

Dou-Yan Yang

May 06, 2008

Does Part-time Work during High School Affect Academic Outcomes?

Advisors:

Shamena Anwar,

Daniel Nagin,

and Mel Stephens

Abstract: A majority of American teenagers work during high school, constituting a large time commitment that pulls teens' attention away from family, friends, school, and community ties. The issue of whether the possible costs to the other parts of teens' lives outweigh the benefits from working has attracted extensive research, but no consensus exists about the relationship of part-time work on academic outcomes. This study uses the Bureau of Labor Statistics' National Longitudinal Survey of Youth (NLSY) from 1997 to examine the impact of working part-time on high school dropout rates and grade point average at age 17. After age 16, federal legislation no longer limits the hours or duties of child labor. However, child labor legislation across different states limits the number of hours that teenagers are allowed to work. By exploiting this variation, the study examines whether a teen's hours of work during the age 16 school year has a statistically significant relationship to his or her performance at school. Average hours of work did not have a statistically significant relationship with academic outcomes when using instrumental variables compared to statistically significant results when using ordinary least squares (OLS). Due to the weakness of the first-stage relationships and large standard errors, I am not able to draw conclusions about the work-dropout relationship or the work-GPA relationship.

Introduction:

Education and labor have competed for young people's time for many years. In earlier times when fewer people continued on to higher education, families were more apt to focus their children's efforts on work duties rather than on schoolwork. Older agrarian lifestyles continue to influence present-day regulations. The current August to June school-year calendar is a vestige from the era when children needed to work on their families' farms during the growing season; the academic calendar molded around this priority. Agricultural work continues to have different regulations than other industries. For example, after obtaining work permits, youth are allowed to work in agricultural occupations at younger ages than in other occupations.

While many youth no longer take leave of school during the academic year to work on the family farm, many youths still work at some point during high school (chart 1). (The data in this chart and subsequent charts comes from the National Longitudinal Survey of Youth-97 (NLSY-97) dataset.) By the time they reach age 15, 24% of American youths have worked in a formal job. The percentage increases each year during high school. By age 16, the percentage reaches 44%; age 17, 74%; age 18, 86%. With the widespread participation of youth in the workforce, citizens, policymakers, and researchers have expressed concern about whether working during high school has a negative impact on the other aspects of youths' lives.

One concern about work hours is the number of hours that youth work. At age 16, 40% of American teenagers do not work any hours a week during the school year (chart 2). 18% work an average number of hours between more than 0 (0+) and 5 hours per week. 15% work between more than 5 (5+) and 10 hours per week. 18% work between more than 10 (10+) and 20 hours per week. 10% work between more than 20 (20+) hours per week. In a related measure, 31% of youth worked twenty hours at least once during the school year while age 16

(chart 3). If a student attends class between 9 a.m. and 3 p.m., their time spent in class is six hours per day, or 30 hours a week. A student working more than 20 hours per week spends nearly as much time at work as time at school.

At a cursory glance, these concerns about the negative impact of work seem well-founded. In a cross-tabulation between work hours and academic performance indicators like achievement test scores, work hours seem to have a mixed relationship with test scores (chart 4). At the lowest end of the scale, teens not working at all, the test scores are lower than the test scores of teens working moderate hours. Then the test scores decrease once youth work more than 20 hours per week.

Recent years have seen closer integration between schools and workplaces. Schools at all levels have created stronger links between the classroom and various careers. Vocational / technical high schools explicitly prepare students for particular careers after graduation. Other types of high schools emphasize post- high school options through shadow days (where students accompany a worker at his or her job), senior capstone projects, and Take our Daughters to Work days. Through these initiatives students get exposure to workplaces and the exposure will spur further exploration of options available after high school.

While schools are supportive in introducing students to post-high school career paths, the attitude towards part-time work during high school is more ambivalent. Present research has not established a clear relationship between part-time work and academic performance.

While OLS has been a popular method to examine the effect of part-time work on academic outcomes, this paper uses an instrumental variables approach. IV can help address the potential bias in the OLS estimates, from the endogeneity in the selection of the number of work hours. Students who choose to work more may have unobserved determinants in their decision

to work more hours, determinants that are correlated with their academic outcomes. Differences in child labor laws across states offer instruments for youth's availability to work.

The organization of this paper follows this order. Section II details previous research in the area. Section III details the model. Section IV describes the National Longitudinal Survey of Youth-97 (NLSY-97) dataset. Section V covers the methodology. Section VI lists the results, with Section VII including a discussion of the results. Section VIII concludes the paper.

I. Previous research:

Popular opinion on the perceived effect of part-time work on academic performance during high school has changed over time. In the earliest evaluations, work during high school was assumed to affect teenagers negatively. Coleman (1961) saw the perceived effect of part-time work as a zero-sum model. In spending time on work, a youth was by definition not spending time on schoolwork. The hours that youths spent working could be better spent studying, participating in family activities, or sleeping (Mortimer et al. 1996b). The cynicism model hypothesized that exposure to the working world while in high school would make students cynical about work because of the menial jobs available to them and would cause them to focus on the extrinsic (e.g., financial) rewards of work rather than intrinsic fulfillment (e.g., learning, level of responsibility, service) (Mortimer et al. 1996a). This form of exposure to the world of work could cause more harm than benefit to a teenager. In the 1970's, under the developmental model, work was seen as easing the transition between the world of school and the world of work. Working could teach youths responsibility, professional skills, and time management (Marsh 1991).

One of more active research areas on the relationship between part-time work and high school academic performance has been to examine the effect of increasing hours of work on academic outcomes like high school grade point average (GPA). Through the early 1990's, many studies relied on Ordinary Least Squares (OLS) to try and evaluate the effect of part-time work during high school on academic outcomes. Some researchers have found a curvilinear relationship of work where a moderate number of hours was positively related to GPA but became negative as the average number of work hours increased. In Mortimer et al (1996a)'s study, high school seniors who worked a moderate number of hours each week (1-20) had higher grades than students who did not work and students who worked more than 20 hours per week. This finding aligns with the curved relationship witnessed between work hours and math test score.

OLS has also been used to examine the effect of work hours during sophomore year specifically. Marsh (1991) examined the High School and Beyond dataset (HSB) and found that the number of hours worked sophomore year is significantly and positively related to dropping out of school. Also working with HSB, Chaplin and Hannaway found that working more than 14 hours per week during sophomore year is negatively related to enrollment two years later for at-risk students (1996). Carr et al. used the NLSY-79 and found no significant relationship between hours of work during H.S. and probability of completing H.S. (1996). (Sophomores were included in the dataset, but the dataset did not restrict the independent variable to work hours during sophomore year.) Also in Mortimer et al (1996a), working more than 20 hours per week during 9th grade had a statistically significant negative relationship with grade point average in 10th grade (1996).

In 1998, the National Research Council explored the effect of work on teenagers. Their study examined work and its relationship to academic outcomes (among other areas like occupational health and safety). The authors did not find a conclusive relationship between work and school outcomes and welcomed further research in the area. One of the difficulties they mentioned was that only correlational studies are available for part-time work, not experimental studies. With correlational studies, causality is difficult to ascertain if one cannot control for selection effects.

In recent years researchers have used a variety of analytical methods to try and work around the lack of experimental data. Oettinger (1999) used the NLSY-79 to examine the relationship between working intensively and grade point average through a fixed effects model. He looked at the transition in and out of work between grades and its relationship with the between-grade change in GPA. He found a negative relationship between working intensively at more than 20 hours per week and GPA (an effect of -0.2 points) for minority students, but no statistically significant effect for white students.

Lee and Staff (2007) used propensity score matching to compare students from the NELS-88 by their propensity to work, net of the non-random selection. They found results of decrease in GPA of approximately 0.1 points among students working more than 20 hours a week in 9th and 10th grade. They also found a positive relationship between intensive work and likelihood to dropout, except for youth with the highest propensity to work intensively, where the work decreased their likelihood to dropout.

Tyler (2003) used the NELS-88 dataset to examine the effect of working during 12th grade on achievement test scores in reading and math, with a 10th grade score for observed ability. Differences in child labor laws across states allowed Tyler to instrument for the youths'

availability to work. He found a negative relationship of -0.20 on youths' twelve-grade math test score and -0.22 on youths' twelve-grade reading test score for each increase of youths' hour of work per week in twelfth grade.

While the evidence supporting or opposing part-time work in high school has been inconclusive, the federal government has established standards that reduce the number of work hours and work duties allowed for young people. At present, a plethora of regulations at the federal and state level dictate the number of hours, occupations, and duties available to workers under age 18. Some state regulations reduce the numbers of hours or occupations below the federal minimum. Some states give school districts the jurisdiction over issuing certificates (sometimes also called work permits), which can make the standards even stricter. Some school districts make the connection between work and academic performance explicit by requiring students to obtain the school district's approval before they can take part-time jobs (e.g., in California¹). As well, the school district is allowed to revoke its approval for inadequate academic performance (e.g., in Indiana²).

Many nuances of work and academic performances complicate a clear determination of the relationship. Both the definition of part-time work and the selection of the outcome variable will affect the shape of the relationship between work and schooling. To determine a youth's workload, some surveys may ask about a typical work week of a teenager, while others will ask about the week prior to the survey as the reference week. Students who decide to undertake a part-time job may modify the difficulty of their course load to better manage their time commitments, so their course load and subsequent grade performance is different than the course load they would have chosen if they did not hold a job. Researchers have also found evidence

¹ <http://www.cde.ca.gov/ci/ct/we/wpfaq.asp>

² www.in.gov/labor/childlabor/modelworkpermitpolicy/optionalguidelines.doc

that teenagers may substitute time from leisure activities in working. They may be reducing their television consumption rather than their study time and using this additional time for work (Schoenhals, Tienda, and Schneider 1998; DeSimone 2006). In this case, the benefit of working has an unclear relationship. The selection of the outcome variable also affects the expected impact of working. Working may have a different effect on an achievement test score (from one sitting) than on a grade point average (accumulated over time).

The difference in academic outcomes may also be attributed to a selection bias in the types of students who choose to work and their decision to work many or few hours. More of the recent research attributes the effect of increasing hours of work on GPA to pre-existing differences in the types of students who decide to work intensively (Schoenhals, Tienda, and Schneider). The desire/decision to work intensively may be part of a syndrome of behaviors. Students who work intensively may be less academically oriented if they find their academic opportunities unsatisfying, so they are more likely to focus their efforts on work (Entwisle, Alexander, and Olson 2005). These youth may have weaker academic results, but they were not applying their efforts to schoolwork even prior to commencing work. An instrumental variables approach may be able to address these issues of endogeneity.

II. Model

Academic achievement, A , is assumed to be related to observed ability, X , unobserved shocks that affect achievement, δ , and the amount of time working, T_w , in a production function, g .

$$A = g(X, \delta, T_w)$$

The time available for work is $T_w = T_{\text{total}} - T_{\text{school}} - T_{\text{activities}}$

The equation may take on this form:

$$A = \beta T_w + \pi X + (\delta + \varepsilon),$$

where ε is a standard mean zero error term uncorrelated with the regressors. T_{school} and $T_{\text{activities}}$ are partly determined by δ . Estimates of β will be biased if this relationship is not addressed.

In the context of the part-time work and academic outcome relationship, the correlation may manifest itself in students who choose to work less to concentrate on school work. If these students achieve higher grades, it is not clear whether prior ability or the decision not to work played a role in the higher scores. Even controlling for background variables and academic aspirations, the coefficients may still be biased.

By using an instrumental variables approach, it may be possible to reduce the potential bias in the OLS estimated coefficient, β .

The equation for the relationship of instrument and T_w may look like:

$$T_w = \alpha + \theta z + \psi X + u,$$

where z is an instrument for T_w and u is a standard mean zero error term uncorrelated with the regressors. For z to serve as a valid instrument, z needs to be correlated with T_w , but uncorrelated with the outcome variable A . It is possible to test the relationship between z and T_w , but it is much harder to prove the second assumption.

Child labor laws are related to T_w , but they do not directly enter the production function. State child labor laws are potential instruments for the endogenous selection of work hours of youth during the school year.

This paper advances the current research on the relationship of part-time work and academic outcomes in two ways. Firstly, this paper uses the NLSY-97 dataset, whose

observations on teens are four years to eight years later than the observations in the NELS-88 dataset Tyler used. Secondly, this paper looks at the effects of working during age 16, which may offer an earlier age of intervention than Tyler was examining for 12th graders. The restrictions on work hours are stricter for 16 year olds than for 18 year olds.

III. Dataset:

This paper uses data from the National Longitudinal Survey of Youth, a survey administered by the U.S. Department of Labor, Bureau of Labor Statistics. The survey tracks a nationally representative group of youth from adolescence through to adulthood. The survey continues to collect data on youth from earlier cohorts (the second most recent cohort started participation in 1979) and has now collected data on the children of the original youth. The most recent cohort started in 1997, with 6748 youths between age 12 and age 16 at the end of 1996. The sample also includes an oversample of African-American and Hispanic youth, so that the survey will be able to provide more robust information about these minorities. (Taking together the cross-sample and oversample respondents, there are 8894 respondents in total.)

The survey data collects a wealth of information about the youth and his or her other household members. The dataset includes information about birth parents, adoptive parents, stepparents, and guardians, as well as siblings. The survey also gathers information about the youth's schooling situation and a complete official high school transcript, if available. The survey interviews the youths at roughly yearly intervals. Through the newly available 2005 round, nine rounds of data are available.

In addition to work and school, the multitude of variables available is extensive. Up through the 2004 survey round, the dataset had more than 11,000 variables available about each

respondent. As with any longitudinal survey, sample attrition has occurred over time. By the 2004 survey round, 16.5% of the respondents (including the oversample respondents) were missing data.

The longitudinal nature of the dataset provides a rich opportunity to investigate the effects of part-time work on academic performance. In offering data at multiple points in time, it is possible to track changes in the respondents over a longer period of time. In addition, the long time window also means that post-high school data will be available in the survey, as well. While the NLSY-1979 dataset has been used many times for studies, due to its relatively more recent availability, the 1997 dataset has not been used as exhaustively for these kinds of studies.

IV. Empirical strategy:

The paper uses two key explanatory variables. The first one is whether a youth worked at least twenty hours in one week during at least one week during the school year. Since work hours are available on a week-by-week basis, it is possible to track a youth's work hours in each week separately from the youth's average work hours. Previous research has used the threshold of more than 20 hours per week as working intensively. The amount has become a popular measure of intense work because 20 hours is often the workload where work begins to have a negative relationship to academic outcomes. In this paper, youths who average 20 or more hours a week, and worked at least one week, were considered to work intensively. In our dataset, 25% of the youths were considered to work intensively if only weeks during the school year when the youth worked were included or 5% of the youths were considered to work intensively if all weeks during the school year were included. A youth who worked 20 hours during one week of the school year had an average hours of work of 20 hours (when only counting the weeks worked).

In another measure, a youth who worked 20 hours during one week of the school year would have the 20 hours averaged over the 38 or 39 weeks of the school year, with a much lower average hours of work.

The second explanatory variable is to look at the average number of hours the youth worked during the age 16 school year. This measure of work includes more youth rather than just the group of youths who work intensively. Average number of work hours has also been a popular measure of work in the literature.

For the purposes of this analysis, the outcome variable's value for GPA is taken from the school year when the youth spends the majority of that school year at least age 17 years. For example, if the youth turned 17 by January of the '92 / '93 school year, he would have spent more months of the school year at age 17 than at age 16. If the youth did not turn 17 by January, then his age 17 GPA was the value from the '93 / '94 school year. In allowing a year to pass while the youth is available to work at age 16, the effect on academic performance will have occurred in that time.

Background variables:

#1: Demographic & residential variables:

The variables in this category aim to duplicate the demographic variables that have previously appeared in other studies on part-time work and schooling. Some of these variables are available yearly, such as urbanicity (urban, suburban, and rural), Metropolitan Statistical Area status, and geographic region. Other variables are only available once (as it is assumed that they do not change): Sex and Race & Ethnicity. Race is available in white, black, and other categories. It is possible to separate Hispanic status from race.

#2: Family background variables:

These variables track the details available about the respondent's parents and living situation. The household's income relative to the poverty line, whether the father (or father figure) is employed, whether the mother (or mother figure) is employed and with whom the youth lives (mother, father, both parents, parent and step-parent) available yearly. The survey asks how many residences the youth has had since age 12. The variables that are asked once are parents' education level (less than high school, high school, bachelor's degree, post-graduate degree). The number of days per week a youth performs chores may indirectly affect a youth's labor availability. The number of weekdays a youth reads for pleasure may also be a reflection of family background or career aspirations.

#3: Education / Schooling variables:

These variables control for a student's measured ability and anticipated career path. The variables include whether the student is in a general curriculum or a college preparatory curriculum. Tests of measured ability include percentile on the ASVAB within their age group, the student's GPA during their age 15 year and the percentile on the score for the math section of the Peabody Individual Achievement Test measure achievement. The education variables also track whether the student is in public school.

PIAT math achievement test:

Respondents who have not completed 10th grade by the first round of the survey in 1997 take the Peabody Individual Achievement Test (PIAT). The test measures mathematical achievement as normed to 100 by age and the scores are scaled from 50 to 150. Percentile scores are also available for the respondents. Respondents who have dropped out of high school take the exam, even if they are no longer enrolled.

ASVAB test percentile:

The Armed Services Vocational Aptitude Battery tests applicants for suitability to military occupations. The test does not measure intelligence, but instead measures aptitude for training for particular military jobs. For the NLSY, all the respondents in the cross-section were asked to take the test, but some respondents declined to take the test. The scores on the test are scaled into percentiles by three-month age groups.

Other variables related to school attendance may also relate to academic performance or engagement. The number of days a youth has been absent from school in the fall term will affect his attendance and his subsequent performance. The NLSY-97 also contains data on whether the youth has ever repeated a grade, has ever skipped a grade, or has ever been suspended from school.

#4: Work background variables:

The survey tracks whether youths receive an allowance. The NLSY-97 is also able to offer details about the type of job that the youth holds and the industry in which the youth works. The job types are divided into the categories management and professional, service, sales, natural resources, and production.

Outcome variables:

Dropout status:

The survey tracks students' enrollment status each year. Students who have received a GED are excluded from the tallies of dropout status at age 17. Students who have received a degree are considered not dropouts.

Grade point average:

The NLSY attempts to obtain high school transcripts for each of the students in the cross-sample data. 69.4% of the cross-sectional data has valid transcript data.³ The transcripts are processed to uniformly track the number of credits and the categories of courses that the students take during high school. The processed transcripts include a yearly grade point average scaled between 0 and 4.0 for each of the students, in each year of study. Since not all the students that have enrollment status information had transcript information, the sample for the regressions with likelihood to drop out of school have a different sample than for the regressions with grade point average.

Features of the Dataset:

The survey aims to gather a complete work history for the youths, starting from age 14. Respondents who are older than 14 years old at the first survey are asked to report retroactively about their work activities. The dataset offers a week-by-week work history for respondents, starting at age 14. Since the data is available week by week, it is possible to separate a youth's average summer hours from their average work hours during the school year. While it is possible that youths may mis-remember their work hours, if they are older and are re-calling their work hours retroactively, it is less likely that they would incorrectly re-call whether or not they worked at all.

At the federal level, age 16 is the first age that a youth can work without restrictions on the number of hours worked or restrictions on nightwork / certain hours during the day. At age 16, all youths have the same labor availability, at least at the federal level. Prior to age 16, federal regulations limit the number of hours per day, the number of hours per week, and the

³ http://www.nlsinfo.org/nlsy97/docs/97HTML00/97guide/ed.htm#sch_surv

times of day when youth can work in non-agricultural employment. After age 16, they have the labor availability as adults.

In excluding the youths who work before age 16, the dataset will contain a uniform group of youths who did not work before age 16 and did not require a pre-age 16 work permit to hold a job. These youths will not have had prior work exposure before age 16, so that any work experience will be the first work experience. The relationship between work experience and the outcome variable will be clearer.

Age 16 also is the first age when youth can drop out of school, in many states. Excluding the exceptions for youth who are employed or get parental permission, the state of Vermont has the earliest age for the end of compulsory schooling, allowing students who have completed 10th grade at age 15 to drop out of high school. At age 16, twenty-eight states allow youth to drop out of high school. In examining the relationship between part-time work and the decision to drop out of school, the age 16 year is when youth most at-risk of dropping out of school will be weighing their new option for the first time.

When examining the likelihood of dropping out of high school or the effect on GPA, a common problem hinders studies of working part-time and academic performance. For a youth to be included in the dataset, the youth must stay in the dataset through the period prior to the study. The restriction means that the findings are limited in their applicability. In choosing age 16, the applicability of the findings have a wider scope. Fewer youth will have dropped out of school prior to age 16, compared to other studies that examine the effects of working on 18 year olds or twelfth graders.

The dataset only considers work experience during the school year for the effect on academic outcomes. Youths with summer work experience after age 16 are not excluded from

the sample. The effect of the youth's summer hours spent working may not carry into the school year. Previous research has not found a connection between a summer job and school year performance (Marsh 1991; Hannah and Baum 2002; Oettinger1999). The school year is considered to run between September 1 and May 31. Since school year calendars vary across districts, this period of time attempts to capture a snapshot of a youth's work activity.

When considering only the weeks in which youths work, 17% of the youths are intensive workers. This contrasts with work hours divided over the number of weeks in the school year. In including all the weeks of the school year, the percentage of intensive workers decreases to 5%.

The difference by work status narrows again, but it is still present when comparing youth by whether they worked at all. Youth who worked at any time during the school year were more likely to drop out of school by age 17.

Tyler used state instruments to examine work during 12th grade. This paper uses four instruments (table 1): whether the state requires a work permit or age certificate to obtain a non-agricultural job, whether the state requires a work permit or age certificate to obtain an agricultural job, whether the state has restrictions on working past 10 p.m. on a school night, and whether the state has restrictions on working more than 40 hours a week. Each of the instruments is a binary variable.

The instruments would affect a youth's availability for work. Some of the instruments would offer barriers to entry (permits), while other instruments would continue to restrict a youth's work hours throughout the period. The states are distributed between having 0 regulations and 4 regulations in place (tables 2a and 2b). One would assume the instruments

would not be correlated with dropout status or grade point average, controlling for region and MSA status.

V. Results:

In a cross-tabulation, the possible selection bias is evident in the dropout rates and GPAs of youth by their work status (chart 5). At low and moderate levels of work, the dropout rate of workers is close to the dropout rate of non-workers (3.9% vs. 3.4%). When work levels increase to 20+ to 40 hours, the dropout rate increases to 5.7%. The small group of students working an average of more than 40 hours per week have a nearly 50% chance of dropping out of school.

The comparison for GPA at 17 is similar to the differences among dropout rates (chart 6). Students who work intensely have a lower GPA than students who do not work intensely. The youth who do not work have close averages to youths who work moderately. Youth who work more than 20 hours per week have a larger gap in GPA relative to the youths not working.

Summary statistics for the two outcome variables are available in table 3 and in table 6.

For each of the OLS regressions (table 5), the direction of the relationship between work and academic outcomes was in the expected direction. As the number of hours worked during the school year increased, the rate of success in academic outcomes decreased. For the relationship between dropout rate and average work hours, as number of average work hours increased, the likelihood of dropout increased. After adding controls, the magnitude of the relationship decreased, but the coefficient was still statistically significant. The average likelihood of dropout in the data was 0.038, an increase in likelihood of 0.0014 would be a change of 3.7%.

The instruments of child labor laws offer a way to reduce the selection bias in the number of work hours of youth. When using a set of five instruments (table 4), the F-statistic was 3.59,

with a p-value of 0.0031. Without controls, the coefficient was statistically significant and increased to 0.0089. In adding controls, the coefficient decreased in magnitude and was no longer statistically significant.

In further examining the instrument with the strongest first-stage relationship, whether the state requires a work permit or age certificate to obtain a non-agricultural job, the relationship between the work variable and the academic outcome was still negative. Without adding controls, the coefficient for the increased likelihood of dropping out from an additional average hour of work was 0.0021. When adding controls, this relationship changed sign from 0.002 to -0.0072. Neither of these results was statistically significant, however.

When examining GPA as the outcome variable, the results broadly fit to expectations. In the OLS regression without controls (table 8), GPA had a negative relationship with average work hours. For each hour increase in average work hours, the GPA decreased .387, or four-thousandths of a point. When adding controls, the decrease in GPA from an hour increase in work hours was .144.

Again, I used a set of instruments of child labor laws offer a way to reduce the selection bias in the number of work hours of youth. These results are able to separate the selection bias between youth who choose to work more or fewer hours. When using a set of five instruments (table 7), the F-statistic was 1.11, with a p-value of 0.3539. Without controls, the coefficient was positive. In adding controls, the coefficient decreased in magnitude and changed sign.

In further examining the instrument with strongest first-stage relationship (whether a permit is required to get a non-agricultural job), the F-statistic increased from 1.11 to 3.82. Here the p-value was 0.0506. These results are biased in the direction of the OLS results. The relationship between the work variable and the academic outcome is positive, both with and

without controls. Without adding controls, the coefficient is 13.0 for the relationship between GPA and an additional hour of average work. The standard error has increased to 11.60. When adding controls, this coefficient decreases to 2.50. Neither of these coefficients is statistically significant, however.

VI. Discussion:

For likelihood to dropout, twelve background variables that had a statistically significant relationship at the 5% level. Race as non-Hispanic black, as Hispanic, and as other (relative to white) were negatively related to likelihood to dropout. Living in a rural area (relative to an urban one) and living in the West (relative to the Midwest) were negatively related to likelihood to dropout. The respondent's father having completed only high school and not further education and having completed college and not further education (relative to less-than-a-high school education) were negatively related to dropout status. The household's ratio of income to poverty level and the number of the youth's residences since age 12 were negatively related to dropout status. The number of days the respondent spent doing chores each week was negatively related to dropout status. The number of days absent in the past month was positively related to dropout status. Having ever skipped a grade was negatively related to dropout status.

For GPA, different variables had statistically significant relationships. Being a male student was negatively related to GPA. Being from the northeast region (relative to the Midwest) had a negative relationship with GPA, while living in the South (relative to the Midwest) had a positive relationship with GPA. Having ever been suspended was negatively related to GPA.

It is difficult to draw conclusions from this analysis. The standard errors are too large to make statistically significant conclusions. Also, from looking at the F-statistics, which have higher p-values, the IV estimates are biased in the direction of the OLS estimates. Although the results using only the strongest instruments and including controls were not statistically significant, they may hint at relationships that would warrant further study.

VII. Conclusion:

With the widespread participation of youth in the workforce, citizens, policymakers, and researchers have a valid interest in the effect of working part-time during high school on the academic outcomes of youth. Between age 16 and 17, 30% of youth work for the first time. Although youth deciding to work any hours may be of concern, the 20% of youth working more than 20 hours per week may warrant special attention. Some previous literature has found that working more than 20 hours is the point where part-time work has a negative effect on work hours.

While much of previous literature has used OLS to examine the effect of part-time work on academic outcomes, this paper uses an instrumental variables approach. IV may address the potential bias in the OLS estimates, from the endogeneity in the selection of the number of work hours. Differences in child labor laws across states offer instruments for youth's availability to work.

Despite the potential of this research, the IV regressions do not have statistically significant results for the relationship between part-time work and the likelihood of dropping out of school or grade point average. The strength of the first-stage relationship did not have F-

statistics that were large enough to overcome the possible bias of the OLS estimates. Also, the standard errors of the IV estimates were large.

As the youths in the NLSY-97 dataset continue to age, it will be possible to study additional academic outcomes. One extension of this project would be to look at academic outcomes past age 17. As a longitudinal survey, the dataset has these variables available past the initial work experience. Also, now that the 1997 cohort of respondents are older, we are able to take a longer view of the effects of part-time work during high school. Two particular outcomes would be especially substantive and attainable to study.

It is possible to track whether a respondent has completed high school, dropped out, or received a GED within four years of starting high school or by a certain age. By the 2005 survey round, the youngest respondents who turned 12 in 1996 will be 21 years old. The enrollment status variable also makes it possible to see if students pursued higher education after high school.

Chart 1: Percentage of youth in the U.S. who have worked at that age (from NLSY-97)

Percentage Have Worked at That Age

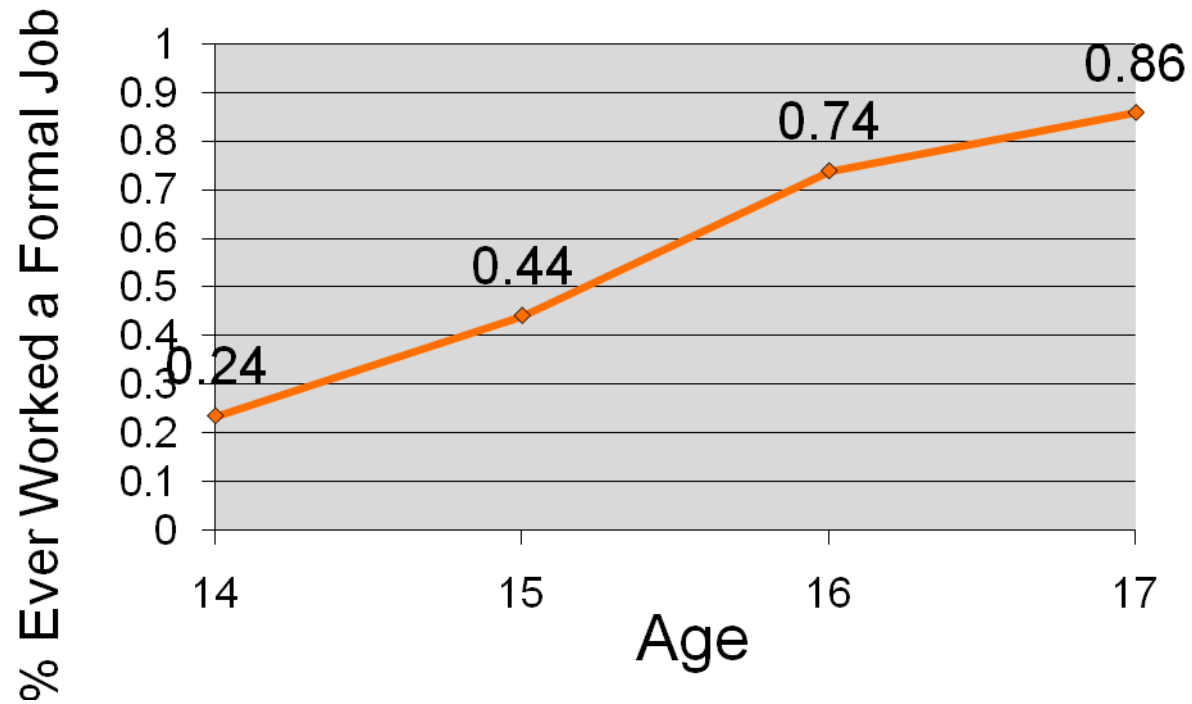


Chart 2: Average hours of work for youth at age 16

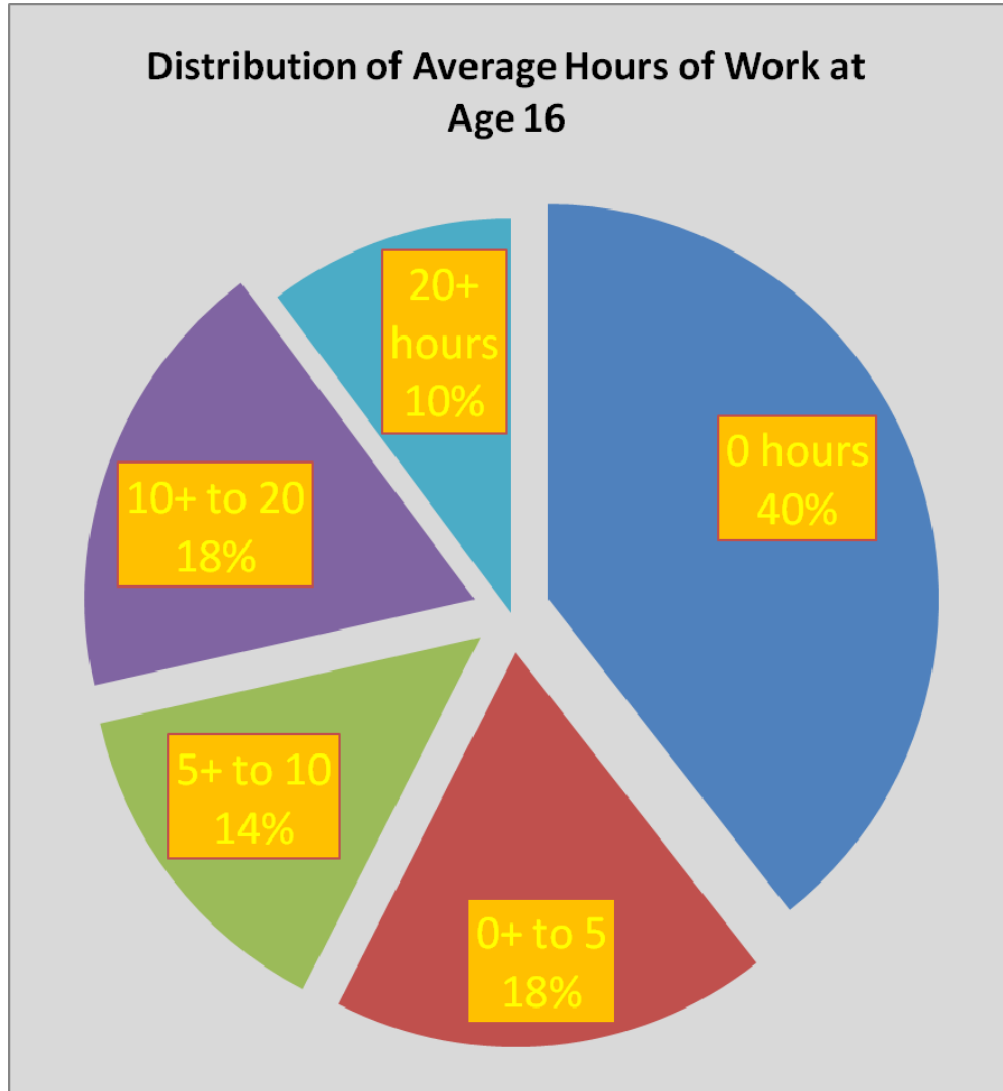


Chart 3: Percentage of youth who worked more than twenty hours per week at least once during the age 16 school year

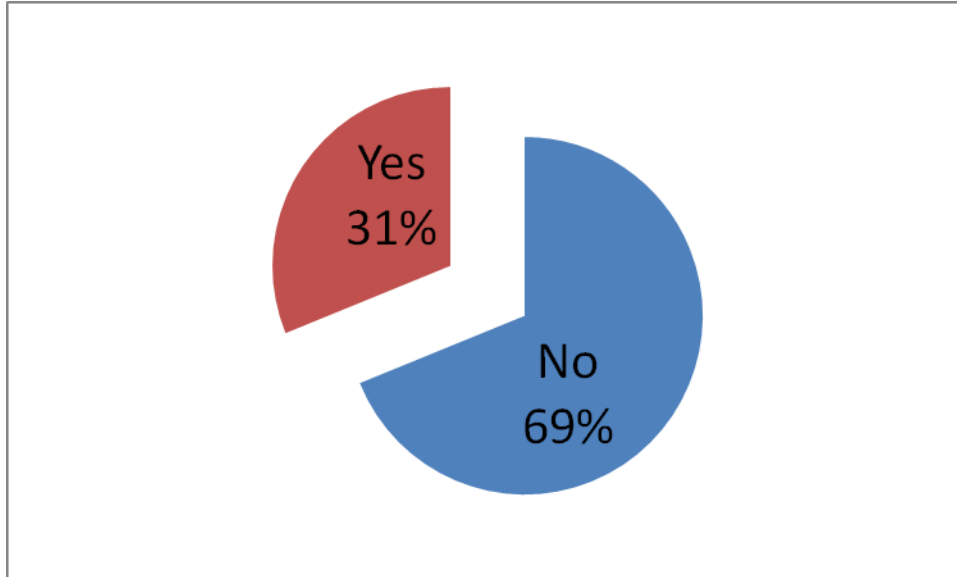


Chart 4: Average PIAT math test score percentile, by average workload during age 16

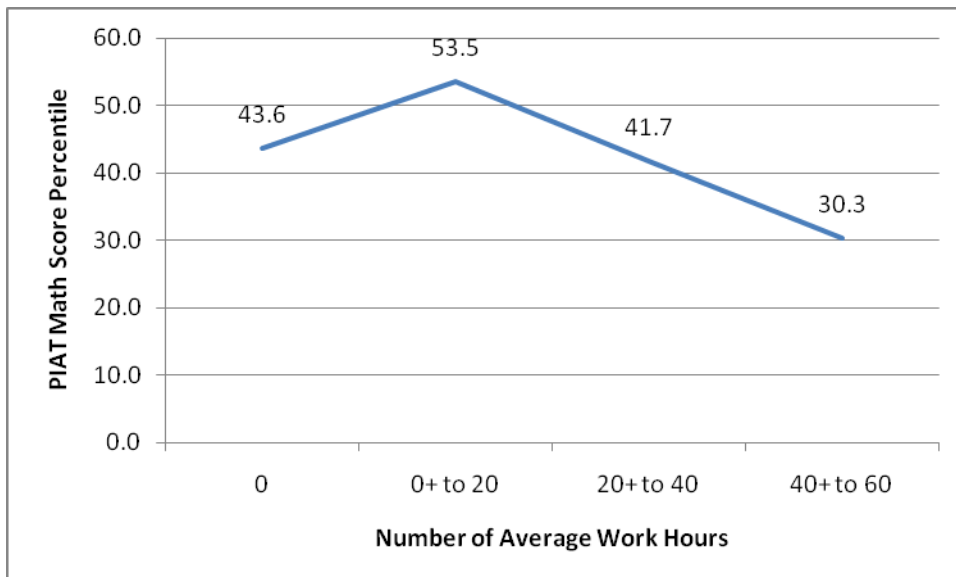


Table 1

The Instruments:

Work permits: Whether the state required a work permit for 16 year olds to work at a agricultural job,

a non-agricultural job,

Hours: Whether the state restricted 16 year olds to working less than 40 hours a week during the school year

10 p.m.: Whether the state restricted 16 year olds from working past 10 p.m. on a school night

Table 2a:

Description of regulation	Number of States
Require a work permit or age certificate to obtain a non-agricultural job	22
Require a work permit or age certificate to obtain an agricultural job	8
Restrictions on working past 10 p.m. on a school night	10
Restrictions on working more than 40 hours a week	14

Table 2b:

Number of regulations for youth at age 16	Number of states
0	18
1	17
2	10
3	5
4	1 (California)

Chart 5: Dropout rate by average hours of work during the age 16 school year

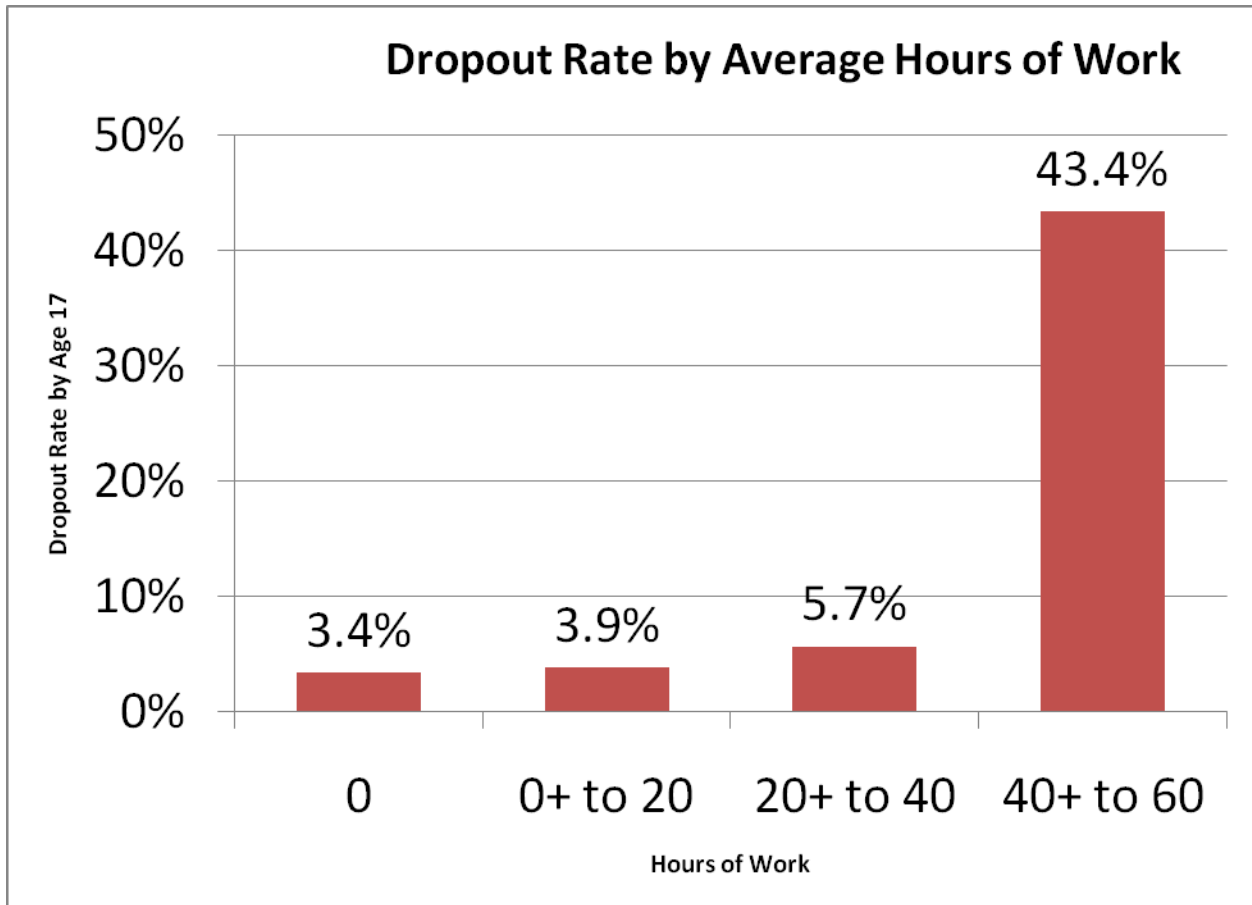


Chart 6: Grade point average by average hours of work during the age 16 school year

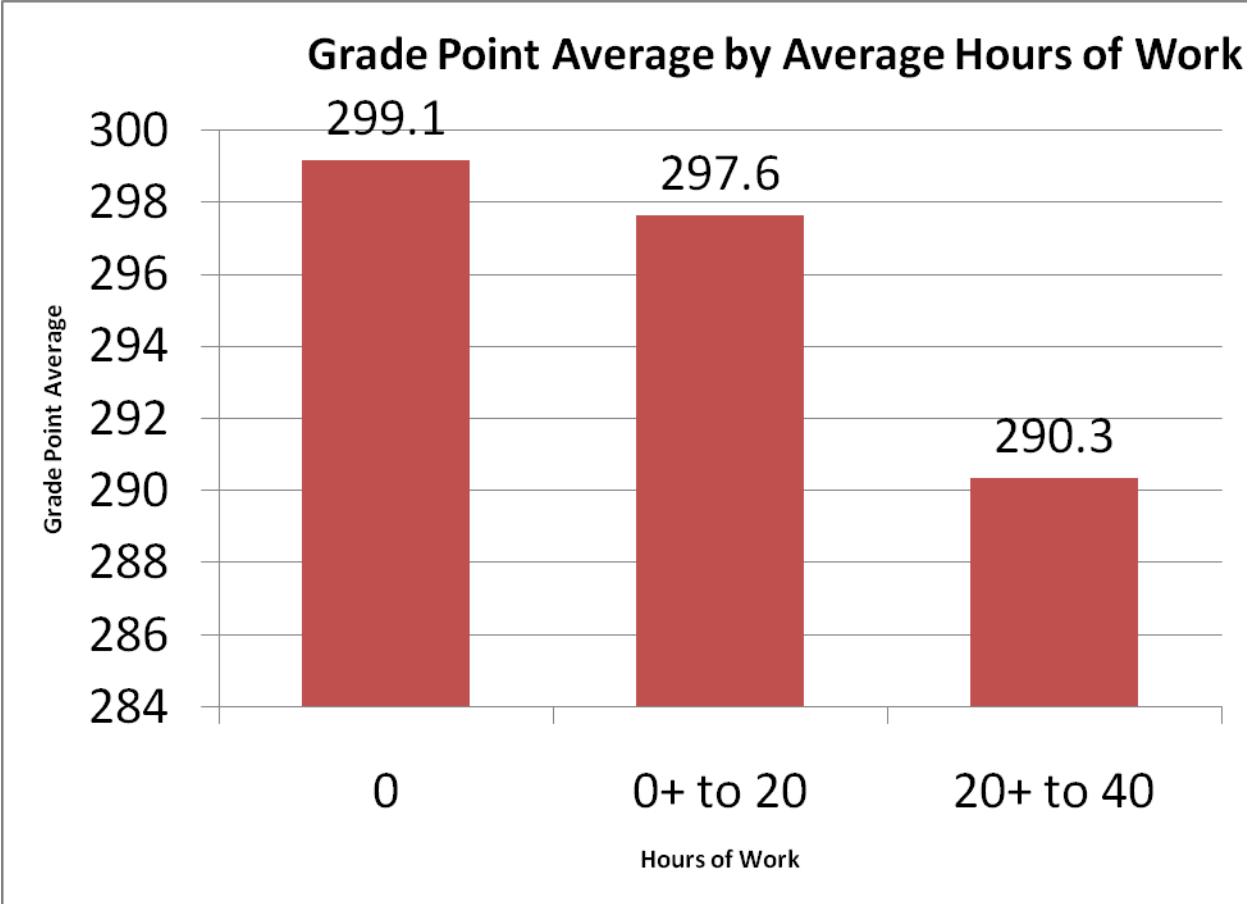


Table 3: Summary statistics for dropout status outcome variable

Variable Name	Mean	Std. Dev.	% Missing
dropout status	3.76%	19.03%	
Male	46.61%	49.89%	0.00%
Black, non-Hispanic	11.26%	31.61%	0.60%
Hispanic	10.16%	30.22%	0.49%
Other Race	6.44%	24.54%	0.60%
Live in Suburbs	55.72%	49.68%	0.27%
Live in Rural Area	20.60%	40.45%	0.27%
Lives in Northeast	17.79%	38.25%	0.26%
Lives in South	36.65%	48.19%	0.26%
Lives in West	21.24%	40.91%	0.26%
Father has HS education	35.46%	47.85%	10.95%
Father has college education	35.98%	48.00%	10.95%
Father has grad sch. education	12.39%	32.95%	10.95%
Mother has HS education	35.11%	47.74%	4.75%
Mother has college education	40.46%	49.09%	4.75%
Mother has grad school education	8.91%	28.49%	4.75%
Ratio of HH's income to poverty level	325.21	291.22	73.08%
General H.S. curriculum	50.84%	50.00%	28.64%
College prep H.S. curriculum	36.97%	48.28%	28.64%
Attends public school	88.77%	31.57%	1.87%
GPA at age 15	297.38	66.10	38.46%
Math percentile at age 15	42.06	29.64	66.81%
ASVAB Percentile (three implied decimal places)	52637	28748	17.92%
born in 1980	20.29%	40.22%	0.00%
born in 1981	20.95%	40.70%	0.00%
born in 1982	20.35%	40.27%	0.00%
born in 1983	19.88%	39.91%	0.00%
born in 1984	18.54%	38.87%	0.00%
Receives an allowance	37.69%	48.47%	0.48%
Number of days per week youth does chores	5.62	1.85	41.84%
Number of weekdays per week youth reads for pleasure	3.15	1.51	63.27%
Number of times absent from school during the fall term	4.57	7.48	2.05%
Ever repeated a grade	16.03%	36.70%	20.35%
Ever skipped a grade	2.06%	14.20%	21.70%
Ever suspended from school	26.53%	44.17%	72.97%
Lives with both parents	53.54%	49.88%	0.57%
Lives with parent and step-parent	13.99%	34.69%	0.57%
Lives with mom	21.51%	41.10%	0.57%
Lives with father	4.11%	19.86%	0.57%

Mother figure employed	79.09%	40.67%	11.69%
Father figure employed	93.40%	24.83%	32.22%
Number of residences since age 12	1.94	1.56	0.12
Worked a managerial or professional job during the school year	4.04%	19.69%	0
Worked a service job during the school year	34.01%	47.38%	0
Worked a sales or office job during the school year	30.84%	46.19%	0
Worked a natural resources, construction, or maintenance job during the school year	5.28%	22.37%	0
Worked a production, transportation, and material moving job during the school year	9.80%	29.74%	0
Youth lives in a state where youth can quit school at age 16	47.39%	29.74%	0
n=3420			

Table 4: First-stage results for dropout status:

Dependent Variable:	Type of Restriction	
	All instruments	Subset of instruments
Average Work Hours		
40 hours / week	0.48 (0.37)	
10 p.m. on a school night	-0.43 (0.34)	
Work permit for agricultural job	0.74 (1.17)	
Work permit for non-agricultural job	-0.77 (0.318)**	-0.95 (0.270)***
Both permits (interaction)	-1.48 (1.38)	
Additional controls	Yes	Yes
F-statistic	3.59	12.4
p-values	(0.0031)	(0.0004)

Table 5: OLS and IV results for dropout status

	No Controls	With Controls
OLS	0.0018 (0.0007)**	0.0014 (0.0007)**
IV	0.0089 (0.0033)***	0.0013 -0.0060
IV (subset)	0.0021 -0.0085	-0.0072 -0.0076
	Mean	Std. Dev.
Average Dropout Rate	0.038	0.190
Average Number of Hours	4.54	7.22

Table 6: Summary statistics for GPA outcome variable

Variable Name	Mean	Std. Dev.	% Missing
GPA at age 17	298.10	0.19	
Male	45.31%	49.89%	0.00%
Black, non-Hispanic	10.18%	31.61%	0.60%
Hispanic	8.92%	30.22%	0.49%
Other Race	6.28%	24.54%	0.60%
Live in Suburbs	55.69%	49.68%	0.27%
Live in Rural Area	22.69%	40.45%	0.27%
Lives in Northeast	16.92%	38.25%	0.26%
Lives in South	34.96%	48.19%	0.26%
Lives in West	22.49%	40.91%	0.26%
Father has HS education	35.27%	47.85%	10.95%
Father has college education	37.10%	48.00%	10.95%
Father has grad sch. Education	14.20%	32.95%	10.95%
Mother has HS education	35.06%	47.74%	4.75%
Mother has college education	42.60%	49.09%	4.75%
Mother has grad school education	9.46%	28.49%	4.75%
Ratio of HH's income to poverty level	380.29	291.22	73.08%
General H.S. curriculum	47.81%	50.00%	28.64%
College prep H.S. curriculum	40.74%	48.28%	28.64%
Attends public school	91.10%	31.57%	1.87%
GPA at age 15	301.32	66.10	38.46%
Math percentile at age 15	45.04	29.64	66.81%
ASVAB Percentile (three implied decimal places)	56216	28748	17.92%
born in 1980	23.37%	40.22%	0.00%
born in 1981	22.07%	40.70%	0.00%
born in 1982	20.12%	40.27%	0.00%

born in 1983	17.12%	39.91%	0.00%
born in 1984	17.32%	38.87%	0.00%
Receives an allowance	37.62%	48.47%	0.48%
Number of days per week youth does chores	5.63	1.85	41.84%
Number of weekdays per week youth reads for pleasure	3.14	1.51	63.27%
Number of times absent from school during the fall term	3.98	7.48	2.05%
Ever repeated a grade	11.63%	36.70%	20.35%
Ever skipped a grade	1.84%	14.20%	21.70%
Ever suspended from school	21.78%	44.17%	72.97%
Lives with both parents	57.23%	49.88%	0.57%
Lives with parent and step-parent	13.99%	34.69%	0.57%
Lives with mom	19.76%	41.10%	0.57%
Lives with father	3.83%	19.86%	0.57%
Mother figure employed	80.06%	40.67%	11.69%
Father figure employed	94.66%	22.49%	28.31%
Number of residences since age 12	1.79	1.56	0.12
Worked a managerial or professional job during the school year	4.47%	19.69%	0
Worked a service job during the school year	35.05%	47.38%	0
Worked a sales or office job during the school year	33.33%	46.19%	0
Worked a natural resources, construction, or maintenance job during the school year	5.59%	22.37%	0
Worked a production, transportation, and material moving job during the school year	9.39%	29.74%	0
Youth lives in a state where youth can quit school at age 16	48.27%	29.74%	0
n=2243			

Table 7: First-stage results for GPA

Dependent Variable:	Type of Restriction	
	All instruments	Subset of instruments
Average Work Hours		
40 hours / week	0.37 (0.42)	
10 p.m. on a school night	-0.25 (0.39)	
Work permit for agricultural job	0.97 (1.32)	
Work permit for non-agricultural job	-0.51 (0.37)	-0.61 (0.313)*
Both permits (interaction)	-1.41 (1.57)	
Additional controls	Yes	Yes
F-statistic	1.11	3.82
p-values	0.3539	0.0506

Table 8: OLS and IV results for GPA

	No Controls	With Controls
OLS	-0.387 (0.217)*	-0.144 (0.19)
IV	1.74 (1.95)	-1.00 (3.40)
IV (subset)	13.0 (11.60)	2.50 (4.17)
	Mean	Std. Dev.
Average GPA	298.1	66.2
Average Number of Hours	4.42	6.80

Bibliography:

- Aaronson, D., Park, K., and Sullivan, D. "The decline in teen labor force participation." Economic Perspectives. 1Q/2006. 2-18.
- Apel, R., Brame, R., Bushway, S., Haviland, A.M., Nagin, D.S., and Paternoster, R. 2007. "Unpacking the relationship between adolescent employment and antisocial behavior: A matched samples comparison." Criminology. 45(1): 67-97.
- Bachman, J.G., Safron, D.J., Sy, S.R., and Schulenberg, J. 2002. "Preferred work intensity of secondary school students: New findings and insights on why parttime work intensity correlates with drug use and problem behavior." Monitoring the Future Occasional Paper No. 48. Ann Arbor, MI: University of Michigan, Institute for Social Research.
- Carr, R.V., Wright, J.D., and Brody, C.J. 1996. "Effects of high school work experience a decade later: Evidence from the National Longitudinal Survey." Sociology of Education. 69(1): 66-81.
- Chaplin, D. and Hannaway, J. 1996. "High school employment: Meaningful connections for at-risk youth." The Urban Institute. <http://www.urban.org/url.cfm?ID=406506>
- Coleman, J.S. 1961. The Adolescent Society. New York: Free Press of Glencoe.
- DeSimone, J. 2006. "Academic performance and part-time employment among high school seniors." Topics in economic analysis and policy. 6(1): Article 10.
- Entwisle, D. R., Alexander, K.L., and Olson, L.S. 2005. "Urban teenagers: Work and dropout." Youth & Society. 31(1): 3-32.
- Greenberger, E., and Steinberg, L. 1986. When teenagers work: The psychological and social costs of adolescent employment. New York: Basic Books.
- Greenberger, E., Steinberg, L., and Vaux, A. 1981. "Adolescents who work: Health and behavioral consequences of job stress." Developmental Psychology. 17(6): 691-703.
- Hannah, R.L. and Baum, C.L. 2002. "An analysis of the linkages between high school allowance, high school market-place work, and academic success in high school." The high school journal. 85(3): 1-12.
- Lee, J.C. and Staff, J. 2007. "When work matters: The varying impact of work intensity on high school dropout." Sociology of Education. 80(2): 158-178.
- Lillydahl, J. H. 1990. "Academic achievement and part-time employment of high school students," Journal of Economic Education. 21(3): 307-316.

Marsh, H. W. 1991. "Employment during high school: character building or a subversion of academic goals?" Sociology of Education. 64(3): 172-189.

Mortimer, J. T., Finch, M.D., Ryu, S., Shanahan, M.J., and Call, K.T. 1996a. "The effects of work intensity on adolescent mental health, achievement, and behavioral adjustment: New evidence from a prospective study." Child Development. 67(3): 1243-1261.

Mortimer, J. T., Pimentel, E. E., Ryu, S., Nash, K., and Lee, C. 1996b. "Part-time work and occupational value formation in adolescence." Social Forces." 74(4): 1405-1423.

National Research Council, Institute of Medicine. 1998. *Protecting Youth at Work: Health, Safety, and Development of Working Children and Adolescents in the United States*. Committee on the Health and Safety Implications of Child Labor, Board on Children, Youth, and Families, Commission on Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Oettinger, G.S. 1999. "Does high school employment affect high school academic performance?" Industrial and Labor Relations Review. 53(1): 136-151.

Schoenhals, M., Tienda, M., and Schneider, B. 1998. "The educational and personal consequences of adolescent employment." Social Forces. 77(2): 723-761.

Tyler, J.H. 2003. "Using state child labor laws to identify the effect of school-year work on high school achievement." Journal of Labor Economics. 21(2): 381-408.

Warren, J., and Cataldi, E. 2006. "A historical perspective on high school students' paid employment and its association with high school dropout." Sociological Forum, 21(1): 113-143.