010	.0005
wage year 4	-.0001	.0011	-.0004	.0011
wage year 3	.0012	.0024	.0004	.0019
Assumption for wage year 2	.0019	.0031	.0018	.0033

Note: The assumptions used to calculate these values is that the effect of weeks worked in the first year after high school take on the largest or the smallest estimated effect of other values of weeks worked on the following years wages.

Table 3.9: Uncorrected Estimates of the Effects of Weeks Worked on Wages

Dependent Variable: Log Real Hourly Wage in t

Men				
	weeks work (t-1)	weeks work (t-2)	weeks work (t-3)	weeks work (t-4)
wage year 5	.0017	.0035	.0017	.0015
	(1.68)	(3.64)	(1.69)	(1.46)
wage year 4	.0040	.0024	.0010	
	(4.65)	(2.83)	(1.21)	
wage year 3	.0037	.0034		
	(3.64)	(3.40)		
wage year 2	.0037			
	(3.64)			

Women				
	weeks work (t-1)	weeks work (t-2)	weeks work (t-3)	weeks work (t-4)
wage year 5	.0016	.0033	.0007	.0021
	(1.55)	(3.30)	(0.69)	(2.08)
wage year 4	.0053	.0018	.0027	
	(4.90)	(1.67)	(2.60)	
wage year 3	.0053	.0025		
	(4.35)	(2.35)		
wage year 2	.0053			
	(6.22)			

Note: Absolute values of t-statistics are in parentheses. Also included but not reported here are whether in high school, married, have children, unemployment, live in an smsa, live in south, part-time, indicator variables for the calendar year an individual left high school, controls for current occupation category, controls for first occupation, and mother's and father's grade level and whether worked in 1978.

Conclusions

This dissertation begins with the fact that young women entering the labor force earn lower wages on average then young men. I have shown that there are differences between young men and women that can account for some of this initial wage gap. but that a large percentage of the gap remains unexplained.

It is important to understand the sources of this initial wage gap because of the potential consequences for young women's futures. Wages are an important determinant of human capital investment, job choice, and labor force participation, all of which influence future labor market outcomes. In Chapter 1, I found that while young men are taking part in job matching processes that contribute to rapidly increasing wages, young women are either not part of these processes or are not reaping the benefits. Even at labor market entry, before traditional measures of experience and tenure can possibly differ, young women earn lower wages than young men. Chapter 2 shows this is due in part to differences in pre-market human capital investment. Investments such as working in high school can increase women's general and specific work skills, improve job-finding skills and job contacts, and relay positive signals to employers about labor force attachment. All of these factors may contribute to higher wage levels.

In addition, women experience only slightly longer periods of not being employed in the first years after leaving high school. These weeks of nonwork seem to have no permanent effect on the future wages of men or women. However, differences between men and women in returns to work in the short-run account for a significant percent of the wage gap. Although these periods of nonwork may be voluntary and not have permanent wage effects, they will still to some degree affect women's lifetime earnings.

Taken together, these results demonstrate that despite the increasing numbers of women in the labor market and the decreasing trend in the gap between men's and women's wages generally, the early labor market experiences of a current cohort young men and women remain different. Differences in job changing behavior, high school work experience, and early periods of nonwork may themselves be attributable to discrimination or to individual preferences. However, to the extent these observed differences as well as the large percentage of the wage differential that remains unexplained are due to discrimination, young women's decisions and labor market experiences throughout their lives will be affected.

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