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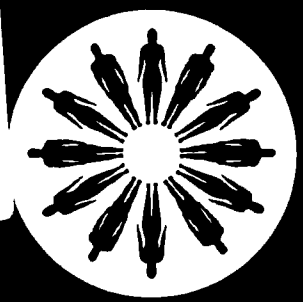
ABSTRACT

National Longitudinal Survey of Youth data characterizing a racially heterogeneous sample of 1,897 male and female high school graduates were analyzed to determine the impact of employment while in high school on subsequent wages. The sample was segmented by gender and amount of work experience gained while in high school, and several wage models were identified for calculating the net effect of high school employment on subsequent wages by controlling for a series of observed and unobserved factors. Among the study's main conclusions were the following: (1) 80% of males and 73% of females work at some point during their junior or senior year, with males and females averaging 10.5 and 8.3 hours per week over the academic year, respectively; (2) more than 70% of students who work more than 20 hours per week are white, and compared with their counterparts, most receive substantially less postsecondary schooling, take fewer credits in grades 11-12, and receive lower grades in academic subjects; and (3) models designed to avoid the shortcomings of past models indicate no significant wage premium associated with high school employment except among individuals who work more than 20 hours per week while in high school. (Twenty tables/figures and 22 references are included.) (MN)



National Longitudinal Surveys

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Discussion Paper

High School Employment

Audrey Light

June 1995

Report: NLS 95-27

The National Longitudinal Surveys (NLS) program supports many studies designed to increase understanding of the labor market and methods of data collection. The *Discussion Papers* series incorporates some of the research coming out of the program. Many of the papers in this series have been delivered as final reports commissioned as part of an extramural grant program, under which grants are awarded through a competitive process. The series is intended to circulate the findings to interested readers within and outside the Bureau of Labor Statistics.

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High School Employment

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June 1995

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Executive Summary

This study addresses a question that, despite its apparent simplicity, has yet to be satisfactorily answered by social scientists: Does holding a job while enrolled in high school enhance, detract from, or have no effect on subsequent career outcomes? From a theoretical perspective, high school employment has an ambiguous effect on career outcomes. On one hand, it may give students a "leg up" in their subsequent careers by providing them with marketable skills, good work habits, and knowledge of the world of work. On the other hand, high school employment may indirectly hinder subsequent employment opportunities by preventing students from performing as well in high school as they otherwise would. In light of the widely documented difficulties faced by many youth in transiting from school to a permanent, productive position in the labor force, it is important to know which effect dominates. After all, public policy can readily be directed toward helping high school students gain employment (by providing job placement services, for example) or, as appropriate, toward discouraging such activities.

The reason social scientists have failed to reach a consensus on the role of high school employment is because it is extremely difficult empirically to identify the *net* effect of high school work experience on measures of subsequent career outcomes such as wages, earnings, weeks worked, or weeks unemployed. Consider a situation where 24-year-old workers who held jobs while in high school are found to earn higher hourly wages, on average, than similarly aged workers who did not hold jobs in high school. Before concluding that high school employment enhances subsequent labor market productivity, one must acknowledge that the two "types" of workers may differ in many dimensions besides high school employment status. There may be significant differences in their family backgrounds, the quality of their high schools (and the intensity of their school effort), their levels of post-secondary education, the amount of post-school work experience they gained, and even their innate ability. Unless each of these factors is "held constant," we cannot tell whether high school employment has a direct, skill-enhancing effect on subsequent wages or whether one or more of these other factors explains the observed difference in average wages. Moreover, a simple comparison of average wages earned at a point in time cannot reveal whether the relationship between high school employment and subsequent wages changes over time.

The current study focuses exclusively on the relationship between high school employment and subsequent average hourly wages rather than considering a broad array of career outcomes. However, it contends with the complexity of this single relationship in ways that previous research does not. Specific features of

the current study include:

- The data are from the National Longitudinal Survey of Youth, which began in 1979 with a sample of 12,686 individuals between the ages of 14 and 22. The survey, which remains in progress, has tracked the employment and schooling experiences of these individuals over the past 16 years, and has also recorded numerous other aspects of their lives. The current study uses data from survey years 1979-91.

- The analysis is based on a racially heterogeneous sample of 1,897 male and female high school graduates who, along with their high schools, participated in a special high school survey and high school transcript collection effort. As a result, we know what courses these individuals took in each year of high school, as well as the grades and credits received for each course. We also know a great deal about the characteristics of their high schools and fellow high school students.

- The first part of the analysis involves carefully segmenting the sample by gender and the amount of work experience gained while in high school (whether the average hours worked per week during grades 11 and 12 equals 0, 1-10, 11-20, or 21+) and providing a comprehensive view of what students in each category "look like" in terms of their personal, family, and school characteristics, high school courses and grades, schooling attainment, and post-high school employment.

- The second part of the analysis involves estimating a series of wage models designed to identify the net effect of high school employment on subsequent wages by carefully controlling for a host of observed and unobserved factors that may confound this relationship. This analytical method also reveals whether the relationship between high school employment and wages changes as workers age.

The analysis reveals new information about the relationship between high school employment and post-school wages, as well as a wide range of factors that are likely to be linked to both the decision to work while in school and subsequent wages. The key findings of the analysis are:

- The majority of students (80% of males and 73% of females) work at some point during their junior or senior year of high school. Male students average 10.5 hours of work per week over the course of the academic years (12.8 hours per week among those who work a positive number of hours) and females average 8.3 hours per week (11.1 hours per week among the workers).

- High school students who work unusually intensively (over 20 hours per week, on average, during grades 11 and 12) differ from their less employed counterparts in a number of dimensions:
  - The overwhelming majority of these students (72% of males and 74% of females) are white.
  - They typically score below-average on the Armed Forces Qualifying Test (AFQT), which is used by the military to assess trainability. The relationship between high school employment and AFQT scores is particularly strong for males.
  - Males in this category have significantly higher family incomes, on average, than their less employed counterparts, although the same is not true for females.
  - They tend to receive substantially less post-secondary schooling than other high school graduates. Only 46% of males and 39% of females in this category report *any* enrollment in the six years after high school graduation.
  - They work during 80% of all weeks, on average, in the first six years after high school graduation and average about 30 hours of work per week, which is far more work effort than their counterparts typically exhibit.
  - While in grades 11 and 12, they generally take fewer credits and receive lower grades than their counterparts in academic subjects, while concentrating their efforts and receiving relatively high grades in vocational subjects.
- High school students who do not work at all during grades 11 and 12 can be characterized as follows:
  - Most (51% of males and 58% of females) are nonwhite.
  - They tend to receive below-average AFQT scores, especially if they are female.
  - They have below-average family incomes.
  - While in high school, they tend to live in areas with unemployment rates that are slightly higher than the unemployment rates typically faced by students who work while in high school.
  - They work far less than their counterparts during the six years immediately following high school. They work in barely more than half of all weeks, on average, and average about 20 hours of work per week.

- Inferences about the "net" effect of high school employment on post-high school wages are extremely sensitive to how the wage model is specified and estimated. One can obtain a very misleading view of the relationship of interest by
  - relying on a cross-sectional sample in which wages are examined at a single point in the life cycle.
  - failing to control fully for confounding factors such as schooling attainment and post-high school employment.
  - constraining the relationship between high school employment and log wages to be linear or quadratic.
- Models that ease the restrictions listed above reveal that there is no significant wage premium associated with high school employment *except* among individuals who work more than 20 hours per week, on average, while in high school. Among these individuals, the "value added" of high school employment rises and then falls as post-high school work experience is gained. When they have accumulated 3-5 years of post-high school experience, they are typically earning 9-10% more than their (previously) less employed counterparts.
- There is no evidence that the estimated effect on wages of high school employment is biased by correlation between high school employment and unobserved factors. However, the tests used to look for this bias are not very powerful because the proxy variable used to control for unobserved ability (pre-high school test scores) is missing for more than half the respondents and the instrumental variables used are only weakly correlated with high school employment.

1 Introduction

The relationships between high school employment and subsequent labor market outcomes have been extensively analyzed as part of a broader literature that seeks to identify the determinants of successful school-to-work transitions. From a theoretical standpoint, high school employment has an ambiguous effect on career outcomes. It might facilitate the transition from school to work by providing students with marketable skills, good work habits, and information about job opportunities and employers' expectations. Such beneficial effects would reveal themselves via a positive relationship between in-school work experience and post-school wages and employment. However, high school employment might do little more than divert students from academic pursuits, in which case it would be negatively associated with academic achievement, schooling attainment, and subsequent wages.

To assess the relative merits of these competing hypotheses, analysts typically estimate single-equation models in which a particular academic or labor market outcome is expressed as a function of in-school work experience. Outcome measures include high school grade point averages or class rank (D'Amico, 1984; Greenberger and Steinberg, 1986; Lillydahl, 1990), high school completion or college attendance (Meyer and Wise, 1982; Marsh, 1991; Steel, 1991), post-high school employment or unemployment (Stevenson, 1978; Meyer and Wise, 1982; Stern and Nakata, 1989; Marsh, 1991; Steel, 1991), post-high school wages or earnings (Stevenson, 1978; Stephenson, 1981; Meyer and Wise, 1982; Coleman, 1984; Stern and Nakata, 1989; Ruhm, 1995), and post-high school occupational attainment or job benefits (Coleman, 1984; Ruhm, 1995).[1] In each study cited, the outcome measure is regressed on a number of covariates in addition to the measure(s) of high school employment but, in each case, the list of controls is far from complete. Coleman (1984), for example, models post-school wages as a function of the number of months worked while in school (high school or college) after controlling for nothing more than respondents', fathers' and mothers' schooling levels and fathers' occupational status. Ruhm (1995) regresses post-school wages on in-school work experience and an extensive set of personal and family characteristics, but does not control completely for post-school work experience or schooling attainment—two key determinants of wages that are also highly correlated with the amount of work experience acquired in high school.

The studies cited in the preceding paragraph have revealed a number of interesting relationships, but they can be faulted for taking a piecemeal approach to the problem. Rather than examining the separate,

[1] Ruhm (1995) provides a very useful summary of the literature.

unconditional relationships between high school employment and various outcomes, we should address the following question: What is the effect of high school employment on post-school wages *conditional* on high school achievement, post-school employment, and other factors that are correlated with in-school job holding and wages? Suppose, for example, that individuals who work intensively while in high school are less likely than their nonemployed or moderately employed counterparts to take college preparatory courses and attend college but, as a result, tend to gain more work experience in the first few years after high school. To determine whether high school employment is beneficial to these individuals in the sense of being "skill enhancing," we must estimate its effect on wages after controlling for the other factors that differ systematically between high school job holders and non-holders. More generally, we must identify the various direct and indirect paths through which high school employment influences subsequent labor market outcomes.

In the current study, I use data from the National Longitudinal Survey of Youth (NLSY) to examine the relationship between high school employment and post-school wages, as well as a large number of additional factors that are likely to be linked to both the decision to work while in school and subsequent wages. Chief among these additional factors are detailed measures of high school achievement and school quality. A high school survey and transcript collection effort were undertaken as part of the NLSY, so I have data on each course taken in high school and the corresponding grade and credits, along with such school characteristics as average teacher salaries, attendance rates, and student-to-teacher ratios. Previous studies have used overall grade point average or class rank as a measure of high school achievement, but detailed transcript data are indispensable if we wish to assess the effect of high school employment on wages net of its effect on skills being learned contemporaneously inside the classroom. In particular, these data enable us to investigate the presumption that employed high school students shun academic subjects in favor of such courses as typewriting, auto mechanics, and choir—curricula choices that may leave them with ample free time and even high grade point averages, but with poorer post-school wage earning capabilities than their nonemployed counterparts.

To assess the various relationships, I begin by classifying individuals by gender and the amount of work experience gained in high school—specifically, whether the average hours worked per week during grades 11 and 12 equals 0, 1-10, 11-20, or 21+. I then compare the distributions of a large number of observable characteristics across these gender-work effort categories. The observables include personal,

family, and labor market characteristics (*e.g.*, race, net family income, local unemployment rates), high school characteristics (*e.g.*, student-teacher ratios, graduation rates, teacher salaries), measures of high school achievement (credits taken and grade point averages in each of four subject areas), and measures of schooling attainment and post-high school employment. After using this preliminary descriptive analysis to get a sense of what employed high school students "look like," I estimate a series of wage models that control for high school employment along with various combinations of the observable characteristics. These models reveal the effect of high school employment on subsequent wages before and after the effects of confounding factors are taken into account.

It can be argued that even after I control for an unusually wide-ranging set of observable factors in the wage models, high school work experience remains endogenous. That is, the estimated effect on wages of high school employment might reflect the relationship between high school employment and unobserved factors that influence wages. For example, a positive estimated effect of high school employment on subsequent wages might reflect the fact that, *ceteris paribus,* individuals with relatively high levels of unobserved (to the researcher) ability, ambition, *etc.* are the ones who seek and are offered employment. It is these unobserved qualities, and not high school employment *per se,* that leads to above-average wages after high school. In an attempt to contend with this type of potential endogeneity, I experiment with the inclusion of proxies for "ability" (pre-high school ability test scores) and with instruments for the high school employment measures.[2] My experiments (the results of which are reported in section 4) suggest that "ability bias" is not very severe or, alternatively, that I lack suitable proxies and instruments. I therefore opt to put aside issues of endogeneity for most of the analysis. After all, it is important to produce a detailed picture of the relationships between high school employment, wages, and a host of observable factors—a description that the existing literature fails to provide—even if uncertainty remains about whether the inferences are influenced by heterogeneity in factors that cannot be observed.

In addition to exploiting transcript and school-specific information to help isolate the "value-added" of high school employment, the current study introduces other innovations. Existing research on the relationship between high school employment and wages focuses on post-school wages at a single point in time, with the particular "point in time" varying from study to study. Stevenson (1978) analyzes wages reported

[2]Fixed effect methods are often used to purge models of the type of time-invariant, unobserved heterogeneity with which I am concerned. These methods are inappropriate in the current application because I would be unable to identify parameters for time-invariant regressors, including the measures of high school employment.

during the last year of the panel survey used in his study, at which time respondents range in age from 23 to 26. Stephenson (1981) examines wages reported one year after high school, and Ruhm (1995) models wages earned 6-9 years after high school. I use a 14 year panel that follows respondents from grade 11 until they are as many as 12 years beyond high school graduation, and I analyze all wages reported during the post-graduation period.[3] As a result, I am able to see how the relationship between high school employment and subsequent wages change over time—something that analyses based on cross-sectional data cannot do. I am also able to use models that exploit both the within-person and cross-person variation in the data, thereby obtaining more efficient estimates than my predecessors. In addition, I control for the amount of work experience gained in high school more carefully than many preceding studies. As I demonstrate, it is important to allow the relationship between high school work experience and log wages to be nonlinear, as Meyer and Wise (1982) also do. A number of analysts may have distorted this relationship by constraining it to be linear (*e.g.*, Coleman, 1984; Stern and Nakata, 1989) or quadratic (*e.g.*, Ruhm, 1995).

In the next section, I describe the manner in which I constructed the data sets used throughout the analysis. In section 3, I classify sample members by gender and the amount of work experience acquired during high school and present summary statistics describing differences in their personal and labor market characteristics, family background, schooling attainment, school quality, high school achievement, and post-school employment. The wage models are described and their estimates discussed in section 4, which begins with a detailed list of the questions that the regression analysis is designed to answer. A summary of results appears in section 5.

2 Data Set Construction

The data are from the National Longitudinal Survey of Youth (NLSY), which began in 1979 with a sample of 12,686 males and females born in 1957-64. Respondents were interviewed annually from 1979 to 1994, with the next interview scheduled for 1996. I use data from the interview years 1979-1991, and I restrict the analysis to a subsample of 1,897 males and females. This reduction in sample size is caused primarily by my requirements that high school transcript data be available for each respondent and that their labor market experiences be "observed" from the start of grade 11 onward. In the remainder of this section I elaborate on the selection criteria and also describe the transcript and employment data.

[3] My description of the panel length and endpoints applies to my subsample, but not to the NLSY in general. Details on the data are provided in section 2.

In 1980, 1981, and 1983 an attempt was made to collect high school transcripts for eligible NLSY respondents. Respondents were eligible if they had consented to release their high school records, did not attend high schools outside the United States, and were not in the military subsample.[4] In addition, respondents had to graduate from or otherwise exit high school before their transcripts were collected; given the seven-year age range of the sample, the collection effort was forced to span a four year period. Although more than 10,000 NLSY respondents were eligible for the transcript collection in one of the three years, completed transcripts were acquired and coded for only 9,010 respondents, generally because their schools did not cooperate with the collection effort. As Table 1 indicates, I delete 3,676 respondents from the original sample because transcript data are unavailable due to ineligibility or these other problems.

Table 1 shows that I delete an additional 2,552 individuals because they did not graduate from high school. Although the relationship between high school employment and the likelihood of graduation is a worthy subject for analysis (see D'Amico (1984), or Ehrenberg and Sherman (1987) for an examination of employment in college and college completion), I choose to exclude high school dropouts so I can look at all respondents' in-school employment experiences for two entire calendar years prior to their school exit. If dropouts were included in the analysis, I would have to contend with the fact that they are legally barred from holding a job for most (or perhaps all) of their last two years of school.

The NLSY asks respondents about their work experiences with virtually every employer ever encountered from January 1978 onward (or, for respondents who were not yet age 16 at that date, from age 16 onward). The reported information is used to create week-by-week variables on labor force status and hours worked on all jobs in progress during the given week.[5] To ensure that each respondent's employment experiences are recorded from the start of grade 11 onward, I delete respondents from the sample if they graduate from high school before January 1980 or prior to their sixteenth birthday. As indicated by Table 1, this leads to an additional 3,345 deletions.

Most of the remaining sample deletions summarized in Table 1 are necessitated by measurement error. I eliminate 74 individuals from the sample because their high school graduation dates cannot be determined. During several of the annual interviews respondents are asked whether they have a high school diploma

[4]The original NLSY sample of 12,686 respondents consisted of a nationally representative subsample (n=6,111), an oversample of Hispanics, blacks and economically disadvantaged whites (n=5,295), and a military subsample of individuals who were enlisted in the military on or before September 30, 1978 (n=1,280).

[5]These created weekly variables are available in the Work History File. See Center for Human Resource Research (1995) for details.

and, if so, when it was received. They are also asked a host of additional questions about their schooling attainment and the dates of their school enrollments. This self-reported information can be verified for internal consistency and can also be checked against the date of high school departure reported in the transcript survey. In the vast majority of cases, I was able to reconcile any inconsistencies in these various pieces of information and come up with a seemingly accurate date of high school exit. In 74 cases, there were dramatic inconsistencies that could not be resolved, so I drop those respondents from the sample.

In addition, I eliminate 1,103 individuals because their transcripts do not reveal an adequate amount of information about courses taken in grades 11 and 12. I require that each respondent have "complete" data for at least three courses taken in both grades. Data are complete if (*a*) a valid, three-digit title code is associated with the course, (*b*) the student received between zero and six Carnegie credits for the course, with one Carnegie credit representing a year-long course, and (*c*) a grade of A, B, C, D, or F is assigned to the course.[6]

The final selection rule involves eliminating 39 respondents who fail to report a valid wage during the post-high school period. The post-high school period begins when the respondent graduates from high school and ends at the date of the last interview (the 1991 interviewer for non-attriters and any interview between 1981 and 1990 for attriters); it ranges in length from one to 12 years. For the 39 individuals with no post-school wage, the average post-school panel length is 2.4 years (standard deviation=1.1), while for the overall sample it is 9.9 years (standard deviation=0.93). Clearly, the 39 individuals are dropped from the sample because they attrit from the survey relatively early, and not necessarily because they are chronically nonemployed.

The remaining sample of 1,897 respondents is heterogeneous with respect to gender and race. Table 2 reveals that the sample consists of 926 males and 971 females. Overall, 24% of the sample is black, 14% is Hispanic and the remaining 62% is non-black, non-Hispanic, hereafter referred to as white. It would be interesting to undertaken a gender and racial comparison of high school employment experiences and subsequent labor market outcomes, especially in light of the striking racial contrasts revealed by Michael and Tuma (1984), Ahituv, Tienda, Xu and Hotz (1994) and Hotz, Xu, Tienda and Ahituv (1995). However,

[6]Course titles and Carnegie credits were assigned as part of the data collection/preparation effort to achieve a measure of uniformity across high schools. The Center for Human Resource Research at The Ohio State University disseminates an undated document entitled "NLSY High School Transcript Survey, Overview and Documentation" that provides (limited) information on how the coding was done. The document was produced by the Center for Human Resource Research and the now-defunct National Center for Research in Vocational Education at The Ohio State University, the two organizations that collaborated in conducting the transcript survey.

my sample is not large enough to support a racial decomposition, so I confine my attention to a male-female comparison in the ensuing analysis.

3 Sample Characteristics

In this section, I describe the amount of employment experience acquired by the 1,897 sample members during grades 11 and 12. I then segment the sample by gender and high school work intensity and examine differences across groups in a large number of characteristics. This simple, descriptive analysis reveals a number of interesting contrasts between individuals who choose not to work in high school, individuals who work a modest amount, and individuals who work very intensively, and it sets the stage for the parametric analysis that appears in section 4.

Tables 3-M (for males) and 3-F (for females) describe the distributions of average hours worked per week during the two years preceding high school graduation. The two year period is broken down into four contiguous segments: the summer before grade 11, the grade 11 academic year, the summer before grade 12, and the grade 12 academic year. To determine when each segment begins and ends, I first reconciled inconsistencies in the reported dates of high school exit to come up with the "true" graduation date (see the discussion on pages 5-6). I then worked backwards and inferred the start date for the senior year of high school and the start and stop dates of the preceding three segments by using the school enrollment dates reported by each respondent or, in the absence of such information, by assuming that academic years last nine months and summer vacations account for the remaining three months of the calendar year.

Tables 3-M and 3-F reveal that many high school juniors and seniors work a substantial number of hours during the academic year. Focusing on the column in table 3-M titled "Grade 12," we see that only 26.8% of males in the sample do not work any hours during their senior year of high school. The remaining 73% of the male sample is fairly evenly divided among those who average 1-10 hours per week during the academic year (22.2% of the sample), those who average 11-20 hours per week (24.2%), and those who average 21 or more hours per week (26.8%). Among the workers, the typical young man averages 17.1 hours per week during his senior year of high school; among the full sample of 926 males, the mean is 12.5 hours per week.

There are two key differences between the employment intensities of male and female high school students. First, the males average more hours of work than the females throughout the two year period

under consideration. For example, males who work during their junior year of high school average 13.0 hours per week, while females average only 11.3 hours per week. During the summer prior to the junior year, male workers average 17.4 hours per week and female workers average only 14.3 hours per week. Second, females are more likely than males to not work at all, but they are also more likely to work very intensively. Focusing on the "Grade 11" columns of tables 3-M and 3-F, for example, we see that 35.7% of males do not work at all during the junior year, while 13.3% average more than 20 hours per week. Relative to these numbers, a larger proportion of the female sample (45.7%) does not work at all, and a larger proportion (24.8%) averages 21 or more hours of work per week. The gender difference in *mean* employment intensities seen here is widely reported in the literature (Stevenson, 1978; Michael and Tuma, 1984; Lillydahl, 1990), but the gender differences in the shapes of the distributions seen in tables 3-M and 3-F are not well documented.

Tables 3-M and 3-F also reveal the temporal patterns that one expects to see in the employment of young people. Among both males and females, there is a pronounced rightward shift in the distribution of average hours as one moves from grade 11 to grade 12 or from the summer before grade 11 to the summer before grade 12. That is, young people are more likely to work—and, conditional on working, are more likely to work more hours—as they age. However, there is not a monotonic increase in work effort over time, for young people frequently work intensively during the summers and then cut back on their hours (or quit their jobs altogether) during the subsequent academic year.

Because of the intrapersonal variation in work effort over time seen in tables 3-M and 3-F, it is not obvious how I should measure high school employment in the ensuing analysis. It is highly desirable to use a single statistic to summarize high school employment rather than, for example, a two-way classification of grade 11 employment by grade 12 employment. Furthermore, it seems desirable to ignore employment during the summer months because I am interested in examining the relationship between high school employment and the course work being undertaken contemporaneously. In light of these considerations (and after experimenting at length with alternative measures), I opt to use the average number of hours worked per week in grades 11 and 12 as my measure of high school employment. That is, I count the total number of hours worked over the course of the two academic years and divide by the combined length of the two academic years.

The right-most columns of tables 3-M and 3-F show the distribution of average hours worked per week

in grades 11 and 12. For summary purposes, I group the respondents according to whether they average 0, 1-10, 11-20, or 21+ hours per week during this (roughly) 18 month period of time.[7] Tables 3-M and 3-F show that 20.4% of males and 27.2% of females do not work at all during either their junior or senior year of high school, while 16.5% of males and 10.9% of females average more than 20 hours per week throughout the two academic years. It is worth noting that 80% of all respondents would be classified the same if I were to use average hours worked per week in grade 12 as the measure of high school employment.

In tables 4-M (males) and 4-F (females), I categorize each sample member by gender and high school employment category (0, 1-10, 11-20, or 21+ hours per week), and report means and standard deviations of a number of characteristics for each of the 8 categories. Table 5 reports the number of observations used to compute the statistics within each gender-employment intensity category.[8] The characteristics summarized in tables 4-M and 4-F are grouped according to whether they represent personal, family, or labor market factors, high school factors, measures of schooling attainment or expectations, or measures of post-high school labor market outcomes (wages and employment). I continue the analysis in tables 6-M and 6-F, where information from the respondents' high school transcripts is summarized. To organize the discussion of tables 4-M, 4-F, 6-M, and 6-F, I begin by focusing on males and then summarize the key differences between males and females.

Looking first at personal, family, and labor market factors, the top three rows of table 4-M reveal a striking difference in the racial composition of the four subsamples defined by intensity of high school employment. Among the 189 males who do not work at all during grades 11 and 12, 49% are white, 38% are black, and 14% are Hispanic. Reading across table 4-M, we see a sizeable increase in the proportion of the sample that is white and a decrease in the proportion that is black as high school work effort increases: among males averaging more than 10 hours of work per week (combining the two right-most categories), 72% are white and only about 15% are black. The last two rows in the top panel of table 4-M reveal that nonemployed high school males are *less* likely than their employed counterparts to live in urban areas (68% versus 74-77%), but are *more* likely to live in areas with high local unemployment rates (9.4%, on average, versus 8.6-8.9%). This evidence is only partially consistent with an often cited explanation for the fact

[7] Again, I tried various alternatives before settling on these four categories. Less than 6% of the sample averages more than 30 hours/week, so there is little to be gained by distinguishing further among respondents in the upper tail of the distribution.

[8] Table 5 shows that there is a substantial amount of missing data for the school characteristics. School-specific data come from the school survey, which was conducted on a one-time basis in 1979. As a result, many respondents' high schools were never surveyed. Furthermore, many questionnaires were only partially completed, presumably because the school administrator did not have ready access to the necessary information.

that black men have higher unemployment rates than white men—*viz.*, that blacks are concentrated in economically depressed urban areas where jobs are scarce.

Two of the remaining personal and family characteristics reveal particularly interesting contrasts. First, there is a clear relationship between the intensity of high school employment and family income: whereas males who do not work in grades 11 and 12 come from families with an average income of less than $21,000 per year, those who average over 20 hours per week have family incomes of almost $32,000 per year. One (partial) explanation for this discrepancy is that the money earned on jobs held in high school contributes to family income. Because family incomes tend to be higher when one or more parents work continuously throughout the year, another explanation is that students may learn about employment opportunities from their employed parents or even obtain jobs at their parents' work places.

Second, males who do not work at all or who work very intensively (21 or more hours/week) tend to score significantly lower than their "intermediate" counterparts on the Armed Forces Qualifying Test (AFQT)—a test that is used by the military to assess trainability.[9] As table 4-M reveals, percentile scores average around 43 among males who work zero hours or, at the other extreme, who average more than 20 hours of work per week. Among males who average 1-20 hours per week, the average percentile AFQT score ranges from 49 to 55. It is worth positioning this systematic pattern in AFQT scores against the racial differences noted above, for the relatively low AFQT scores among males who work 21+ hours per week, 72% of whom are white, contrasts dramatically with the fact that whites tend to score much higher than blacks on the AFQT. My calculations show that among the roughly 11,900 NLSY respondents for whom AFQT scores are available, the average percentile score for whites is 48.4 (standard deviation=28.4) and the average score for blacks is 22.9 (standard deviation=20.6).[10] Hence, the relationship between AFQT scores and high school employment points to the existence of (acquired) ability-based sorting into high school employment status above and beyond any racial sorting that takes place.

I turn now to the high school characteristics, which were reported directly by school administrators during the 1979 survey of respondents' secondary institutions. Of the seven variables summarized in table

[9]NLSY respondents were not administered the AFQT directly, but were administered the Armed Services Vocational Aptitude Battery (ASVAB) in the summer of 1980. About 94% of the original 12,686 NLSY respondents agreed to take the ASVAB in exchange for a payment of $50. Approximate scores for the AFQT are computed by combining raw scores from the arithmetic reasoning, numerical operations, paragraph comprehension, and word knowledge portions of the ASVAB. Note that I use *percentile* rather than *raw* AFQT scores.

[10]Respondents were 16-24 years old when they took the ASVAB, so their scores reflect such factors as the amount and quality of schooling received as well as their test-taking skills and even their level of cooperation. As a result, the AFQT is unlikely to provide an accurate measure of innate intelligence.

4-M, the one that reveals the most extreme contrast across the four "types" of students is the percent of students in the school who are classified as economically disadvantaged.[11] Table 4-M reveals a strong, negative relationship between the number of hours worked by the student and the percent of students in his school classified as disadvantaged. Male students who work intensively not only belong to families with relatively high family incomes, as seen earlier, but they also attend schools with students from relatively affluent families.

The means for the remaining school characteristics suggest a negative relationship between hours worked in high school and school quality. Students in the 21+ category attend schools with higher student-to-teacher ratios, lower attendance and graduation rates, and higher teacher turnover rates than do students who do not work at all. The differences in means between the right-most and left-most columns are not large, but they are often statistically significant. It is unsurprising that students who concentrate their efforts on employment attend schools that appear to be weak in a number of dimensions, but this evidence is somewhat at odds with the finding that these "weak" schools have disproportionately few economically disadvantaged students. Moreover table 4-M shows that their teacher earn salaries that are roughly equal to the salaries reported by schools in the other categories.

A strong relationship exists between high school employment and schooling attainment, as the next section of table 4-M reveals. Reading across the first three columns, it is apparent that increased work intensity is associated with a slight increase in expected schooling and the amount of schooling actually received. Students who average 11-20 hours of work per week expect to complete 14.9 years of school, on average, compared to 14.5 years for students who do not work in high school. Students in the 11-20 category end up completing 0.3 more years of school, on average, than their nonemployed counterparts and they spend slightly more time enrolled in school during the first several years after high school. However, the right-most column reveals a sharp break in this trend when it comes to students who average 21 or more hours of work a week during high school: these students have average schooling expectations and average schooling completion levels that are markedly lower than their less employed counterparts, and they spend far less time enrolled in school after graduating from high school. Table 4-M shows that 54% of these students report no post-high school enrollment, versus 40-44% for everyone else in the sample. Marsh (1991) and Steel (1991) have also found that intensive high school work effort is associated with a decrease

[11] In answering this particular question, administrators were asked to report the classification based on ESEA guidelines or, alternatively, the guidelines used by their school.

in post-secondary schooling attainment.

The bottom section of table 4-M illustrates the enormous differences across the four categories in post-high school employment. Specifically, it shows that high school employment intensity is highly correlated with post-high school employment. The typical male who averages more than 20 hours of work per week during high school is employed for 77.7% of the first year after graduation and averages 28.8 hours of work per week (36.8 hours per week if the denominator is confined to work weeks). This is substantially more work effort than is seen among the non-workers, who are employed for an average of 35.7% of the first year after graduation and average only 11.9 (25.3) hours of work per week. Regardless of how post-high school employment is measured, table 4-M shows a steep rise as high school employment increases.

It is tempting to infer that these differences in post-high school work effort reflect the fact that individuals who work relatively little (or not at all) during high school tend to be enrolled in school, rather than employed, in the period immediately following graduation. In fact, the employment gap seen in table 4-M proves to persist even after differences in post-high school enrollment are taken into account. Panel a of figure 1-M plots average hours worked per week over the 24 quarters following high school graduation for the four "types" of individuals. This figure shows, as does table 4-M, that males who average 21+ hours/week of work during high school also work far more hours during the six years after high school than their less employed counterparts. Figure 1-M also shows that post-high school work effort is highly cyclical, particularly among the 0, 1-10, and 11-20 categories, presumably because these individuals tend to be enrolled in school. Panel b of figure 1-M plots the average weeks enrolled in school for each of the four "types" over the same 24-quarter period; this plot underscores the nonmonotonic relationship between high school employment and post-secondary enrollment seen in table 4-M. The final panel of figure 1-M nets out differences in enrollment propensities across the four "types" by focusing only on those individuals who do not enroll in school at all during the first 24 quarters after high school. Panel c reveals that the cyclicality all but disappears and, more importantly, the gap in employment intensity between the 21+ category and the others persists. Males who work long hours during high school continue to do so upon leaving school, and they work more intensively than other non-enrolled high school graduates.

To summarize the differences between males in the 21+ category and those in the remaining three categories, members of the former sample are far more likely to be white than the others. In all likelihood, they also have lower AFQT scores, attend weaker high schools (despite having relatively high family income),

receive less post-secondary schooling, and work far more hours upon graduation from high school than their less employed counterparts. How do these differences translate into wages? The bottom few rows of table 4-M suggest that males in the 21+ category earn substantially higher wages than the others one year after high school graduation (average log wages of 1.49 versus 1.37-1.42, which translates into hourly wages of $4.50/hour versus $3.95-4.15/hour) and even six years after graduation (log wages of 1.94 versus 1.69-1.88, or $7.00/hour versus $5.40-6.55/hour). However, this wage gap all but disappears when I control for the sizeable difference in the accumulation of post-high school work experience. When I compute mean wages at the point where one year of work experience has been gained (or, alternatively, at the six year mark), there is virtually no difference in wages among the four "types." A more rigorous analysis of wages appears in section 4, but the statistics shown here underscore the difficulty of assessing the relationship between high school employment and wages, given the many confounding factors that exist.

The final characteristics that I summarize are intended to measure high school achievement. Table 6-M shows mean credits and grade point averages for the same four subsamples analyzed in table 4-M. The NLSY transcript data include the titles of each course taken in each grade of high school, along with the number of credits received (coded in Carnegie units for uniformity) and the grades received. I confine my attention to the courses taken in grades 11 and 12, and I group the courses into four aggregate categories: humanities and social studies, mathematics and science, vocational, and all other courses. The five most frequently reported course titles in each category are listed at the bottom of table 6-M.

Table 6-M reveals that the four "types" of high school students differ fairly predictably in their curricula choices and grades. Just as the 0 and 21+ samples were seen in table 4-M to have the lowest average AFQT scores and the lowest schooling completion levels, they also appear to receive the weakest academic training while in high school. The top panel of table 6-M shows that the typical male in the right-most employment group completes about 0.35 fewer credits in grades 11 and 12 than do his counterparts who work only 1-10 or 11-20 hours per week. A slightly smaller gap exists between males who do not work in high school and the intermediate groups. One Carnegie credit represents a year-long course (see footnote 6), so the gap of 0.35 credits represents something on the order of 60 fewer hours in the classroom over a two year period. Moreover, the gap in credits completed widens when we focus on courses in humanities, social studies, math, and science. Comparing students in the 21+ category to those in the 1-10 category, the former average almost 0.5 fewer credits in both humanities/social studies and math/science, while averaging one credit

more (that is, one additional year-long course) in vocational subjects. In fact, students in the 21+ category devote 31% of their classroom time to vocational subjects, on average, which is far more than any of the other groups.

The bottom panel of table 6-M shows that students in the 21+ category tend to receive grades that are significantly lower than the grades received by their less employed counterparts in every subject area except vocational courses. Interestingly, in the two academic areas (humanities/social studies and math/science), differences in the mean GPAs among the 0, 1-10, and 11-20 categories are statistically insignificant, while the 21+ category has a significantly lower mean GPA than any other group. In vocational subjects, however, there is a strong, positive correlation between the number of hours worked in high school and the grades received. Some students may receive high school credit for holding a part-time job (particularly those taking courses titled "general work experience" or something similar), in which case they might actually receive a boost to their grade point average from working long hours.

With few exceptions, data for female high school students reveal the same relationships that tables 4-M and 6-M and figure 1-M show for the males. In fact, my primary reason for presenting separate tables of summary statistics for males and females is to be consistent with the regression analysis in section 4, for the data reject the pooling across genders when I estimate the wage models. In comparing tables 4-M and 4-F, a notable difference between males and females is seen in the relationship between high school employment and AFQT scores. Males in the two extreme categories (0 and 21+ hours/week) have mean AFQT scores that are roughly equal to each other and significantly lower than the means for the intermediate categories. Among females, individuals who do not work in grades 11 and 12 have the lowest mean percentile AFQT score (35.5), but there is little difference between the means for the remaining three subsamples. Considering that individuals in the 21+ category have the lowest probability of attending college, regardless of gender, one would expect them to have below-average AFQT scores. (In making this statement, I assume that the "trainability" measured by AFQT scores reflects academic ability, and that individuals select into college on the basis of this ability.) Therefore, the pattern seen for the females is somewhat anomalous.

Two additional gender differences emerge in tables 4-M and 4-F. First, the weak, negative relationship between hours worked in high school and school quality seen for the males is even weaker for the females. Among females, for example, it is *not* the case that students in the 21+ category attend schools with the lowest average high school graduation rates and the highest average teacher turnover rates. Second, figure

1-F shows that females in the 21+ category work more hours per week than their counterparts in the period following high school graduation, which is also seen for the males in figure 1-M. However, figure 1-F shows a stronger convergence in the work effort of the four "types" of students than what is seen for the males. Moreover, figure 1-F shows that females in the 0 category are outliers in the opposite direction—that is, females who do not work in high school work far fewer hours than their counterparts after graduating, even after variation in post-secondary enrollment is taken into account.

4 Wage Models

The summary statistics shown in the preceding section demonstrate that the number of hours high school students choose to work are systematically related to a large number of characteristics that are likely to be correlated with subsequent wages. Many of these characteristics, such as the measures of schooling attainment, post-high school employment, and high school achievement, are recognized to be important determinants of wages because they reflect workers' past human capital investments.[12] The remaining characteristics (especially the person- and family-specific factors and the measures of school quality) may be proxies for human capital investments as well, and they may also be related to such intangibles as peer and family influence and labor market opportunities, all of which are likely to influence wages.

Because high school employment is correlated with so many wage determinants, it is apparent that one must proceed carefully in identifying the marginal, skill-enhancing effect of high school employment on subsequent wages. If wages were regressed on high school employment without proper controls for variation in schooling attainment, for example, the estimated effect of high school employment would be biased downward due to the negative correlation between hours worked in high school and subsequent school enrollment. If the wage model failed to control for variation in subsequent work experience, an upward bias might result, particularly if the wages were reported in the first few years after high school when high school "workers" have typically accumulated far more work experience than their nonemployed counterparts. Clearly, model specification is of paramount importance in the current application.

In estimating the relationship between high school employment and wages, I experiment not only

[12] As a result of the empirical work by Hanoch (1967), Mincer (1974), and legions of subsequent researchers, there is a broad consensus that schooling attainment and work experience are key "human capital" earnings determinants. Evidence on the relationship between high school achievement and subsequent earnings is less clear-cut. Levine and Zimmerman (1994) find that mathematics courses enhance the post-school wages of female college graduates, but have no significant effect on the wages earned by males and/or terminal high school graduates. Altonji (1992) finds only a weak relationship between courses taken in academic fields and subsequent wages after a large number of correlates are controlled for.

with various sets of regressors, but with a number of alternative samples and estimation techniques. The existing literature provides a multitude of estimates of the value of high school employment without reaching a consensus, yet researchers have made little effort to justify their model specifications and estimation techniques, let alone reconcile their results with others'.[13] Therefore, I present what I believe to be the "right" answer, but I also attempt to demonstrate how one might obtain a very different conclusion by pursuing a suboptimal estimation strategy. I devote the rest of this section to summarizing the results obtained from estimating a large number of wage models designed to answer the following questions:

- Do measures of high school employment contribute significantly to explaining the variation in post-high school wages? To what extent does the explanatory power of these measures depend on the inclusion or exclusion of other controls in the model?
- Are our inferences about the relationship between high school employment and subsequent wages sensitive to whether the sample includes within-person as well as interpersonal variation in wages?
- Does the estimated relationship between high school employment and subsequent employment change as workers ages? If so, how?
- Is it necessary (and possible) to control for correlation between high school employment and unobserved wage determinants?
- Is the relationship between high school employment and log wages linear and, if not, what is the nature of the nonlinearity?
- After examining the sensitivity of our inferences to numerous issues of model specification and estimation, can the "true," skill enhancing effect of high school employment on wages be identified? If so, what is the effect?
- Do the answers to the preceding questions differ for male and female workers?

4.1 Variables, Samples, and Estimation Methods

Much of my experimentation consists of estimating wage models that combine alternative sets of regressors. Table 7 provides a comprehensive list of the regressors used in at least one specification; there is considerable

[13] In the group of researchers whose work is cited in section 1, Ruhm (1995) is the only one to present results based on alternative model specifications and estimation techniques.

overlap between the variables listed in table 7 and the ones summarized in tables 4-6. The group headings in table 7 are particularly important because I use them throughout this section to refer to sets of regressors. When I say a wage model includes high school employment, for example, I mean it includes the three dummy variables AH_10, AH_20, and AH_21+ listed in table 7. A model that includes school characteristics controls for all seven variables listed in table 7 along with the seven corresponding "missing" indicators. (The baseline variables are given that heading because they are included in every wage model.)

The dependent variable used throughout the analysis is the logarithm of the CPI-deflated, average hourly wage, expressed in 1982 dollars. During each annual NLSY interview, information is obtained on the current earnings for jobs (employer spells) in progress and both the ending and "usual" earnings for jobs left subsequent to the previous interview. I use the information on current and usual earnings. Respondents are permitted to report their earnings in any units they choose (*e.g.*, annual, monthly, bi-weekly, or weekly income), and an average hourly rate of pay is computed for the public release of the NLSY data using the earnings information along with respondent-reported information on weeks worked per year and hours worked per week. This created rate of pay variable is the one that I use to form my dependent variable.

To associate a measure of work experience (X) with each wage, I count the cumulative number of hours worked from high school graduation to the date when the wage is reported. The tenure variable (T) is measured similarly, but the count begins at the reported starting date for the particular job. The information on hours worked comes from the week-by-week hours array mentioned in section 2. For X and T, as well as their higher order terms, I divide the cumulative number of hours worked by 2,000 (40 hours per week times 50 weeks) to convert to units of "full-time, year long" work. Note that by measuring labor market experience from high school graduation onward, I am assuming that every individual begins his career when he leaves high school. This is not an innocuous assumption, for it implies that the labor market experiences of terminal high school graduates and college students are treated identically. However, my earlier analysis of alternative career starting dates (Light, 1995) leads me to believe that this career initialization rule is preferred to a rule based on, for example, person-specific school completion dates. Because I include wages reported by post-secondary students, I define a variable called INSCHOOL, which equals one if the individual is enrolled when the wage is earned and zero otherwise. The PARTTIME variable, which equals one if the individual works less than 30 hours/week, also helps to control for differences between students and non-students.

In addition to estimating wage models that differ only in the choice of regressors, I also compare results based on different samples. For each gender, I use five alternative samples. The largest sample contains data for every wage reported by every respondent during the post-graduation period. These "all observations" samples contain 10,763 observations for 926 male workers and 10,899 observations for 971 female workers. These are my preferred samples because they makes full use of the information provided in the NLSY, but for illustrative purposes I also form four additional samples for each gender by taking cross-sections of the "all observations" samples. One subsample is formed by selecting only those wages earned one year after high school graduation or, more accurately, at the one-year mark plus or minus 3 months. The "1 year after high school" subsamples contain 992 observations for 925 male workers and 957 for 945 female workers. I form the remaining subsamples by selecting wages earned three, six, and nine years after high school. These cross-sectional samples needlessly discard information, but I use them to show what the relationship of interest looks like when one examines wages at a single point in time as the authors of previous work in this area have done. Tables 8-M and 8-F report means and standard deviations for each variable defined in table 7 for the five subsamples. (The proxy and instrumental variables will be described in section 4.2.)

The "all observations" sample contains multiple wage observations for most respondents. There are between 1 and 28 observations per person for the males, with a mean of 11.6 (standard deviation=4.4). For the females, the range is also 1-28 and the mean is 11.2 (standard deviation=4.3). It is inappropriate to view the residuals for these samples as independently distributed across observations, so I assume an error structure consisting of a person-specific (mean zero) random effect plus white noise. Except where otherwise stated, I assume that both components of the residual are uncorrelated with the regressors.

The four so-called cross-sectional samples also contain multiple wage observations for a small number of respondents because I use all wages reported within the relevant six-month window rather than restrict the sample to one observation per person. However, the amount of within-person variation is very small—*e.g.*, the "1 year" male sample has 925 individuals with one observation and 67 with two, and the "6 year" male sample has 651 individuals with one observation and 275 with two observations. Even though the assumption of independence of the error terms is not met, I use ordinary least squares (OLS) to estimate models based on these samples. I do so because the results are indistinguishable from what I obtain using generalized least squares (GLS) or, alternatively, limiting the sample to a true cross-section by eliminating observations.

4.2 Estimates

Tables 9-M and 9-F summarize the estimates from a series of wage models in which I use different combinations of regressors with each of the five samples. To obtain the statistics in the first row of table 9-M, I use the wages reported one year after high school and estimate a model via OLS that controls for nothing but the baseline characteristics defined in table 7. I then reestimate the same model after adding the three high school employment variables to the small list of regressors. The first three columns of statistics report the results of an F test for the null hypothesis that the addition of the high school employment variables contributes significantly to the prediction of the dependent variable. A "no" under the "reject at 95%" column means that I fail to reject the null hypothesis at a 95% confidence level. The remaining columns report the coefficients and standard errors for the three employment variables.

In subsequent rows of the top panel of table 9-M, I reestimate the two regressions described above after adding the regressors listed. In row 2, for example, I control for the baseline variables *plus* the two schooling attainment dummy variables, with and without the high school employment variables. In row 3, I control for the baseline variables, schooling attainment, and the six experience and tenure variables. The six sets of regressions are repeated for each of the four remaining samples to obtain the estimates in the other panels. The analysis summarized in tables 9-M and 9-F involves the estimation of 60 wage models for each gender, with as many as 63 covariates per model, so I present these succinct tabulations of the results rather than the full set of parameter estimates for each model.

In a sense, the models underlying tables 9-M and 9-F are "straw men" that demonstrate that almost anything can be inferred about the relationship between high school employment and subsequent wages. For males, I can at least claim that the various estimates form a consistent and seemingly sensible pattern. One year after high school, males who worked 21+ hours/week in grades 11-12 earn significantly more than their (previously) nonemployed or less employed counterparts: the estimated wage premium for these males is about 12%, regardless of which controls are included. Schooling attainment and post-high school employment are not expected to exert much influence because they show little variation this soon after graduation, but it is somewhat surprising that the AH_21+ coefficient is invariant to the addition of other controls. The coefficients for AH_10 and AH_20 are smaller than those for AH_21+—hinting at the existence of smaller rewards for males who worked less intensively in high school—but statistically insignificant at a

5% significance level. The next few panels of table 9-M reveal that the wage premium enjoyed by males who worked 21+ hours/week in high school decreases over time, falling to zero somewhere between six and nine years after graduation. These panels also reveal that the addition of most regressors (especially post-high school employment) to the model causes a substantial decrease in the AH_21+ coefficient. At the three-year mark, for example, the coefficient is 0.160 when the baseline variables are the only additional controls and 0.096 when all remaining regressors are added to the model.

Table 9-F tells a very different story for females. High school employment appears to have no (statistically significant) effect on the wages of female workers except when they are six years past high school graduation. At this point—and after the entire list of regressors is controlled for—females who worked 11-20 hours a week in grades 11-12 appear to earn about 9% more than all other female workers. Quite inexplicably, high school employment does not appear to explain wages in any sample except the "6 years after high school" cross-section.

The patterns in tables 9-M and 9-F provide partial answers to some of the questions posed earlier in this section. First, it appears that the explanatory power of high school employment erodes as additional regressors are added to the model. The addition of regressors typically causes the coefficients for high school employment to shrink, the standard errors to increase, and the F statistic to decline dramatically in value. This tendency is seen most clearly in the "6 years after high school" sample for males, where high school employment makes a statisticially significant contribution to the prediction of log wages in rows 1 and 2, but no contribution when additional regressors are added. Among women, however, the null hypothesis that high school employment contributes to the model is rejected more often than not.[14]

Second, as noted above, the fact that the estimates differ across the four cross-sectional samples suggests that the relationship between high school employment and wages changes over time. I explore the time-varying effects of high school employment further in tables 10-M and 10-F, where I work exclusively with the "all observations" samples. The longitudinal samples allow me to look at interactions between high school employment and *actual* experience (recall that actual experience varies within each cross-sectional sample), and they also produce far more efficient estimates of the time-varying effects of high school employment

[14] The coefficients for the post-high school employment variables are jointly significant at a 5% significance level in every model estimated, and the coefficients for the schooling attainment variables are jointly significant for every model estimated with the exception of those using the "1 year after high school" cross-section. With few exceptions, the coefficients for the family and high school achievement variables are jointly significant as well. The school characteristics rarely prove to have a statistically significant effect on wages, singly or jointly, possibly because information is missing for a relatively large proportion of the sample. These findings continue to hold when I rearrange the order in which I add sets of regressors.

than does a series of cross-sections. In fact, the primary value of the series of cross-sections used for tables 9-M and 9-F is that they demonstrate that researchers are taking an unnecessarily narrow view of the role of high school employment when they use single, point-in-time estimates. Depending on which "point" is chosen, the inferences changes dramatically.

A final set of estimates is summarized in tables 10-M and 10-F, where I use the "all observations" sample to explore the remaining questions of interest. Specifically, I consider (*a*) the time-varying effects of high school employment on wages (columns 1-2), (*b*) nonlinearities in the relationship between high school employment and log wages (columns 4-6), and (*c*) methods for contending with potential correlation between high school employment and unobserved factors (columns 2, 3, 5, and 6). Each model estimated for tables 10-M and 10-F is a modified version of the specification presented in the bottom row of tables 9-M and 9-F.

Recall that tables 9-M and 9-F suggest that the effect of high school employment on wages falls over time for males, but peaks at around 6 years of potential experience (time elapsed since high school graduation) for females. To obtain the estimates in column 1 of tables 10-M and 10-F, I use a specification that is better able to identify time-varying effects than are the cross-sectional estimates examined earlier. While the series of cross-sections shows how the relationship between high school employment and wages changes over *time*, the models used for tables 10-M and 10-F ask how it changes as workers gain *work experience*, which I believe is the more relevant question. Furthermore, models based on the "all observations" sample can identify continuous changes in the effect of high school employment, rather than identifying changes at discrete intervals. The estimates are also far more efficient, for more data are used and the coefficients for BLACK, HISPANIC, *etc.* are not reestimated at every point in time.

After experimenting with interactions between the three high school employment variables and X, X^2, and X^3, as well as other specifications, I determined that the optimal way to identify time-varying effects is to use an unrestricted spline function. I divide the X-axis into six segments—less than or equal to one year of actual experience, two years, three years, four years, five years, and six or more years—and define a dummy variables for every one of the 24 AH-X combinations. When a person who averaged 15 hours of work per week in high school reports a wage at three years of experience, for example, the variable representing this particular AH-X combination (AH_20|X=3) equals one and all other combinations equal zero.

Column 1 of table 10-M indicates that the returns to high school employment for males are concentrated

among individuals who work relatively intensively in high school, and that these returns rise and then fall as experience is gained. The interactions between X and both AH_0 and AH_10 tend to yield coefficients that are small in absolute value (and sometimes negative), with extremely large standard errors. At no point in time is there a wage benefit associated with working 0 or 1-10 hours per week in grades 11-12. The coefficients for the interactions between AH_20 and X are statistically insignificant except at experience levels of five years and higher. These estimates suggest that males who averaged 11-20 hours of work per week in high school earn more than their nonemployed (and less employed) counterparts only after gaining several years of post-high school work experience. The pattern seen among the AH_21+ interactions indicates that males who worked 21 or more hours/week in high school receive a substantial wage premium in the years that follow graduation. In contrast to what table 9-M reveals, however, the estimates in table 10-M show that this wage premium rises as work experience is gained and then falls after about five years of experience. (It takes virtually all workers far more than five years of calendar time to accumulate five years of work experience, given that X is measured in units of 2,000 hours.) Table 10-F shows a similar pattern for females.

Throughout the analysis, I have controlled for high school employment with three categorical dummy variables to distinguish between mean wages earned by individuals who averaged 0, 1-10, 11-20, and 21+ hours of work per week in grades 11-12. A more common practice in the literature is to use a single, continuous measure of high school employment or, alternatively, a continuous measure and its square—that is, to assume a linear or quadratic relationship between high school employment and log wages. These assumptions are testable, of course, and I have chosen the categories used thus far because the data prefer them to any simple alternative, including alternatives that group hours worked into different categories. In column 4 of tables 10-M and 10-F, I show estimates obtained using one of the alternatives to help substantiate my claim. I control for the average number of hours per week worked in high school (0-51 for males, 0-44 for females, with the means and standard deviations reported in tables 3-M and 3-F) and the square of that variable. The issue of interactions between high school employment and work experience is set aside, so the column 4 estimates should be compared to those appearing in the bottom row of tables 9-M and 9-F.

Column 4 of table 10-M reveals that, for males, the coefficient for the continuous measure of high school employment (AH) is 0.005 and the coefficient for AH^2 is -0.00009. These coefficients imply that a

young man who worked 8 hours/week in grades 11-12 earns 3.3% more than someone who did not work at all, a male who worked 15 hours/week earns 5.3% more, and a male who worked 25 hours/week earns 6.6% more. The latter estimate is very close to the wage premium of 6.3% based on the categorical specificaton (see table 9-M). However, the quadratic specification implies that males who worked less intensively in high school receive wage premia as well, whereas the more flexible specification reveals no such effect. In table 10-F, the quadratic specification implies wage boosts of 3.5%, 5.2%, and 5.4% for females who worked 8, 15, and 25 hours/week in high school. Again, the quadratic specification seriously overestimates the returns to light-to-moderate high school employment.[15]

Next, I ask whether the estimates of the wage benefits of high school employment are biased by the correlation between high school employment and unobserved factors such as ability, ambition, and peer influence, all of which may affect post-high school wages. To address this issue, I begin by using a small set of proxy variables intended to control for unobserved ability. The ideal proxy would be scores from an intelligence test administered prior to the start of high school, for such a proxy would control for any "pre-existing" ability differences that influence the decision to work while in high school. As part of the high school transcript collection, information on aptitude and intelligence tests given to the respondent and contained in his or her school record was collected, so I have such "ideal" proxies for a number of sample members. The information coded for each test consists of the total and percentile score and the month, year, and grade level in which it was taken. The specific tests for which information is available (for varying subsets of respondents) include the California Test of Mental Maturity, the Otis-Lennon Mental Ability Test, the Differential Aptitude Test, and the Stanford-Binet Intelligence Scale.

I form a single variable (PRETEST) defined as the percentile score for whichever intelligence test is reported for the given respondent. When more than one test score is available for a respondent, I use the test taken in grade 9 or as soon before grade 9 as possible. When no test score is available for a respondent, I set the test score equal to zero and set a missing indicator equal to one; when a test score is reported, the missing indicator equals zero. Summary statistics for the PRETEST variable and associated missing indicator appear in tables 8-M and 8-F. These tables show that, unfortunately, information is missing for 61% of males and 64% of females. Because this "ideal" proxy suffers from a severe missing data problem, I

[15]When a linear specification is used (that is, when AH^2 is dropped, the coefficients for AH are 0.0021 (standard error=0.0008) for males and 0.0019 (0.0009) for females. This specification does not overstate the return to low levels of high school employment as seriously as does the quadratic model, but it *understates* the return to 21+ hours/week of high school employment.

also experiment with percentile AFQT scores as a proxy for ability. As discussed in footnote 9, these scores are taken from a test administered in 1980, at which point respondents' schooling attainment ranged from grade 9 to the completion of college. Hence, AFQT scores do not control for the skills that each respondent embodied at the time that the high school employment decision was made.

Columns 2, 3, and 5 of tables 10-M and 10-F report the results from adding proxy variables to alternative specifications of the wage model. One point to be made about these estimates is that the coefficients for the proxy variables do not differ significantly from zero (in isolation or jointly) in any of the three models. The second point is that, comparing column 2 to column 1, column 3 to the bottom row of tables 9-M and 9-F, and column 5 to column 4, it is apparent that adding proxies for ability does not change my inferences about the relationship between high school employment and wages. These two conclusions continue to hold when I use AFQT scores or PRETEST scores in isolation.

The inclusion of proxy variables may have no affect on the high school employment coefficients because unobserved heterogeneity does not bias the estimates, or because the test scores are weak proxies for unobserved factors that are correlated with high school employment. Therefore, as an alternative to the use of proxies, I attempted to find instrumental variables for the high school employment measures. The instruments that I use are the unemployment rate prevailing in the respondent's region of residence at the time he or she leaves high school and a dummy variable indicating whether the respondent's high school offers vocational and technical courses; the latter variable is missing for numerous respondents, so I again form a missing variable indicator. Unemployment rates are shown in tables 4-M and 4-F to be systematically related to high school unemployment, presumably because they reflect the job opportunities available to high school students. The availability of vocational courses is also likely to influence students' propensities to seek employment: students may substitute a job for the opportunity to acquire vocation skills within the classroom or, as tables 6-M and 6-F seem to suggest, they may be inclined to combine employment with a vocational curriculum. At the same time, it is reasonable to assume that these labor market and school opportunities are unrelated to individual students' unobserved characteristics, so they appear to be suitable choices for instruments. Tables 8-M and 8-F present summary statistics for the instrumental variables.

I cannot estimate the column 1 model in tables 10-M and 10-F using instrumental variables because I do not have enough instruments for identification, given that there are 18 endogenous variables. When I estimate the column 3 model (or, more accurately, the model associated with the bottom row of tables

9-M and 9-F, for the proxy variables are dropped from the instrumental variables specifications), I obtain nonsensical results. For the males, for example, I obtain coefficients for AH_10, AH_20, and AH_21+ of -3.58, 0.88, and 5.29. An examination of the first stage estimates reveals why this problem arises: the R^2s are around 0.009. Apparently, the "cautionary tale" told by Bound, Jaeger, and Baker (1993) about the biases that result when weak instruments are used applies to my particular application. However, experience has suggested that it is often easier to use instruments for continuous variables than for dummy variables, so I apply the instrumental variables method to the specification shown in column 4 of tables 10-M and 10-F. The estimates shown in column 6 are not quite as nonsensical as the ones alluded to above, but a severe bias still appears to exist: for both males and females, the use of instrumental variables causes the AH coefficient to increase by a factor of ten and the AH^2 coefficient to increase in absolute value by a factor of 33.

5 Concluding Comments

In this study, I identify the "net" effect of high school employment on post-school wages by estimating a wage model that controls for a broad array of personal, family, and high school characteristics, along with detailed measures of high school achievement, schooling attainment, and post-school employment. I also attempt to control for unobserved factors that may influence both wages and the decision to work while in high school, but my proxy and instrumental variables are demonstrably flawed. Nonetheless, I conclude that the net effect of high school employment on wages is generally not significantly different than zero. Individuals who average more than 20 hours of work per week in high school *do* receive a return to their high school experience, but the effect is short-lived. Focusing on males, for example, the wage boost associated with 21+ hours per week of high school employment rises from 6% immediately after high school to about 10% when 4-5 years of post-high school work experience has been accrued, and then declines. Females who work 21+ hours per week in high school receive a similar return, but the post-school wages of those who are less intensively employed in high school are roughly the same as those who are nonemployed.

One interpretation of the results reported here is that the transitory wage boost enjoyed by individuals who work very intensively in high school is not a return to marketable skills *per se,* but instead reflects job-seeking skills obtained via high school employment. That is, high school employment might benefit young workers by teaching them how to locate good employment opportunities and communicate effectively with

potential employers, and perhaps by providing a valuable signal (of reliability, for example) to potential employers. Such benefits would cause high school workers to proceed "up the job ladder" at a different rate than their counterparts, and perhaps explain the nonlinear wage benefit that they receive. I suggest this interpretation because if high school employment were to benefit workers by enhancing their stock of marketable skills, there is no reason to believe the wage effect would be time-varying or short-lived. These notions can be explored further by examining the relationship between high school employment and patterns of job mobility and wage growth, but I will leave such analyses for future work.

In closing, it is worth noting that by focusing exclusively on average hourly wages I am, in all likelihood, understating any career-enhancing benefits of high school employment. After all, even if high school employment has *no* effect on average hourly wages, it will significantly increase lifetime earnings through its positive effect on post-school employment. As I show in section 3, individuals who average 21+ hours of work per week in high school continue to work very intensively after graduation relative to their counterparts who gained less work experience while in high school. Furthermore, high school employment may have a positive impact on nonwage components of career "success," such as occupational status and fringe benefits. Ruhm (1995) analyzes the relationship between high school employment and alternative measures of career outcomes, so I have opted to forego such an extension here.

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Table 1

Number of Sample Deletions by Reason

Number of Respondents	Reason for Deletion
12,686	Original NLSY sample
3,676	Transcript data not collected
9,010	
-2,552	Did not graduate from high school
6,458	
- 74	Date last enrolled in high school indeterminate
6,384	
-1,103	Transcript missing course information for grades 11 and 12
5,281	
-3,299	Graduate from high school before January, 1980
1,982	
- 46	Graduate from high school before sixteenth birthday
1,936	
- 39	No post-high school wages
1,897	Sample used for analysis (926 males, 971 females)

Table 2

Gender and Race Composition of Sample

	Males		Females	
Race	Number	Percent of Sample	Number	Percent of Sample
White	606	65.4	574	59.1
Black	207	22.4	241	24.8
Hispanic	113	12.2	156	16.1
All	926		971	

Table 3-M (Males)

Distribution of Average Hours Worked Per Week
in Grades 11 and 12 and Preceding Summers

Average Hours Worked Per Week	Percent of Individuals				
	Summer Before Grade 11	Grade 11	Summer Before Grade 12	Grade 12	Grades 11 and 12
0	36.8	35.7	25.4	26.8	20.4
1-10	18.8	29.0	17.0	22.2	35.2
11-20	22.5	21.9	24.8	24.2	27.9
21+	21.9	13.3	32.8	26.8	16.5
Mean avg. hours/week	11.0	8.4	14.9	12.5	10.5
(standard deviation)	(12.1)	(10.0)	(13.4)	(11.9)	(9.9)
Mean among workers	17.4	13.0	19.9	17.1	12.8
(standard deviation)	(11.0)	(9.7)	(11.8)	(10.8)	(9.5)
Number of individuals	921	926	926	926	926

Table 3-F (Females)

Distribution of Average Hours Worked Per Week
in Grades 11 and 12 and Preceding Summers

Average Hours Worked Per Week	Percent of Individuals				
	Summer Before Grade 11	Grade 11	Summer Before Grade 12	Grade 12	Grades 11 and 12
0	51.5	45.7	37.7	30.7	27.2
1-10	9.9	15.0	12.2	16.4	38.9
11-20	17.3	14.4	19.1	15.6	23.0
21+	21.3	24.8	31.1	37.4	10.9
Mean avg. hours/week	6.9	6.1	9.9	10.6	8.3
(standard deviation)	(10.0)	(8.3)	(11.5)	(11.2)	(8.7)
Mean among workers	14.3	11.3	15.9	15.3	11.1
(standard deviation)	(10.0)	(8.4)	(10.9)	(10.4)	(8.3)
Number of individuals	962	971	971	971	971

Table 4-M (Males)

Characteristics of Sample by Average Hours Worked Per Week in Grades 11-12

	Average Hours Worked Per Week in Grades 11-12							
	0		1-10		11-20		21+	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Personal, family, labor market characteristics								
1 if white	0.49		0.67		0.72		0.72	
1 if black	0.38		0.22		0.16		0.14	
1 if Hispanic	0.14		0.11		0.12		0.14	
AFQT score	42.98	30.38	48.85	28.49	54.67	27.41	43.30	25.14
1 if foreign born	0.04		0.05		0.07		0.06	
Net family income (in 1000s of 1982 dollars)[a]	20.59	14.69	26.17	17.30	29.49	15.41	31.80	18.22
Number of siblings	3.71	2.78	3.18	2.24	2.98	1.94	3.33	2.63
Father's highest grade completed	11.09	3.74	12.32	3.52	12.41	3.47	12.04	3.26
Area unemployment rate	9.42	3.90	8.94	3.22	8.55	3.21	8.60	3.46
1 if live in urban area	0.68		0.77		0.77		0.74	
High school characteristics								
Total enrollment in high school (1000s)	1.23	0.77	1.30	0.81	1.32	0.72	1.40	0.80
Student-teacher ratio	18.96	4.42	18.97	3.96	18.98	4.04	19.01	3.72
Percent of students classified as disadvantaged	26.33	23.57	21.50	19.52	19.16	18.66	15.80	17.54
Average daily percent attendance	90.34	12.89	89.57	14.34	89.49	14.16	88.88	16.81
Percent of 10th graders who fail to graduate	12.68	14.67	14.91	20.81	15.56	22.98	15.35	21.19
Average salary for first-year teachers (1000s)	10.68	1.32	10.87	1.17	10.87	1.00	10.80	1.49
One year turnover rate among full-time teachers	6.75	7.46	6.57	8.14	6.78	8.95	7.21	8.12
Schooling expectations and attainment								
Highest grade expect to complete[b]	14.45	2.12	14.65	2.17	14.86	2.01	14.22	2.03
Highest grade completed by 1991	13.70	2.00	13.79	2.05	14.09	2.17	13.28	1.85
Weeks enrolled in school in first year after HS	6.42	5.45	6.38	5.34	6.86	5.45	5.34	5.33
Weeks enrolled in school in 1st 6 years after HS	21.17	24.64	20.96	25.35	22.91	24.88	15.61	22.26
1 if no enrollment after HS	0.44		0.40		0.44		0.54	
Post-high school employment								
Percent of weeks worked in first year after HS	35.74	34.05	51.24	34.23	64.04	33.44	77.68	29.93
Percent of weeks worked in 1st 6 years after HS	56.44	27.81	60.29	27.93	67.97	28.44	79.71	25.05
Average hours worked per week								
In first year after HS[c]	11.91	12.85	15.68	12.33	20.15	13.39	28.80	15.02
In 1st 6 years after HS[c]	21.66	12.63	22.82	12.62	25.97	13.23	33.48	13.03
During work weeks in first year after HS[d]	25.32	18.17	28.82	14.78	30.55	12.69	36.76	12.02
During work weeks in 1st 6 years after HS[d]	37.10	9.35	37.20	9.55	37.54	8.70	41.70	8.90
Log of average hourly wage (1982 dollars)								
1 year after HS	1.37	0.32	1.42	0.38	1.42	0.28	1.49	0.34
6 years after HS	1.69	0.48	1.80	0.48	1.88	0.43	1.94	0.49
After gaining 1 year of post-HS work experience	1.45	0.40	1.49	0.40	1.50	0.34	1.50	0.37
After gaining 6 years of post-HS work experience	1.87	0.52	1.90	0.40	2.00	0.43	1.96	0.43
Number of observations [percent of 926][e]	189	[20.4]	326	[35.2]	258	[27.9]	153	[16.5]

[a]Household income from all sources net of respondent's wage earnings, for year in which respondent leaves HS.

[b]Reported in 1979, 1981, or 1982, whichever is closest to date of exit from high school.

[c]Total weeks worked in one (six) year(s) divided by 52 (312) weeks.

[d]Total weeks worked in one (six) year(s) divided by number of work weeks.

[e]Summary statistics are computed for nonmissing observations only. See Table 5 for sample size within each cell.

Table 4-F (Females)

Characteristics of Sample by Average Hours Worked Per Week in Grades 11-12

	Average Hours Worked Per Week in Grades 11-12							
	0		1-10		11-20		21+	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Personal, family, labor market characteristics								
1 if white	0.42		0.59		0.72		0.74	
1 if black	0.41		0.24		0.14		0.12	
1 if Hispanic	0.17		0.17		0.14		0.14	
AFQT score	35.54	25.65	44.25	26.49	48.07	23.33	43.82	24.51
1 if foreign born	0.03		0.04		0.07		0.04	
Net family income (in 1000s of 1982 dollars)[a]	19.34	14.29	26.44	17.27	27.57	15.58	27.82	14.45
Number of siblings	3.70	2.73	3.37	2.37	3.22	2.19	3.38	1.97
Father's highest grade completed	10.67	3.58	11.84	3.66	12.11	2.94	11.05	2.79
Area unemployment rate	9.21	3.29	8.45	3.00	8.71	3.56	8.08	3.12
1 if live in urban area	0.67		0.79		0.80		0.71	
High school characteristics								
Total enrollment in high school (1000s)	1.20	0.75	1.38	0.78	1.42	0.79	1.44	0.70
Student-teacher ratio	19.50	5.06	19.22	4.17	18.99	3.76	19.56	4.09
Percent of students classified as disadvantaged	28.52	24.36	19.20	18.34	17.25	18.11	15.21	15.91
Average daily percent attendance	89.59	13.67	89.39	14.03	89.12	15.69	87.49	18.21
Percent of 10th graders who fail to graduate	18.19	23.05	13.79	17.78	15.75	23.62	12.24	13.83
Average salary for first-year teachers (1000s)	10.61	1.31	10.72	1.22	10.69	1.11	10.89	0.82
One year turnover rate among full-time teachers	7.23	9.04	7.34	8.47	6.50	5.67	7.04	8.04
Schooling expectations and attainment								
Highest grade expect to complete[b]	14.31	2.04	14.61	2.02	14.54	2.01	14.14	1.93
Highest grade completed by 1991	13.52	1.96	13.86	2.01	13.55	1.97	12.86	1.64
Weeks enrolled in school in first year after HS	6.41	5.41	6.44	5.48	6.05	5.41	3.75	4.83
Weeks enrolled in school in 1st 6 years after HS	20.17	24.50	21.52	24.37	17.79	22.14	8.58	16.57
1 if no enrollment after HS	0.44		0.41		0.48		0.61	
Post-high school employment								
Percent of weeks worked in first year after HS	25.86	30.53	51.94	36.33	66.64	33.98	80.50	26.72
Percent of weeks worked in 1st 6 years after HS	50.79	26.32	64.50	25.98	71.03	25.31	76.96	22.44
Average hours worked per week								
In first year after HS[c]	7.30	9.60	13.82	11.99	19.64	13.00	28.20	11.91
In 1st 6 years after HS[c]	17.43	10.31	21.66	10.53	25.04	10.98	28.90	10.71
During work weeks in first year after HS[d]	18.93	17.72	22.98	13.99	27.29	12.96	35.00	9.60
During work weeks in 1st 6 years after HS[d]	33.66	9.35	33.09	8.12	34.55	8.02	37.05	6.98
Log of average hourly wage (1982 dollars)								
1 year after HS	1.24	0.34	1.31	0.39	1.32	0.28	1.33	0.31
6 years after HS	1.53	0.53	1.66	0.48	1.72	0.43	1.72	0.44
After gaining 1 year of post-HS work experience	1.37	0.43	1.37	0.42	1.39	0.35	1.40	0.34
After gaining 6 years of post-HS work experience	1.70	0.41	1.80	0.50	1.79	0.45	1.79	0.44
Number of observations [percent of 971][e]	264 [27.2]		378 [38.9]		223 [23.0]		106 [10.9]	

[a]Household income from all sources net of respondent's wage earnings, for year in which respondent leaves HS.

[b]Reported in 1979, 1981, or 1982, whichever is closest to date of exit from high school.

[c]Total weeks worked in one (six) year(s) divided by 52 (312) weeks.

[d]Total weeks worked in one (six) year(s) divided by number of work weeks.

[e]Summary statistics are computed for nonmissing observations only. See Table 5 for sample size within each cell.

Table 5

Number of Nonmissing Observations Used to Compute Summary Statistics in Tables 4-M and 4-F

	Number of Observations							
	MALES				FEMALES			
	0	1-10	11-20	21+	0	1-10	11-20	21+
Personal, family, labor market characteristics								
1 if white	189	326	258	153	264	378	223	106
1 if black	189	326	258	153	264	378	223	106
1 if Hispanic	189	326	258	153	264	378	223	106
AFQT score	184	323	253	148	257	370	220	102
1 if foreign born	189	326	258	153	264	378	223	106
Net family income	151	261	209	109	201	293	175	74
Number of siblings	189	326	258	153	264	378	223	106
Father's highest grade completed	155	287	240	139	229	329	203	99
Area unemployment rate	185	324	257	148	261	375	220	100
1 if live in urban area	189	326	258	153	264	378	223	106
High school characteristics								
Total enrollment in high school	147	253	201	116	197	277	171	81
Student-teacher ratio	144	245	196	113	193	270	162	79
Percent of students classified as disadvantaged	129	219	180	96	172	243	144	72
Average daily percent attendance	148	256	213	121	199	278	172	83
Percent of 10th graders who fail to graduate	146	251	205	113	201	271	169	78
Average salary for first-year teachers (1000s)	139	252	208	113	188	267	165	82
One year turnover rate among full-time teachers	146	258	208	119	202	279	174	80
Schooling expectations and attainment								
Highest grade expect to complete	183	325	248	147	255	363	213	95
Highest grade completed by 1991	189	326	258	153	264	378	223	106
Weeks enrolled in school in first year after HS	189	326	258	153	264	378	223	106
Weeks enrolled in school in 1st 6 years after HS	189	326	258	153	264	378	223	106
1 if no enrollment after HS	189	326	258	153	264	378	223	106
Post-high school employment								
Percent of weeks worked in first year after HS	189	326	258	153	264	378	223	106
Percent of weeks worked in 1st 6 years after HS	189	326	258	153	264	378	223	106
Average hours worked per week								
In first year after HS	189	326	258	153	264	378	223	106
In 1st 6 years after HS	189	326	258	153	264	378	223	106
During work weeks in first year after HS	189	326	258	153	264	378	223	106
During work weeks in 1st 6 years after HS	189	326	258	153	264	378	223	106
Log of average hourly wage								
1 year after HS	114	252	209	123	130	291	177	95
6 years after HS	161	260	216	137	197	308	185	87
After gaining 1 year of post-HS work experience	180	301	242	143	240	355	211	100
After gaining 6 years of post-HS work experience	103	182	169	95	116	230	147	67

Table 6-M (Males)

Credits Taken and Grade Point Average by Subject Area
and Average Hours Worked Per Week in Grades 11-12

Subject Area[a]	Average Hours Worked Per Week in Grades 11-12							
	0		1-10		11-20		21+	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	Number of credits taken							
Humanities and social studies	4.38	1.30	4.36	1.36	4.23	1.39	3.88	1.29
Mathematics and natural science	1.91	1.40	1.99	1.50	1.87	1.42	1.55	1.50
Vocational subjects	1.99	1.73	2.37	2.01	2.70	2.04	3.30	2.16
Other subjects	2.25	1.80	2.03	1.45	1.92	1.46	1.65	1.38
All courses	10.49	1.58	10.75	1.49	10.72	1.57	10.38	1.95
	Percentage of total credits taken							
Humanities and social studies	42.05	12.08	40.77	12.16	39.78	12.26	37.86	11.91
Mathematics and natural science	18.00	12.70	18.35	13.53	17.63	13.55	14.41	12.41
Vocational subjects	21.38	16.39	22.18	18.35	24.90	18.10	31.48	19.41
Other subjects	18.58	11.66	18.71	12.96	17.69	13.05	16.25	13.76
	Grade point average							
Humanities and social studies	2.34	0.84	2.36	0.81	2.37	0.79	2.21	0.71
Mathematics and natural science	1.90	1.16	1.97	1.16	1.98	1.15	1.66	1.19
Vocational subjects	2.25	1.17	2.23	1.29	2.40	1.20	2.53	1.05
Other subjects	2.50	1.24	2.62	1.19	2.58	1.24	2.33	1.33
All courses	2.47	0.70	2.56	0.67	2.57	0.64	2.47	0.63
Number of observations [percent of 926]	189	[20.4]	326	[35.2]	258	[27.9]	153	[16.5]

[a]The five most frequently reported course titles in each category, in descending order, are:
Humanities/social studies: American History, English III, American Government, English IV, Popular Literature.
Mathematics/science: Chemistry I, Algebra II, Physics I, Geometry I, Biology.
Vocational: General Work Experience, Typewriting I, Accounting, Automobile Mechanics, Auto Shop I.
Other: Physical Education, Health, Band/Orchestra, Driver Education, Art I.

Table 6-F (Females)

Credits Taken and Grade Point Average by Subject Area
and Average Hours Worked Per Week in Grades 11-12

Subject Area[a]	Average Hours Worked Per Week in Grades 11-12							
	0		1-10		11-20		21+	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	Number of credits taken							
Humanities and social studies	4.53	1.24	4.47	1.31	4.28	1.37	3.85	1.10
Mathematics and natural science	1.49	1.30	1.54	1.35	1.42	1.34	1.12	1.11
Vocational subjects	2.33	1.92	2.22	1.96	2.82	1.99	3.19	1.94
Other subjects	2.46	1.64	2.32	1.41	2.05	1.57	2.22	1.60
All courses	10.81	1.52	10.56	1.69	10.56	1.67	10.37	1.81
	Percentage of total credits taken							
Humanities and social studies	42.42	11.63	42.74	11.51	40.96	12.85	37.81	11.23
Mathematics and natural science	13.59	11.57	14.26	12.11	13.37	12.40	10.85	10.67
Vocational subjects	21.30	16.66	20.65	17.06	26.51	17.77	30.14	17.12
Other subjects	22.69	14.55	22.35	13.85	19.16	14.01	21.20	14.29
	Grade point average							
Humanities and social studies	2.55	0.80	2.60	0.79	2.65	0.72	2.52	0.76
Mathematics and natural science	1.93	1.32	1.91	1.34	1.80	1.35	1.67	1.30
Vocational subjects	2.32	1.30	2.25	1.35	2.54	1.21	2.62	1.13
Other subjects	2.79	1.14	2.84	1.12	2.66	1.19	2.56	1.25
All courses	2.71	0.67	2.71	0.69	2.76	0.61	2.67	0.65
Number of observations [percent of 971]	264	[27.2]	378	[38.9]	223	[23.0]	106	[10.9]

[a]The five most frequently reported course titles in each category, in descending order, are:
Humanities/social studies: American History, English III, American Government, English IV, Psychology.
Mathematics/science: Chemistry I, Algebra II, Geometry I, Biology, Physics I.
Vocational: General Work Experience, Typewriting I, Accounting, Shorthand, Office Practice.
Other: Physical Education, Choir, Health, Band/Orchestra, Driver Education.

Table 7

Names and Definitions of Variables Used in Regression Analysis

Variable Name	Definition
Dependent variable	
WAGE*	Log of average hourly wage (1982 dollars)
High school employment	1 if average hours worked/week in grades 11-12 is
AH_10	1-10
AH_20	11-20
AH_21+	21+
Baseline characteristics[a]	
BLACK	1 if respondent is black
HISPANIC	1 if respondent is Hispanic
KIDS*	1 if child under the age of 6 is present
MARRIED*	1 if respondent is married
DIVORCED*	1 if respondent is divorced
INSCHOOL*	1 if currently enrolled in school
PARTTIME*	1 if work less than 30 hours/week
UNION*#	1 if union job
CITY*	1 if live in urban area
SOUTH*	1 if live in South
GOVT*	1 if public sector job
Schooling attainment	
HS*	1 if highest grade completed is 12
COLLEGE*	1 if highest grade completed is 16+
Post-high school employment[b]	
X*	Years of post-high school work experience
T*	Years of tenure with current employer
Family characteristics	
FOREIGN	1 if foreign born
NUMSIBS	Number of siblings
FATHER_ED#	Father's highest grade completed
INCOME#	Net family income (1000s of 1982 dollars)[c]
School characteristics	
SCHOOLSIZE#	Total enrollment in high school (1000s)
RATIO#	Student-teacher ratio
DISADVANTAGED#	Percent of students classified as disadvantaged
ATTENDANCE#	Average daily percent attendance
DROPOUT#	Percent of 10th graders who fail to graduate
TURNOVER#	One year turnover rate among full-time teachers
SALARY#	Average salary for first-year teachers (1000s)
High school achievement	
CRED_HUMSOC	Credits taken in humanities/social science
CRED_MATHSCI	Credits taken in mathematics/natural science
CRED_VOC	Credits taken in vocational subjects
CRED_OTHER	Credits taken in other subjects
GPA_HUMSOC	Grade point average (GPA) in humanities/social science
GPA_MATHSCI	GPA in mathematics/natural science
GPA_VOC	GPA in vocational subjects
GPA_OTHER	GPA in other subjects

[a]Baseline characteristics also include dummy variables indicating the calendar year in which the wage was earned.

[b]Post-high school employment characteristics also include X^2, X^3, T^2, and T^3.

[c]For the year in which the respondent leaves high school.

#Denotes regressors for which some observations have missing values. A missing value indicator is defined for these variables; see the note to tables 8-M and 8-F.

*Denotes regressors that vary over time after the respondent has left high school.

Table 8-M (Males)

Summary Statistics for Samples Used in Regression Analysis

	1 year after HS			3 years after HS			6 years after HS			9 years after HS			All observations		
Variable	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.
Dependent variable															
WAGE	1.41	.33		1.51	.40		1.79	.49		1.95	.51		1.70	.49	
High school employment															
AH_10	.37			.36			.37			.34			.36		
AH_20	.31			.30			.26			.28			.29		
AH_21+	.19			.19			.18			.19			.19		
Baseline characteristics															
BLACK	.17			.18			.22			.23			.20		
HISPANIC	.13			.12			.13			.13			.13		
KIDS	.02			.07			.21			.29			.17		
MARRIED	.03			.09			.28			.47			.25		
DIVORCED	—			.02			.03			.08			.03		
INSCHOOL	.48			.39			.16			.07			.24		
PARTTIME	.42			.33			.19			.15			.26		
UNION	.12		.02	.12		.01	.14		.05	.24		.05	.13		.04
CITY	.74			.73			.75			.80			.76		
SOUTH	.32			.34			.35			.34			.34		
GOVT	.10			.09			.08			.10			.09		
Schooling attainment															
HS	.96			.75			.52			.44			.63		
COLLEGE	—			.00			.21			.32			.16		
Post-HS employment															
X	.57	.35		1.90	.94		4.24	1.97		7.43	2.72		4.04	3.12	
X^2	.45	.58		4.49	4.00		21.86	17.49		62.68	42.19		26.52	36.34	
X^3	.44	1.01		12.13	15.76		126.06	139.88		577.18	579.82		216.70	430.17	
T	.41	.32		.91	.89		1.65	1.69		2.74	2.69		1.61	2.00	
T^2	.27	.47		1.63	2.92		5.58	10.89		14.76	28.29		6.58	17.37	
T^3	.24	.81		3.95	10.20		26.37	76.76		109.85	360.88		41.82	195.37	
Family characteristics															
FOREIGN	.06			.05			.05			.05			.05		
NUMSIBS	3.12	2.32		3.11	2.30		3.22	2.29		3.18	2.28		3.18	2.31	
FATHER_ED	10.87	4.95	.10	11.16	4.81	.09	10.79	5.01	.11	11.00	5.08	.11	10.89	4.99	.11
INCOME	22.47	18.78	.20	22.22	18.85	.20	21.73	18.41	.19	21.82	18.59	.21	21.69	18.45	.20

Continued on next page.

Table 8-M (Males)
CONTINUED

Summary Statistics for Samples Used in Regression Analysis

	1 year after HS			3 years after HS			6 years after HS			9 years after HS			All observations		
Variable	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.
School characteristics															
SCHOOLSIZE	1.05	.88	.22	1.01	.86	.22	.96	.88	.25	1.05	.87	.21	1.02	.87	.22
RATIO	14.54	8.83	.24	14.16	8.90	.25	13.86	9.18	.27	14.62	8.82	.23	14.37	8.92	.25
DISADVANTAGED	13.76	18.84	.32	13.70	18.95	.32	13.66	19.36	.35	13.96	19.09	.33	13.72	18.82	.33
ATTENDANCE	71.68	38.15	.20	71.65	38.25	.20	69.22	39.87	.23	72.63	37.44	.19	71.80	38.05	.20
DROPOUT	11.72	19.62	.22	11.68	19.93	.23	11.48	20.04	.26	11.07	17.81	.22	11.34	18.89	.23
TURNOVER	5.20	7.51	.20	5.51	7.95	.20	5.17	7.86	.24	5.72	8.30	.19	5.42	7.91	.21
SALARY	8.37	4.65	.23	8.24	4.67	.24	7.98	4.88	.26	8.52	4.62	.22	8.29	4.68	.23
High school achievement															
CRED_HUMSOC	4.23	1.29		4.20	1.31		4.27	1.35		4.24	1.36		4.24	1.35	
CRED_MATHSCI	1.81	1.42		1.88	1.43		1.80	1.46		1.83	1.43		1.84	1.44	
CRED_VOC	2.64	2.10		2.69	2.07		2.63	2.04		2.60	2.05		2.62	2.05	
CRED_OTHER	1.94	1.46		1.87	1.40		1.95	1.39		1.96	1.40		1.92	1.39	
GPA_HUMSOC	2.32	.77		2.35	.79		2.31	.78		2.34	.79		2.34	.79	
GPA_MATHSCI	1.87	1.16		1.92	1.15		1.88	1.17		1.89	1.15		1.91	1.16	
GPA_VOC	2.33	1.23		2.41	1.18		2.32	1.20		2.32	1.22		2.34	1.20	
GPA_OTHER	2.55	1.26		2.51	1.28		2.54	1.23		2.59	1.23		2.56	1.24	
Proxy and instrumental variables															
AFQT SCORE													48.70	28.50	.01
PRETEST SCORE													12.97	27.11	.61
UNEMPLOYMENT RATE													11.33	2.51	
VOC/TECH PROGRAM													.77		.18
Number of observations	992			974			1,201			977			10,763		

Note: "Miss" refers to the fraction of observations in the sample with missing data; no number means there are no missing observations. In cases of missing data, the variable is set equal to zero and a "missing" indicator is set equal to one; for nonmissing cases, the indicator is set equal to zero. Means are for missing and nonmissing observations.

Table 8-F (Females)

Summary Statistics for Samples Used in Regression Analysis

	1 year after HS			3 years after HS			6 years after HS			9 years after HS			All observations		
Variable	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.
Dependent variable															
WAGE	1.30	.34		1.36	.37		1.61	.40		1.72	.52		1.53	.47	
High school employment															
AH_10	.39			.39			.39			.39			.40		
AH_20	.30			.26			.26			.26			.26		
AH_21+	.15			.13			.11			.13			.13		
Baseline characteristics															
BLACK	.20			.21			.25			.26			.24		
HISPANIC	.16			.17			.16			.15			.15		
KIDS	.05			.14			.23			.24			.19		
MARRIED	.08			.21			.37			.50			.32		
DIVORCED	.00			.02			.06			.10			.06		
INSCHOOL	.40			.36			.13			.07			.21		
PARTTIME	.53			.46			.28			.26			.36		
UNION	.09		.03	.07		.02	.10		.06	.11		.03	.09		.04
CITY	.77			.76			.79			.80			.77		
SOUTH	.36			.40			.40			.41			.40		
GOVT	.11			.12			.10			.11			.11		
Schooling attainment															
HS	.97			.79			.49			.45			.62		
COLLEGE	—			.00			.25			.31			.16		
Post-HS employment															
X	.50	.31		1.58	.83		3.77	1.59		6.48	2.18		3.51	2.69	
X^2	.35	.44		3.17	2.93		16.77	12.90		46.69	27.69		19.55	25.38	
X^3	.30	.64		7.35	9.49		83.16	92.48		361.04	303.27		133.25	244.13	
T	.37	.29		.84	.80		1.51	1.54		2.16	2.18		1.37	1.67	
T^2	.22	.32		1.35	2.23		4.63	8.71		9.41	17.05		4.67	11.70	
T^3	.17	.37		2.82	6.39		19.61	51.04		55.14	142.73		24.25	99.09	
Family characteristics															
FOREIGN	.04			.04			.05			.04			.04		
NUMSIBS	3.35	2.22		3.47	2.35		3.40	2.46		3.26	2.26		3.34	2.33	
FATHER_ED	10.34	4.86	.11	10.37	4.77	.09	10.54	4.92	.10	10.37	4.83	.11	10.40	4.86	.11
INCOME	20.32	17.67	.22	19.96	17.87	.23	20.26	18.12	.23	20.32	18.18	.23	20.16	18.02	.23

Continued on next page.

Table 8-F (Females)
CONTINUED

Summary Statistics for Samples Used in Regression Analysis

	1 year after HS			3 years after HS			6 years after HS			9 years after HS			All observations		
Variable	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.	Mean	S.D.	Miss.
School characteristics															
SCHOOLSIZE	1.04	.90	.25	.97	.88	.28	.97	.87	.27	1.03	.87	.24	1.01	.88	.25
RATIO	14.23	9.49	.27	13.40	9.44	.30	13.49	9.31	.29	14.26	9.12	.26	13.92	9.26	.27
DISADVANTAGED	12.71	18.41	.35	11.81	17.61	.37	11.82	17.94	.38	13.15	18.54	.34	12.41	18.14	.35
ATTENDANCE	68.43	39.90	.23	64.42	41.93	.28	66.06	40.99	.26	67.85	40.22	.23	67.06	40.63	.25
DROPOUT	10.91	17.64	.26	10.98	19.14	.28	11.15	19.46	.27	10.25	16.40	.24	10.75	18.06	.26
TURNOVER	5.43	7.32	.23	5.26	7.36	.26	5.51	7.93	.25	5.53	7.63	.22	5.42	7.63	.24
SALARY	7.99	4.84	.26	7.47	4.98	.30	7.53	5.00	.30	7.80	4.87	.27	7.73	4.91	.28
High school achievement															
CRED_HUMSOC	4.35	1.33		4.37	1.30		4.40	1.29		4.39	1.31		4.38	1.30	
CRED_MATHSCI	1.44	1.31		1.42	1.30		1.54	1.31		1.49	1.35		1.48	1.33	
CRED_VOC	2.53	1.98		2.59	1.97		2.46	1.98		2.44	1.93		2.47	1.97	
CRED_OTHER	2.30	1.60		2.26	1.53		2.29	1.55		2.24	1.51		2.28	1.54	
GPA_HUMSOC	2.58	.78		2.61	.77		2.64	.78		2.56	.76		2.60	.77	
GPA_MATHSCI	1.86	1.32		1.87	1.35		1.93	1.30		1.82	1.32		1.87	1.32	
GPA_VOC	2.24	1.28		2.42	1.26		2.43	1.29		2.33	1.29		2.37	1.29	
GPA_OTHER	2.72	1.17		2.76	1.16		2.76	1.16		2.71	1.15		2.77	1.15	
Proxy and instrumental variables															
AFQT SCORE													43.56	26.07	.02
PRETEST SCORE													10.55	25.08	.64
UNEMPLOYMENT RATE													11.33	2.52	
VOC/TECH PROGRAM													.74		.22
Number of observations	957			1,039			1,168			1,035			10,899		

Note: "Miss" refers to the fraction of observations in the sample with missing data; no number means there are no missing observations. In cases of missing data, the variable is set equal to zero and a "missing" indicator is set equal to one; for nonmissing cases, the indicator is set equal to zero. Means are for missing and nonmissing observations.

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Table 9-M (Males)

Conditional Effects of High School Employment on Log Wages

Other Regressors Included in Model	F test for null hypothesis that high school employment contributes to prediction of log wage: F statistic	df	Reject at 95%	Coefficient (S.E.) for average hours worked per week in grades 11-12: 1-10		11-20		21+	
1 year after HS [OLS]									
1. Baseline characteristics	4.86	(3,973)	no	.063	(.032)	.055	(.033)	.132	(.036)
2. 1 + schooling attainment	4.28	(3,972)	no	.060	(.032)	.054	(.033)	.124	(.036)
3. 2 + post-HS employment	3.61	(3,966)	no	.059	(.032)	.052	(.034)	.118	(.037)
4. 3 + family characteristics	3.76	(3,960)	no	.057	(.032)	.053	(.034)	.123	(.038)
5. 4 + school characteristics	3.94	(3,946)	no	.057	(.032)	.046	(.035)	.124	(.039)
6. 5 + HS achievement	3.72	(3,938)	no	.056	(.032)	.050	(.035)	.125	(.039)
3 years after HS [OLS]									
1. Baseline characteristics	5.75	(3,954)	no	.034	(.038)	.059	(.039)	.160	(.043)
2. 1 + schooling attainment	5.79	(3,952)	no	.031	(.038)	.057	(.039)	.159	(.043)
3. 2 + post-HS employment	3.81	(3,966)	no	.016	(.038)	.033	(.040)	.128	(.045)
4. 3 + family characteristics	3.52	(3,946)	no	.006	(.039)	.021	(.041)	.118	(.046)
5. 4 + school characteristics	2.63	(3,926)	no	-.010	(.039)	.011	(.042)	.092	(.047)
6. 5 + HS achievement	2.70	(3,918)	no	-.009	(.040)	.012	(.042)	.096	(.047)
6 years after HS [OLS]									
1. Baseline characteristics	4.17	(3,1181)	no	.076	(.039)	.116	(.042)	.152	(.046)
2. 1 + schooling attainment	4.71	(3,1179)	no	.071	(.039)	.103	(.042)	.165	(.045)
3. 2 + post-HS employment	2.28	(3,1173)	yes	.056	(.039)	.079	(.042)	.119	(.047)
4. 3 + family characteristics	1.35	(3,1167)	yes	.035	(.039)	.052	(.043)	.093	(.047)
5. 4 + school characteristics	1.15	(3,1153)	yes	.035	(.039)	.047	(.043)	.088	(.048)
6. 5 + HS achievement	1.03	(3,1145)	yes	.030	(.039)	.052	(.043)	.081	(.049)
9 years after HS [OLS]									
1. Baseline characteristics	.49	(3,958)	yes	-.011	(.046)	.025	(.048)	.036	(.051)
2. 1 + schooling attainment	.87	(3,956)	yes	-.021	(.045)	.017	(.047)	.047	(.051)
3. 2 + post-HS employment	.52	(3,950)	yes	-.040	(.044)	-.008	(.046)	.007	(.052)
4. 3 + family characteristics	.56	(3,944)	yes	-.051	(.044)	-.025	(.046)	-.012	(.052)
5. 4 + school characteristics	.52	(3,930)	yes	-.049	(.044)	-.019	(.047)	-.009	(.053)
6. 5 + HS achievement	.45	(3,928)	yes	-.051	(.044)	-.028	(.047)	-.034	(.054)
All observations [GLS]									
1. Baseline characteristics	1.75	(3,10735)	yes	.032	(.024)	.095	(.026)	.115	(.115)
2. 1 + schooling attainment	2.09	(3,10732)	yes	.026	(.024)	.087	(.025)	.122	(.028)
3. 2 + post-HS employment	1.89	(3,10727)	yes	.025	(.023)	.067	(.025)	.081	(.027)
4. 3 + family characteristics	1.33	(3,10721)	yes	.008	(.023)	.044	(.025)	.060	(.028)
5. 4 + school characteristics	1.26	(3,10707)	yes	.008	(.023)	.045	(.025)	.058	(.028)
6. 5 + HS achievement	1.22	(3,10699)	yes	.009	(.023)	.048	(.025)	.063	(.028)

Table 9-F (Females)

Conditional Effects of High School Employment on Log Wages

Other Regressors Included in Model	F test for null hypothesis that high school employment contributes to prediction of log wage			Coefficient (S.E.) for average hours worked per week in grades 11-12					
	F statistic	df	Reject at 95%	1-10		11-20		21+	
1 year after HS [OLS]									
1. Baseline characteristics	1.10	(3,936)	yes	.050	(.032)	.058	(.034)	.056	(.039)
2. 1 + schooling attainment	1.10	(3,935)	yes	.050	(.032)	.058	(.034)	.055	(.039)
3. 2 + post-HS employment	.70	(3,929)	yes	.044	(.033)	.045	(.035)	.043	(.042)
4. 3 + family characteristics	.53	(3,923)	yes	.040	(.033)	.039	(.036)	.037	(.042)
5. 4 + school characteristics	.27	(3,909)	yes	.029	(.033)	.025	(.036)	.018	(.042)
6. 5 + HS achievement	.32	(3,901)	yes	.029	(.033)	.021	(.037)	.008	(.043)
3 years after HS [OLS]									
1. Baseline characteristics	1.54	(3,1019)	yes	.019	(.031)	.066	(.034)	.050	(.041)
2. 1 + schooling attainment	1.54	(3,1018)	yes	.019	(.031)	.066	(.034)	.050	(.041)
3. 2 + post-HS employment	.56	(3,1012)	yes	.002	(.031)	.036	(.036)	.001	(.043)
4. 3 + family characteristics	.61	(3,1006)	yes	-.010	(.031)	.028	(.036)	-.006	(.044)
5. 4 + school characteristics	.49	(3,992)	yes	-.008	(.031)	.025	(.036)	-.010	(.044)
6. 5 + HS achievement	.56	(3,984)	yes	-.004	(.032)	.032	(.036)	-.001	(.044)
6 years after HS [OLS]									
1. Baseline characteristics	5.06	(3,1148)	no	.058	(.037)	.151	(.041)	.123	(.052)
2. 1 + schooling attainment	5.67	(3,1146)	no	.051	(.036)	.150	(.041)	.138	(.051)
3. 2 + post-HS employment	3.85	(3,1140)	no	.036	(.037)	.128	(.041)	.105	(.053)
4. 3 + family characteristics	3.01	(3,1134)	no	.008	(.037)	.098	(.041)	.084	(.053)
5. 4 + school characteristics	2.81	(3,1120)	no	.000	(.037)	.090	(.042)	.081	(.053)
6. 5 + HS achievement	2.63	(3,1112)	no	-.004	(.038)	.085	(.043)	.077	(.054)
9 years after HS [OLS]									
1. Baseline characteristics	1.93	(3,1016)	yes	.087	(.041)	.067	(.046)	.105	(.055)
2. 1 + schooling attainment	1.95	(3,1014)	yes	-.021	(.045)	.017	(.047)	.047	(.051)
3. 2 + post-HS employment	1.15	(3,1008)	yes	.071	(.040)	.029	(.045)	.035	(.055)
4. 3 + family characteristics	.59	(3,1002)	yes	.036	(.041)	-.007	(.045)	-.004	(.055)
5. 4 + school characteristics	.77	(3,988)	yes	.032	(.041)	-.020	(.045)	-.011	(.056)
6. 5 + HS achievement	1.03	(3,980)	yes	.035	(.041)	-.027	(.045)	-.017	(.056)
All observations [GLS]									
1. Baseline characteristics	2.89	(3,10871)	no	.084	(.022)	.102	(.024)	.118	(.030)
2. 1 + schooling attainment	1.01	(3,10868)	yes	.059	(.021)	.094	(.024)	.122	(.030)
3. 2 + post-HS employment	1.29	(3,10863)	yes	.048	(.020)	.064	(.023)	.070	(.028)
4. 3 + family characteristics	.83	(3,10857)	yes	.030	(.020)	.044	(.023)	.054	(.028)
5. 4 + school characteristics	.58	(3,10843)	yes	.025	(.020)	.033	(.023)	.046	(.028)
6. 5 + HS achievement	.96	(3,10835)	yes	.028	(.020)	.036	(.023)	.053	(.028)

Table 10-M (Males)
Alternative GLS and IV/GLS Estimates
of the Conditional Effect of High School Employment on Log Wages
Using the "All Observations Sample"

	1		2		3		4		5		6	
	GLS		GLS		GLS		GLS		GLS		IV/GLS[a]	
Variable	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
AH_0|$X = 2$	.017	.033	.017	.033								
AH_0|$X = 3$	.050	.040	.051	.041								
AH_0|$X = 4$	.050	.048	.052	.048								
AH_0|$X = 5$	.048	.054	.050	.054								
AH_0|$X >= 6$	.038	.057	.041	.057								
AH_10|$X <= 1$	.028	.028	.028	.028								
AH_10|$X = 2$	-.016	.035	-.016	.035								
AH_10|$X = 3$	-.022	.037	-.022	.037								
AH_10|$X = 4$	-.021	.039	-.021	.039								
AH_10|$X = 5$	.003	.041	.003	.041								
AH_10|$X >= 6$	.034	.031	.034	.031								
AH_20|$X <= 1$	.024	.030	.017	.030								
AH_20|$X = 2$	.031	.037	.025	.037								
AH_20|$X = 3$	.030	.040	.024	.040								
AH_20|$X = 4$	.039	.041	.033	.041								
AH_20|$X = 5$	.092	.044	.086	.044								
AH_20|$X >= 6$	.093	.032	.086	.032								
AH_21+|$X <= 1$	.056	.035	.059	.035								
AH_21+|$X = 2$	.077	.036	.080	.042								
AH_21+|$X = 3$	.088	.045	.081	.045								
AH_21+|$X = 4$	.096	.046	.099	.046								
AH_21+|$X = 5$	.101	.047	.105	.047								
AH_21+|$X >= 6$	.063	.034	.066	.035								
AH_10					.009	.023						
AH_20					.042	.025						
AH_21+					.066	.028						
AH							.005	.002	.004	.002	.054	..092
AH2/100							-.009	.007	-.007	.007	-.299	.451
AFQT SCORE			.001	.000	.001	.000			.001	.000		
MISSING			.051	.032	.050	.032			.051	.032		
PRETEST SCORE/100			-.018	.026	-.018	.026			-.017	.026		
MISSING			-.016	.016	-.016	.016			-.016	.016		

[a]Instruments are area unemployment rates at time of high school graduation, a dummy variable indicating whether the respondent's high school offers vocational/technical courses, and a dummy variable indicating whether the vocational/technical variable is missing.

Note: Each model also controls for the baseline variables, schooling attainment, post-high school employment, family characteristics, school characteristics, and high school achievement.

Table 10-F (Females)
Alternative GLS and IV/GLS Estimates
of the Conditional Effect of High School Employment on Log Wages
Using the "All Observations Sample"

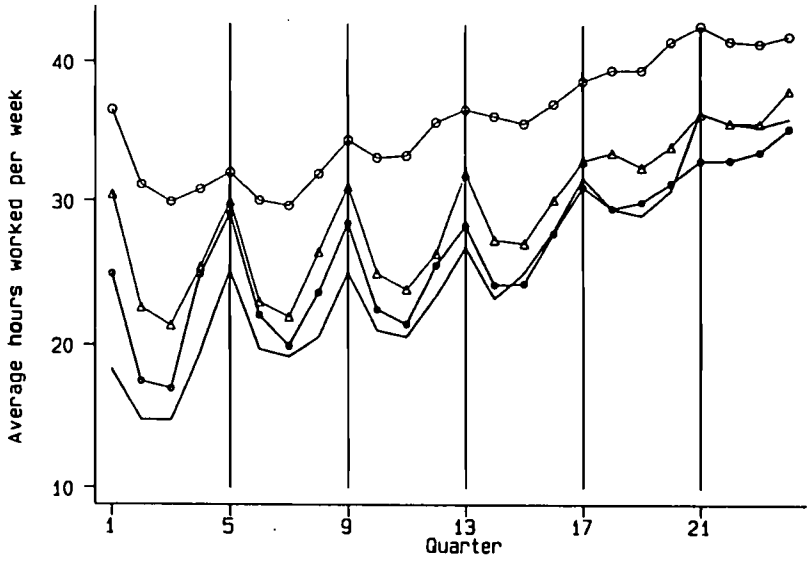
	1		2		3		4		5		6	
	GLS		GLS		GLS		GLS		GLS		IV/GLS[a]	
Variable	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
AH_0|$X = 2$	-.047	.029	-.046	.029								
AH_0|$X = 3$	-.066	.036	-.063	.036								
AH_0|$X = 4$	-.062	.044	-.058	.044								
AH_0|$X = 5$	-.052	.051	-.048	.051								
AH_0|$X >= 6$	-.049	.057	-.045	.057								
AH_10|$X <= 1$	-.005	.024	-.013	.024								
AH_10|$X = 2$	.040	.030	.032	.030								
AH_10|$X = 3$	.071	.031	.062	.031								
AH_10|$X = 4$	.035	.033	.026	.034								
AH_10|$X = 5$	.052	.036	.043	.037								
AH_10|$X >= 6$	.041	.029	.032	.029								
AH_20|$X <= 1$	-.002	.027	-.012	.028								
AH_20|$X = 2$	.040	.034	.030	.034								
AH_20|$X = 3$	.108	.035	.097	.035								
AH_20|$X = 4$	.078	.037	.068	.037								
AH_20|$X = 5$	.085	.041	.074	.041								
AH_20|$X >= 6$	.022	.031	.012	.032								
AH_21+|$X <= 1$	-.005	.035	-.013	.035								
AH_21+|$X = 2$	.079	.041	.072	.041								
AH_21+|$X = 3$	.098	.043	.090	.043								
AH_21+|$X = 4$	.116	.045	.107	.046								
AH_21+|$X = 5$	.086	.048	.078	.048								
AH_21+|$X >= 6$	.052	.037	.042	.037								
AH_10					.020	.020						
AH_20					.026	.023						
AH_21+					.045	.028						
AH							.006	.002	.005	.002	.065	.056
AH2/100							-.013	.008	-.011	.008	-.373	.318
AFQT SCORE			.001	.000	.001	.000			.001	.000		
MISSING			-.014	.026	-.015	.026			-.013	.026		
PRETEST SCORE/100			.010	.028	.008	.027			.009	.028		
MISSING			.002	.017	-.000	.000			.000	.017		

[a]Instruments are area unemployment rates at time of high school graduation, a dummy variable indicating whether the respondent's high school offers vocational/technical courses, and a dummy variable indicating whether the vocational/technical variable is missing.

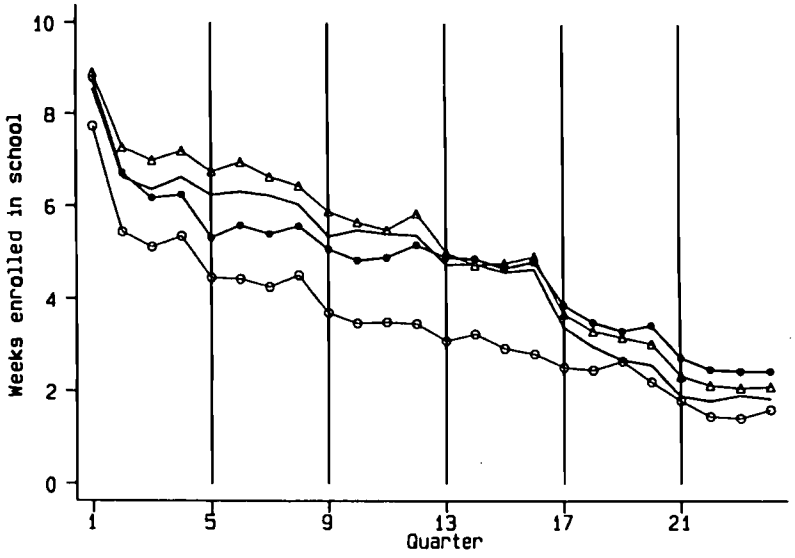
Note: Each model also controls for the baseline variables, schooling attainment, post-high school employment, family characteristics, school characteristics, and high school achievement.

Figure 1-M (Males)
Work Effort and School Enrollment in First 6 Years After High School
by Average Hours Worked Per Week in Grades 11-12

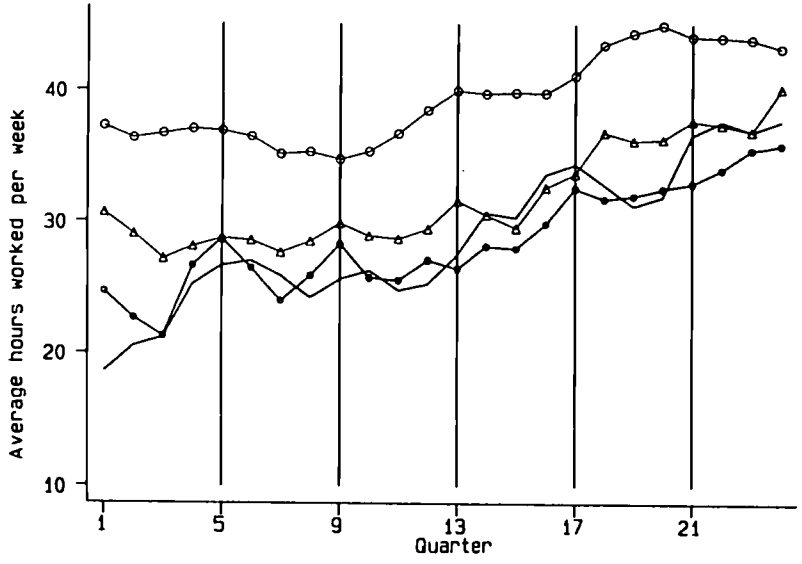
a. All Males (n=926)



b. All Males (n=926)



c. Males with no post-HS enrollment (n=410)



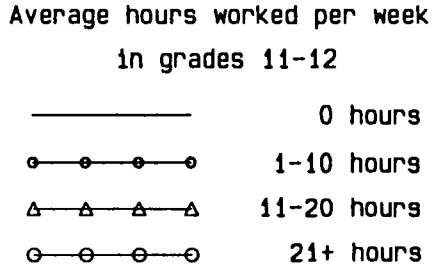


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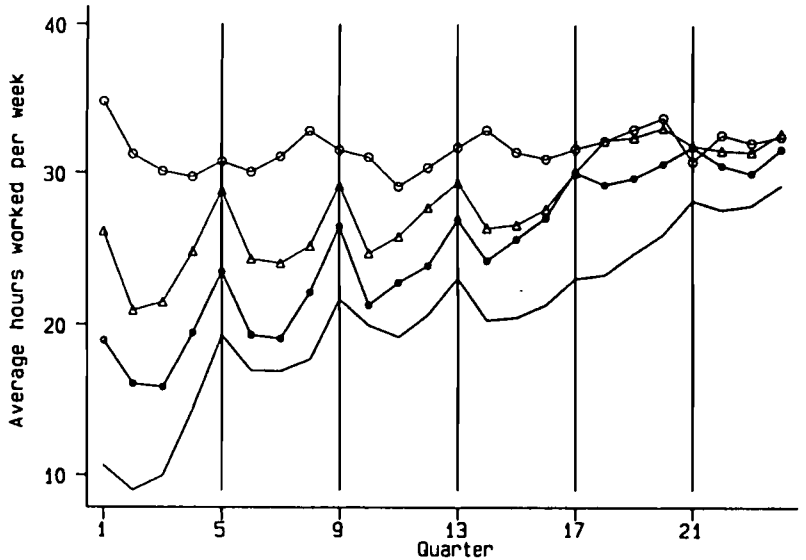
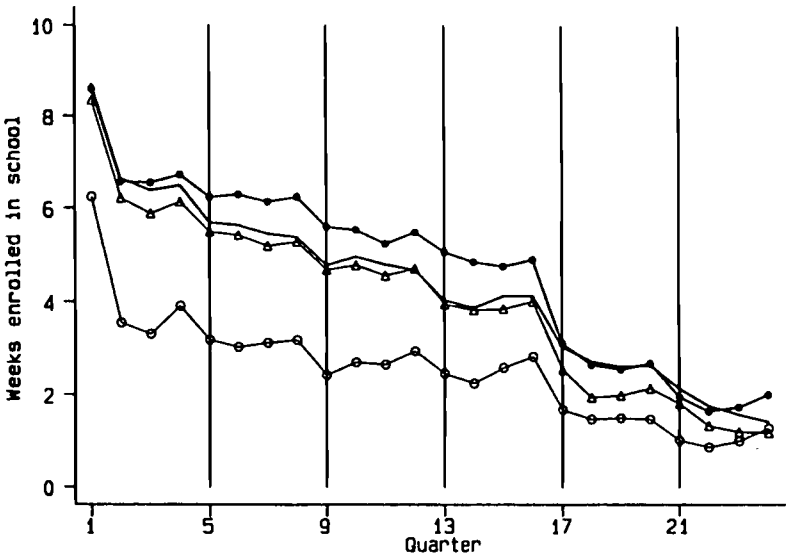
Figure 1-F (Females)
Work Effort and School Enrollment in First 6 Years After High School
by Average Hours Worked Per Week in Grades 11-12

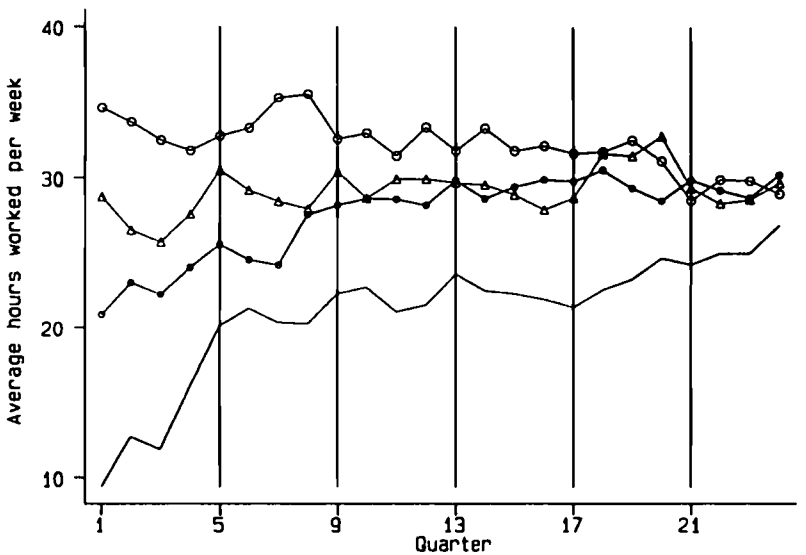
a. All Females (n=971)

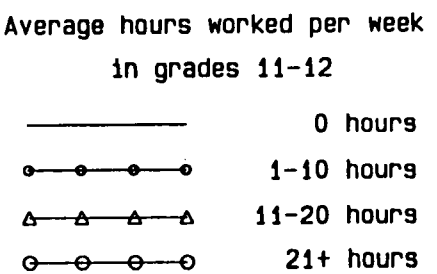


b. All Females (n=971)



c. Females with no post-HS enrollment (n=442)





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