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**Employment
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THE LASTING BENEFITS OF EARLY WORK **EXPERIENCE**

The Employment Policies Institute (EPI) is a nonprofit research organization dedicated to studying public policy issues surrounding employment growth. In particular, EPI research focuses on issues that affect entry-level employment. Among other issues, EPI research has quantified the impact of new labor costs on job creation, explored the connection between entry-level employment and welfare reform, and analyzed the demographic distribution of mandated benefits. EPI sponsors nonpartisan research that is conducted by independent economists at major universities around the country.

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I N S T I T U T E

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THE LASTING BENEFITS OF EARLY WORK EXPERIENCE

Executive Summary

The US labor market has recovered slowly but steadily in the years since the Great Recession officially ended in June 2009. But for young adults between the ages of 16 and 19, the recovery has been tepid at best: In the five year period since the summer of 2008, youth unemployment has averaged a staggering 23.5 percent, and the seasonally-adjusted rate was still north of 21 percent as of this writing.

These young adults are missing out on extra spending cash, but they're also missing out on early workforce experience that could play a valuable role in future career development. In this new study, Drs. Christopher Ruhm of the University of Virginia and Charles Baum of Middle Tennessee State University examine data that spans three decades to measure the career benefits of early work experience.

The economists rely on data from the National Longitudinal Survey of Youth (NLSY), which tracks the career progress of one group of respondents who graduated from high school in the late 1970s and early 1980s, and another group of respondents who were in high school around the turn of the millennium. This permits them to examine both the near-term benefits of early work experience (roughly 10 years after graduation)

and the longer-term benefits of that experience (roughly 30 years after graduation).

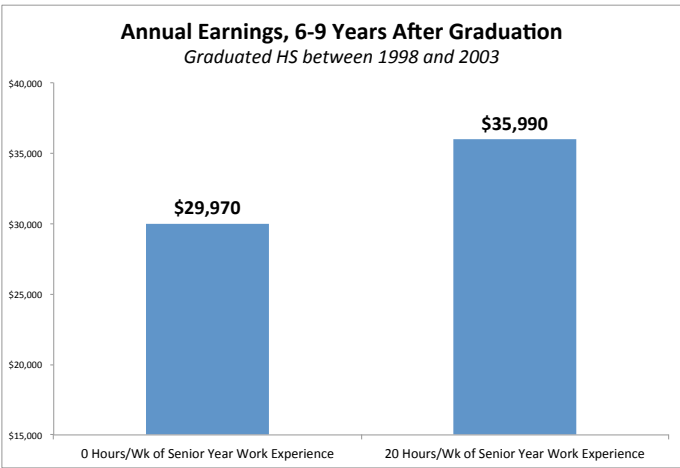
Carefully controlling for other family background characteristics that could impact subsequent career achievement, Drs. Ruhm and Baum find clear evidence that part-time work by young adults—both during senior year of high school, and during the summer months—translates to future career benefits that include higher hourly wages, increased annual earnings and less time spent out of work.

Most importantly, the economists find that this career benefit of entry-level work persists in the long term: Young adults who graduated high school in the late 1970s and early 1980s and worked part-time during their senior year saw a career benefit 5-10 years after graduation—and the earnings differential still existed nearly 30 years later.

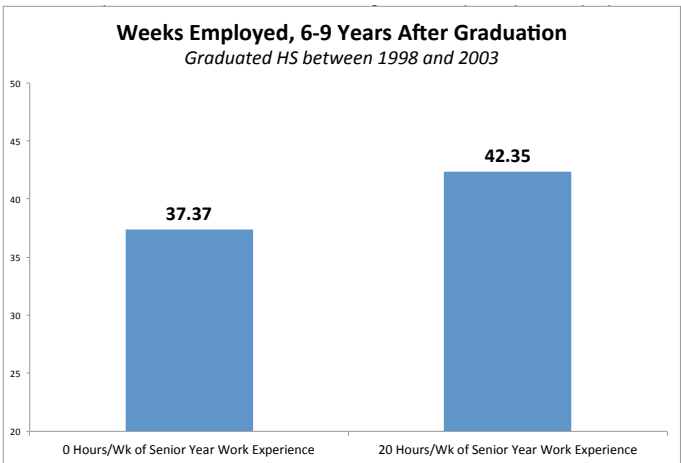
Studying hourly wages, for instance, the authors find that these part-time employed high school seniors enjoyed a nearly 11 percent wage premium over their unemployed counterparts. Checking in when the respondents were in their 40s or 50s, the wage premium held up: The people who held a job in high school were still earning 9.4 percent more per hour. (More recently, high school graduates also enjoyed an hourly wage premium, although it was more modest at 3.6 percent.)

The authors provide numerous other tangible data points that demonstrate the benefit:

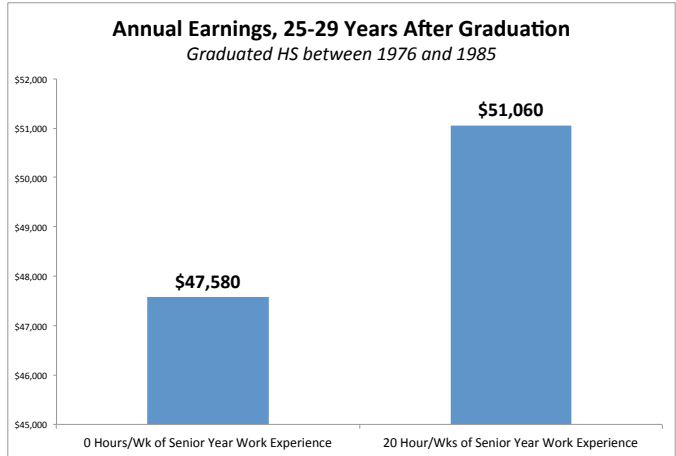
- For a young adult in high school at the turn of the millennium, 20 hours of part-time work per week in their senior year resulted in annual earnings that were 20 percent higher 6-9 years after graduation, as compared to their fellow students who didn't work.



- The authors also detect a positive impact on employment. Millennial high school seniors who held a part-time job were employed an average 42 weeks per year after graduation, as compared to 37 weeks of employment per year for those who didn't hold a job.



for years: Even for workers who were high school students in the late 1970s and early 1980s, 20 hours of senior-year work experience per week is associated today with annual earnings that are seven percent higher as compared to those who didn't work.



Drs. Ruhm and Baum demonstrate that these future career benefits are occurring specifically as a result of the career experience that's gained in early work experience. Some commentators have referred to this as the "invisible curriculum" that makes you more attractive to future employers. Their results in this study suggest entry-level work—at restaurants, at grocery stores, at a local retailer—plays a significant role in career development. Especially in this current environment, policymakers should tread carefully before passing policies like significant increases in the minimum wage that put these positions further out of reach.

Note: Policy conclusions don't necessarily reflect the views of the authors or their universities.

Introduction and Background

Early work experience in high school, by facilitating the transition from school to the labor force, is widely believed to be important to later economic success (Bailey, 1995; Bishop, 1996; Osterman, 1995; Poczik, 1995). Students who are employed while in high school may be able to enhance their future employment prospects and earnings potential by learning work-related skills as they forge contacts with employers. The impact of early work experience on earnings may have increased as the return to “skill” has risen (Oettinger, 1999). This may be particularly important today, with a national unemployment rate that still remains above six percent, and a youth unemployment rate that remains near 20 percent. However, others (Greenberger and Steinberg, 1986) believe early work experience harms academic performance by decreasing high school graduation and college attendance rates, which is detrimental to later economic success.

A substantial amount of research has examined the effects of student employment on later economic outcomes. This literature generally finds that modest amounts of high school employment enhance future employment opportunities and increases wages (Carr, Wright, and Brody, 1996; Hotz, Xu, Tienda, and Ahituv, 2002; Light, 1999, 2001; Marsh, 1991; Meyer and Wise, 1982; Mortimer and Finch, 1986; Steel, 1991; Stephenson, 1981; Stern and Nakata, 1989). For example, Ruhm (1997) examines the effects of high school marketplace work on future hourly and annual earnings, fringe benefits (e.g., retirement pensions and health insurance), and occupation status measured several years later in

1979-cohort National Longitudinal Survey of Youth (NLSY79) data, and he finds that early work experience during the senior year generally has beneficial effects on these outcomes.

We build on this literature by providing current estimates of the benefits and costs of early work experience in high school using a newer data set (1997-cohort NLSY data) that examines youths who were in high school around the turn of the millennium and their labor market outcomes from the NLSY97’s most recently-released survey waves. Our analysis is perhaps most similar to Ruhm’s (1997) work with the NLSY79 cohort. Existing studies, including Ruhm’s (1997) and relatively recent papers, use older data, when youths were in high school in the early 1980s or earlier. We identify substantially longer-term benefits and costs of early work experience than have previously been studied by examining respondents who are now in their 40s and 50s from the NLSY79 to show whether initial effects of early work experience are transitory or permanent. Previously, Ruhm (1997) examined effects for NLSY79 respondents 6 to 9 years after high school, when they were approximately 23 to 26 years of age. Finally, we are the first to examine whether the effects of early labor market experiences have changed over the last 20 years by comparing effects for NLSY79 and NLSY97 respondents at similar ages.

Examining whether the effects of early work experience have changed is important because the prevalence of high school employment has dramatically decreased. The National Center for Education Statistics (2012) shows the employment rate of high school students aged 16 or older remained roughly constant at 32 percent during

¹Alternatively, Smith (2012) finds that, after increasing during much of the period after World War II, the employment rate of 16- and 17-year olds began declining at the end of the 1980s, and by 2010 had fallen to 20 percent from about 45 percent in 1989. This decrease accounts for one-third of the aggregate decrease in labor force participation after 2000. Aaronson, Park, and Sullivan (2006) show a similar decrease for 16 to 19-year olds, which accounts for half the aggregate decrease in labor force participation after 2000. Smith (2012) and Aaronson et al. (2006) do not limit their samples to high school students, which may explain why the trends they describe differ from trends provided by the National Center for Education Statistics.

the 1990s, but after 2000, the proportion of high school students employed began declining, and by 2010, only 16 percent were employed.¹ A portion of this decline may be due to the Great Recession (dated December 2007 through June 2009), where the types of employers who have traditionally hired high school students (e.g., fast food restaurants, theaters, and retail stores) increasingly began hiring college graduates, although most other years between 2000 and 2010 also experienced declines. Other reasons include youths being displaced by immigrants as the immigrant portion of the population has increased; labor market polarization due to automation and computerization, where adults who might have been employed in middle-class jobs are seeking the same lower-paying jobs teens have often held; and increased emphasis on education as the college wage premium has increased and more financial aid from state lottery scholarships is available (Aaronson, Park, and Sullivan, 2006; Gottschalk and Hansen, 2003; Sum, Harrington, and Khatiwada, 2006; Smith, 2011; 2012).² Smith (2011) reports that high school students are also more likely to be enrolled in school during summer months, potentially because some school years begin earlier, more schools are in session year-round, and more students require additional summer education to pass high school exit exams. If the decrease in high school employment is due to greater emphasis on education, then the decline may enhance future labor market outcomes, but if it is due to displacement by immigrants or older workers, then lost work experience may be detrimental to later earnings potential.

We find that NLSY97 high school students do not work noticeably less than their NLSY79 counterparts did approximately 20 years earlier during the academic year, which is consistent with trends reported by the National

Center for Education Statistics (2012), though they do work less during the summer. Regression results show working during the high school senior year for NLSY79 respondents significantly benefits adult labor market outcomes measured between 1986 and 1988. This result is robust to various model specifications, including several approaches to control for unobserved heterogeneity bias. Senior work-hour effects measured approximately 10 years later (between 2007 and 2009) for NLSY97 respondents are beneficial in most specifications but smaller in magnitude than for comparably-aged NLSY79 respondents (in 1986-1988). This is also true for labor market outcomes measured between 2006 and 2010 for those who graduated from high school approximately 30 years earlier (e.g., NLSY79 respondents). For example, when working the optimal number of hours per week during the senior year (e.g., the number of hours that maximizes wages), the wage premium from senior work experience is about twice the size for younger NLSY79 respondents in 1986-1988 (24.4 percent) than for NLSY97 respondents in 2007-2009 (10.9 percent) and NLSY79 respondents in 2006-2010 (12.3 percent). This suggests beneficial effects of early work experience fade over time within cohorts and have diminished over time across cohorts. Early work experience does not appreciably affect adult labor market outcomes through education because early work experience does not appreciably affect education for the most common amounts of senior-year work. Effects on adult labor market outcomes through subsequent work experience are larger.

The remainder of the paper is as follows. In Section II, we outline the reasons why high school work experience could have beneficial or detrimental effects on later economic outcomes and academic achievement and

²Similarly, Hao, Astone, and Cherlin (2004) find that more stringent welfare policies introduced by welfare reforms in the 1990s reduced high school employment as adults on welfare moved to the labor force, often into the same industries typically employing youths.

attainment. Section III provides a more in-depth review of the literature. Our empirical approach is presented in Section IV with results in Section V. Following these sections, we offer some conclusions.

Theory

The fields of economics and sociology use three theories (the human capital, signaling, and occupational socialization models) to predict the effects of high school employment on later economic outcomes. All three theories suggest that there are conditions under which wages will be enhanced by this employment experience but others under which they will not, as discussed below. However, the methods by which economic outcomes are affected differ among the theories. Further, high school employment may have indirect effects on wages by influencing education outcomes.

The human capital model suggests that an individual's productivity is increasing in skills and knowledge and that an individual's potential earnings are increasing with productivity (Becker, 1964, 1975; Mincer, 1974, 1979). Factors that increase an individual's skill and knowledge represent human capital accumulation, enhancing economic attainment. High school work experience may increase wages via human capital accumulation. Employed students acquire skills and knowledge that increase productivity.

The screening model suggests that employers are unable to identify an individual's productivity. To determine whom to hire (or what wage to pay), employers rely on "signals" to indicate productivity (Spence, 1973, 1974; Arrow, 1973). High school employment may serve as such a signal, where students who successfully engage in marketplace work are more productive. If so, then high school employment may result in higher wages. However, for high school employment to serve as a

signal of productivity, it must be less costly to acquire for those who are more productive.

The occupational socialization model, similar to the human capital model, suggests workers enhance their productivity by learning job-related skills. However, the occupational socialization model goes further by suggesting workers enhance productivity by developing favorable work attitudes, stronger work orientations, higher self-reliance, and positive self-concepts (Mortimer and Finch, 1986; Steel, 1991). Individuals who have developed these characteristics through work experience are more attractive to employers and, since their work experience has increased their productivity in these ways, receive higher wages.

Stern and Nakata (1989) build on the human capital and the occupational socialization models by suggesting work experience also develops "learning" skills. These skills enable individuals to "learn on the job." Learning on the job is needed to approach new problems effectively, to understand the steps required to complete an assignment, to identify the information needed to complete an operation, or to devise a means by which to attain requisite information. Stern and Nakata believe developing the ability to learn on the job is becoming more important with technological change, increased employee decision-making, and our economy's shift from high-volume manufacturing to low-volume specialized production.

Just the opposite, high school employment may lower wages indirectly through education. One possibility is that high school employment decreases cognitive skill accumulation as measured by GPAs, high school dropout and graduation rates, and college attendance rates (Greenberger and Steinberg, 1986). For example, work may interfere with learning and detract from educational attainment if it serves as a substitute for time studying. Work may lead to exhaustion or stress where high school

students have less ability to focus in the classroom and resort to deviant methods such as cheating and copying to maintain academic performance (Steinberg, Fegley, and Dornbusch, 1993).

Conversely, if marketplace work allows students to improve productive characteristics such as skill and knowledge, then it may indirectly raise wages by enhancing educational performance (increasing GPAs, graduation rates, and so on). For example, work may help students develop time-management skills or industrious work habits, and these skills may enhance academic performance.

Existing Evidence

A modest amount of research has examined the effects of high school marketplace work on later economic outcomes. This literature generally finds that high school employment enhances future employment opportunities and increases wages (Carr, Wright, and Brody, 1996; Hotz, Xu, Tienda, and Ahituv, 2002; Light, 1999, 2001; Marsh, 1991; Meyer and Wise, 1982; Mortimer and Finch, 1986; Steel, 1991; Stephenson, 1981; Stern and Nakata, 1989).³ Ruhm (1997) finds that early work experience during the senior year has positive effects on future hourly and annual earnings, fringe benefits (e.g., retirement pensions and health insurance), and occupation status measured 6 to 9 years later. Ruhm's

results are robust to including various sets of supplemental covariates and to techniques designed to control for selection bias. He also finds that senior-year employment may reduce educational attainment, particularly for intensity levels of 20 hours or more per week. Early work experience during the sophomore and junior years does not significantly affect future labor market outcomes or educational performance.

Meyer and Wise's (1982) estimates suggest post-high school annual employment increases by 1.5 weeks with every 5 additional hours of weekly high school employment. Their estimated return to wages from working while in high school ranges from 5 to 9 percent. Light (1999) finds high school employment raises wages as many as 6 years after high school graduation. Her preferred results suggest 25 hours of high school employment per week (compared to no high school employment) raise wages by 6 percent. However, Light finds these positive effects fall to zero 7 or 8 years after high school graduation. In a different study, Light's (2001) results suggest 2 years of in-school employment raise wages between 10 and 18 percent (for college graduates). Carr, Wright, and Brody's (1996) results show high school employment increases labor force participation, employment, and income measured ten years later.

Quite differently, Hotz, Xu, Tienda, and Ahituv (2002) conclude positive effects of high school work

³Stern, Finkelstein, Urquiola, and Cagampang (1997) differentiate between the effects of two kinds of high school work. They identify "co-op" work and "non-school-supervised" work, with co-op work defined as where teachers and employers develop a work-related training plan for the student. Their results show that when controlling for whether high school students continue to college after high school graduation, co-op work has a statistically insignificant effect on wages. Both types of employment significantly decrease high school grades, but the negative effects of non-school-supervised work are larger than those of co-op work.

In a related study, Neumark and Joyce (2001) use NLSY97 data to study the effects of school-to-work programs on current school enrollment, employment, hours of work, wages, and educational attainment and on expectations of future education and employment. While program participation seems to affect students' expectations, Neumark and Joyce's results suggest school-to-work programs have virtually no effect on any of the other outcomes listed above. However, their results must be interpreted with caution because their data is taken from the 1997 wave when respondents were roughly 12 to 16 years of age. Consequently, outcomes such as employment, hours of work, and wages are barely observed for most respondents. Neumark and Joyce acknowledge that when such outcomes are observed, their interpretation is unclear because these NLSY97 respondents are unlikely to have begun their careers in earnest.

on wages found in the literature are due to unobserved heterogeneity. Hotz et al. (2002) distinguish between students who work during the school year and students who do no work, and they find that failure to control appropriately for unobserved heterogeneity results in overstated returns to high school employment. Their estimated effects of high school employment when explicitly controlling for unobserved heterogeneity are not statistically different than zero. However, Light (2001) believes Hotz et al.'s (2002) findings may be the result of examining the effects of whether students work rather than work intensities.

Other studies have examined the effects of marketplace work on educational performance during high school.⁴ Early work by Greenberger and Steinberg (1980), Mortimer and Finch (1986), Steinberg and Dornbusch (1991), Steinberg, Greenberger, Garduque, and McAuliffe (1982), and Steinberg, Fegley, and Dornbusch (1993) show hours of work during the school year have detrimental effects on multiple measures of high school performance. These detrimental effects are especially strong for those students who work long hours (more than 20 per week). Similarly, Marsh (1991) finds work during high school has unfavorable effects on going to college, attendance, and homework. Steinberg, Greenberger, Garduque, Ruggiero, and Vaux (1982) find such work decreases the amount of time that high school students

spend on homework and extracurricular activities.⁵

Later studies concur. Carr, Wright, and Brody (1996) determine high school work has a negative effect on collegiate educational attainment. Eckstein and Wolpin (1999) show working while attending high school has detrimental effects on graduation rates and grade point averages.⁶ Oettinger's (1999) results indicate extensive high school employment (working more than 20 hours in each week during the school year) has a negative effect on grades. Tyler (2003) finds working during the twelfth grade significantly reduces performance on math tests.

However, other studies find modest amounts of marketplace work in high school may have positive effects on some measures of school performance. Schill, McCartin, and Meyer (1985) and Mortimer, Finch, Ryu, Shanahan, and Call (1996) find students who work between 1 and 20 hours have higher grade point averages than those who do not work and those who work more than 20 hours per week. Lillydahl (1990) reaches a similar conclusion: working between 0 and about 13 hours a week increases grade point averages, but additional hours of work decreases grades. DeSimone (2006) also finds positive and then negative effects on GPAs but with a turning point at a higher level of hours worked. School attendance may be increasing with modest amounts of work during high school: Steel (1991) finds

⁴Related studies by Ehrenberg and Sherman (1987), Stinebrickner and Stinebrickner (2003) and Arano and Parker (2008) examine early work experience in college and college academic achievement. Ehrenberg and Sherman find that college employment has little effect on grades but that off-campus employment has negative effects on enrollment and graduating on time. Stinebrickner and Stinebrickner find collegiate marketplace work decreases grades at Berea College. Other related studies have examined the effects of high school students' marketplace work on psychological factors. Steinberg and Dornbusch (1991) and Steinberg, Fegley, and Dornbusch (1993) find such work has detrimental effects on various measures of psychological and behavioral development. These studies also find marketplace work increases a student's autonomy from his/her parents and may decrease self-reliance.

⁵However, Steinberg et al. (1982) find high school work does not have a negative effect on grade point average. They also examine the effect of high school work on personal and social responsibility and negative byproducts of working such as cigarette and marijuana smoking, materialism, and cynicism toward work.

⁶Eckstein and Wolpin's simulations predict mandating high school students refrain from marketplace work will only have a trivial effect on school outcomes. They believe this is because grade point averages and graduation rates are primarily due to unobserved traits such as ability or motivation.

small or moderate amounts marketplace work increase future school enrollment for whites but excessive work decreases enrollment, and D'Amico (1984) shows that modest amounts of high school work increase high school completion rates but intensive work increases the probability of dropping out of high school.

Still others find that work during high school has essentially no effect on academics (Buscha, Maurel, Page, and Speckesser, 2011; Sabia, 2009) or is largely (or at least primarily) due to unobserved characteristics such as preexisting preferences for work over school (Bachman, et al., 2003, 2008, 2011; Rothstein, 2007; Schoenhals, Tienda, and Schneider, 1998; Staff, Schulenberg, and Bachman, 2010; Warren, 2002; Warren and Lee, 2003; Warren, LePore, and Mare, 2000). For example, Gottfredson (1985) does not detect much effect of marketplace work on delinquency, commitment to education, time spent on homework and extracurricular activities, or attachment to school. Modeling student preferences for school versus the labor force, Montmarquette, Viennot-Briot, and Dagenais (2007) find working less than 15 hours per week (in Canada) does not have an appreciable negative effect on success in high school.

We build on this literature in three ways. First, we provide the current effect of early work experience on economic outcomes using a newer data set with youths who were in high school as recently as 2003. The literature (even the most recent papers) uses older data that are often from the early 1980s or earlier. For example, Carr, Wright, and Brody (1996), Light (1999), and Oettinger (1999) examine respondents who were in high school in the late 1970s and early 1980s. Because our economy, with higher unemployment after the Great Recession, and the prevalence of high school work have changed over the last several decades, the effects of early work experiences may have changed. Second, we provide long-term effects on

labor market outcomes. For adults aged 45 through 51 in 2010, we estimate the effects of early work experience during high school from approximately 30 years earlier. Third, we compare the current effects of early work experience on labor market outcomes for youths who were in school around the turn of the new millennium to the effects on the labor market outcomes of similarly-aged respondents approximately 20 years earlier.

Data

We use data from the 1979 and 1997 National Longitudinal Survey of Youth (NLSY) cohorts (referred to henceforth as the NLSY79 and NLSY97) to examine the consequences of early work experience on adult labor market outcomes. NLSY data is particularly well-suited for our purposes because it collects unusually detailed information about the employment experiences (and background and school characteristics) of high school students and their subsequent labor market outcomes several decades later, required to identify long-term effects. From 1979 through 1994, the NLSY79 annually interviewed a cohort of 12,686 respondents who were between the ages of 14 and 21 in 1979. After the 1994 survey, the NLSY79 began interviewing biennially, and these respondents have since been re-interviewed on that basis. The original NLSY79 sample contained 6,283 females and an oversample of blacks, Hispanics, low-income whites, and military personnel. The military sample was dropped in 1984 and the low-income white sample was dropped in 1990. We exclude the military sample and the low-income white oversamples from our analysis because the NLSY97 does not contain comparable oversamples. The NLSY97 began annually interviewing 8,984 youths who were aged 12 through 16 on January 1, 1997 and the survey remains in progress on that basis. The NLSY97 sample contains 6,748 cross-sectional observations and an oversample of 2,236 additional black and Hispanic observations.

The 1997 NLSY cohort will be used to examine how high school work experience at the turn of the 21st century is related to the subsequent labor market outcomes of young adults, aged 26 to 30, in 2010. The 1979 NLSY cohort will be used to examine how work experience in high school, occurring during the 1980s, is related to longer-term labor market effects of adults aged 45 to 51 in 2010. We will also compare the effects of early work experience on the labor market outcomes of the NLSY97 respondents with corresponding effects of early work for similarly-aged 1979 NLSY respondents approximately 20 years earlier.

Early Work Experiences

The NLSY identifies each respondent's labor force status in each week covered by the surveys.⁷ Respondents report being employed, unemployed, or out of the labor force and the number of hours worked in each week (if employed). Following Ruhm (1997), we use the months of October, November, February, March, April, and May for academic-year work experience to avoid including employment during time out of school (e.g., Christmas break or summer break). We identify, where possible, early work experience during the freshman, sophomore, junior, and senior high school academic years. We use several specifications for early work experience, including (i) whether the respondent was employed in the labor force at all during the academic year while in high school, (ii) the average number of hours worked during the school

year (for each high school grade level), (iii) the fraction of academic year weeks worked, and (iv) the average number of hours worked per week during the summer between the junior and senior years. We top-code work hours at 40 when respondents report working more than 40 hours per week during the academic year. Again following Ruhm (1997), we use the eight-week period beginning July 1 to reflect summer employment experiences.

We explore the implications of using the retrospective work history to create the high school employment covariates instead of using survey week measures as representative proxies. Both offer advantages. Some prefer the accuracy of reference week measures because hours worked in recall data is often overstated (Ruhm, 1997). Others (e.g., Rothstein, 2007) claim recall data offers the “major” advantage of covering the entire academic (or summer) period; otherwise, hours worked tends to increase as the academic year progresses, making reference week work hours unduly influenced by the interview date. Work history data also allows academic year work hours and summer work to be compared. Ultimately, we use the recall data throughout the analysis because survey-week work hours are only collected in the 1997, 2000, and 2006 NLSY97 surveys.⁸

The youngest respondents in the NLSY97 (those 12 years of age in 1997) are in high school from approximately 1999 through 2003. The oldest (those 17 years of age in 1997) are in high school from about 1994 through 1998.

⁷The NLSY97 identifies whether each youth aged 14 or older is employed at an “employee-type” job or at a “freelance-type” job in each week from 1994 through the most recent survey. An employee-type job is defined as one where the youth works for a regular employer. A freelance-type job is defined as one with no boss or where the youth works for him or herself (e.g., snow shoveling, babysitting, and newspaper delivery). The NLSY79 work history begins January 1, 1978 and does not make the distinction between employee-type and freelance-type employment. We do not differentiate between employee-type jobs and freelance-type jobs in our analysis, but we acknowledge this may mask heterogeneous effects on later economic outcomes, particularly for younger high school students if they are the ones most likely to take jobs babysitting, cutting grass, and so forth.

⁸Ruhm (1997) and others find work hours to be overstated in recall work history data relative to survey week accounts. We also find that work hours in the NLSY work histories are approximately 10 to 15 percent higher than survey-week work hours. To explore how this influences the results, we re-estimate the preferred log wage models using reference week work hours. Compared to using recall data, the effects of early work experience based on reference week data seem to be of similar size but are less precise due to smaller samples.

Thus, high school work experience for the 1997-cohort NLSY occurs from approximately 1997 through 2003. Similarly, the youngest respondents in the NLSY79 (those 14 years of age in 1979) are in high school from approximately 1981 through 1985. The oldest (those 21 years of age in 1979) were in high school from about 1972 through 1976. The NLSY79 work history begins with the first week of January 1978, so the high school work experiences for the 1979-cohort NLSY occurs from 1978 through 1985.

Not all respondents provide the information needed to identify early work experience during each year of high school. In most cases, this is because the respondent began high school before the NLSY began surveying (this would be true, for example, for a NLSY79 respondent aged 16 in 1979). We include respondents who provide information identifying work experience during at least a portion of their time in high school throughout most of the analysis because it should be largely random whether a respondent's time in high school completely overlaps with the NLSY survey period (e.g., whether a NLSY79 respondent was aged 12 or 16 in 1979). We are also reluctant to discard potentially useful information. We conduct sensitivity analyses to explore whether excluding such respondents (and only including those respondents whose work experiences are identified in each high school year) would substantively change our results.

In table 1, we present descriptive statistics for selected early work experience covariates for the NLSY97 and NLSY79 samples. Most high school students (over 80 percent in all three NLSY samples) are employed at some point during high school. As expected, work hours increase substantially with high school grade, from less than 5 per week for freshmen and sophomores to between 12 and 14 hours per week for seniors. Work hours are 1 to 4 hours per week higher during the summer between the junior and senior years than during

the senior academic year. Approximately 75 percent of high school seniors work, and about 30 percent work more than 20 hours per week. The prevalence of high school work does not seem to have diminished over time during the academic year, with students from the NLSY97 working almost an identical amount as students in school 20 years earlier from the NLSY79. For example, 26.0 percent of NLSY97 respondents do not work at all during their senior year compared to 26.3-26.8 percent for NLSY79 respondents. These statistics are similar to Rothstein's (2007) for the NLSY97 and Ruhm's (1997) for the NLSY79, although both use slightly different sample selection criteria (Rothstein includes NLSY97 respondents with valid grades; Ruhm examines NLSY79 respondents with valid economic outcomes from 1991). For example, Rothstein reports that male (female) NLSY97 seniors work in 52.1 (57.0) percent of school-year weeks compared to 57.8 percent in our sample and in 12.9 (13.0) hours per week compared to 14.3 hours in our sample. Ruhm reports that NLSY79 seniors work in 52.3 percent of the academic-year weeks compared to 54.5 percent in our sample (for NLSY79 respondents examined in the 1986-1988 period) and in 12.3 hours per week compared to 16.2 hours in our sample.

Adult Labor Market Outcomes

The key dependent variables are measures of adult labor market outcomes. These include (i) hourly wages, (ii) whether employed, (iii) annual weeks employed, (iv) annual hours worked, (v) annual weeks unemployed, (vi) annual earnings, (vii) weekly earnings, and (viii) employment benefits (i.e., receipt of medical insurance and a retirement or pension benefit). Several supplemental models also examine education outcomes. All dollar figures are adjusted for inflation using the CPI to year-2012 dollars. The NLSY's weekly work history described above is used to create the measures of annual weeks and hours worked and annual weeks unemployed (and

whether the adult was employed). The NLSY surveys provide additional information on jobs held during the survey year, and this information is used to create the hourly wage and employment benefits measures.

The “contemporaneous” adult labor market outcomes are averaged across the three most recent NLSY surveys to smooth temporary fluctuations. When data is missing for one of these survey years, we instead average over the two remaining surveys to limit losing observations. We use the 2006, 2008, and 2010 surveys for NLSY79 adults (because the NLSY79 is now biennial) and average across the 2007, 2008, and 2009 surveys for NLSY97 adults (to center on 2008 as for NLSY79 respondents). To compare the adult labor market experiences for NLSY97 respondents with those for similarly-aged NLSY79 respondents (e.g., aged 23 to 29), we create adult labor market measures averaged across the 1986, 1987, and 1988 NLSY79 surveys.⁹

Table 2 presents descriptive statistics for the economic outcomes variables for the three samples. Hourly wages are higher for NLSY97 respondents than for similarly-aged respondents from the 1986-1988 NLSY79, as expected since wages tend to grow over time. NLSY79 respondents examined during the 2006-2010 period have the highest hourly wages, weekly wages, and annual earnings on average, likely because they are older and have more experience. Hours worked is higher and weeks unemployed is lower for the older NLSY79 sample compared to NLSY97 and younger NLSY79 respondents, who are more similar to each other along these dimensions. The proportion of weeks worked is lowest (77.5 percent) in 1986-1988 for NLSY79 respondents and highest (83.8 percent) in 2006-2010 for NLSY79 respondents. Again, many of these differences are anticipated effects of aging. The receipt of medical

insurance and retirement/pension plans are quite similar for the NLSY97 and younger NLSY79 samples but are substantially higher for older NLSY79 respondents. NLSY97 respondents average more education (14.7 years) than their NLSY79 counterparts (who average 13.5 to 14.1 years), and NLSY97 respondents are more likely to graduate from college (43.4 percent versus 33.8 percent for NLSY79 respondents by 2006-2010). In 1991, Ruhm (1997) reports NLSY79 respondents average 13.6 years of education.

In table 3, we show how early work experience and subsequent labor market outcomes are correlated by providing weighted means for adult wages, weeks worked, and having a college degree for working 0 hours, greater than zero to 10 hours, greater than 10 to 20 hours, and greater than 20 hours during the high school senior year and the preceding summer. Wages are lowest for those who do not work at all during these periods. Wages are highest for those who work, often for those who work more than 10 hours per week. Correlations for wages and weeks are similar: adult weeks worked are always lowest for students who do not work at all and are highest in every case for students who work more than 10 hours per week. Exactly the opposite of associations for wages and weeks worked, the probability of having a college degree is lowest either when not working at all or when working more than 20 hours per week during the academic year. The probability of having a college degree is therefore highest for relatively low amounts of work (working, but no more than 20 hours). These results are similar to Ruhm’s (1997), which also provide some evidence that economic outcomes such as wages continued to increase with hours of early work experience but academic outcomes such as graduating from college ultimately decreased with successive hours of work.

⁹NLSY97 respondents are aged 26 to 30 in the most recently-released year-2010 survey wave, but they are aged 23 to 29 during the 2007-2009 period we examine.

Empirical Specification

We use multivariate regression analysis to explore the effects of early work experience. The key dependent variables are adult labor market outcomes, such as wages (W_{it}), which are measured at the individual level (for respondent i at time t). The key explanatory variables are early employment experiences (E_{it}), which will include measures of high school employment from the school year and during the summer between the junior and senior years. We explore the presence of non-linear effects with quadratic functional forms. Formally, we estimate

$$W_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 E_{it} + \epsilon_{it}, \quad (1)$$

where X , in the basic model, includes standard demographic controls for gender, race/ethnicity, age, marital status, family size, region of residence, and urbanicity. Time-varying demographic characteristics (e.g., family size, region of residence) are adult measures.¹⁰ Other specifications include additional covariates, as detailed below. Following others (e.g., Tyler, 2003), we generate a dummy variable for each covariate that equals one when a respondent provides insufficient information to create that covariate. This prevents sample loss from missing values for covariates that are not the primary focus of our analysis.

We initially exclude controls for education and subsequent work experience. If early work experience affects adult labor market outcomes through education and later work

experience, then this specification provides the total effect of early work experience. In subsequent models, we include controls for education and later work experience to obtain partial effects of early work experience (e.g., holding education constant).

Students who seek employment while in high school are unlikely to be a random sample of high school students. Ideally, the factors included in X control for these differences. However, if some of these factors are unobserved (or unmeasurable) to the researcher, then the error term will capture these unobserved variables, producing biased results. Unobserved heterogeneity will produce biased results if any included explanatory variable is correlated with the same unobserved characteristics. For example, suppose that high school students who work in the labor market have less academic ability. Also assume that academic ability is a trait that enhances later labor market outcomes such as wages. If academic ability is unobserved, then the error term in the wage equation will be correlated with high school employment, which is an explanatory variable in that equation. If this is the case, then high school employment and wages are correlated with the same unobserved characteristic, which will produce biased results. If these unobserved factors are not adequately controlled, then high school employment may spuriously appear to affect wages when, in fact, there may not be a causal relationship. We attempt to control for potential unobserved heterogeneity bias using two techniques, each of which has shortcomings and may not fully control for the various sources of potential bias.¹¹

¹⁰In appendix table A1, we present descriptive statistics for selected demographic characteristics for our samples. As anticipated, those in the NLSY97 sample are more likely to be Hispanic, and those in the NLSY79 sample examined in 2006-2010 are older and more likely to be married. NLSY97 respondents are close in age to NLSY79 respondents examined in 1986-1988.

¹¹We also estimate family-specific fixed effects models (Oettinger, 1999). Family-specific fixed effects models use siblings surveyed by the NLSY to control for unobserved family-specific characteristics. Thus, these models control for unobserved factors that are shared by siblings. Unfortunately, these models do not control for unobserved characteristics that vary between siblings or over time. The fixed effects results are mixed, suggesting early work experience benefited labor market outcomes shortly after high school 20 years ago but it does not offer benefits for similarly-aged adults today or for adults 40 years after high school. However, further inspection shows only about 20 percent of the NLSY97 and NLSY79 samples have a sibling (because siblings only a few years apart in age are less likely to both be in high school during a period covered by the surveys). We ultimately do not present fixed effects results because identification may be based on samples too small to derive meaningful conclusions.

First, we include supplemental vectors of explanatory variables to control more extensively for family background characteristics, student ability, and school characteristics that might reflect differences between high school students who are and are not employed. The supplemental characteristics available vary somewhat between the NLSY79 and NLSY97 surveys. The NLSY79 contains more information about family background (e.g., whether the respondent and his or her mother and father are foreign born and whether the respondent's household received magazines and newspapers and had a library card when the respondent was 14), and the NLSY97 contains more information about school characteristics and experiences (school size and student-teacher ratio, the number of math and science courses taken, and eighth grade GPAs). Specifically, a vector of family background characteristics includes controls for mother's and father's education, living with both parents, whether English was spoken, town size, religious affiliation, and church attendance for NLSY97 respondents and mother's and father's education, living with both parents, parents being foreign born, whether English was spoken, town size, whether the household had a magazine subscription, took a newspaper, and had a library card, the number of siblings, and religious affiliation for NLSY79 respondents. Ability for NLSY97 respondents is measured by the Armed Services Vocational Aptitude Battery (ASVAB) test score and for NLSY79 respondents is measured by the Armed Forces Qualifications Test (AFQT) score. We also include eighth grade GPA as an ability measure for NLSY97 respondents. The covariate block of school characteristics and experiences contains controls for the student's high school program of study (general, college preparatory, vocational, or combination); the number of math and science courses taken; and the school's type (public, private, or parochial), size, and student-teacher ratio for NLSY97 respondents. For the NLSY79 sample, this block contains the student's program of study (vocational, commercial, college preparatory, or

general); the school type (public or private); and student perceptions of boredom, safety, and satisfaction with school. The school experiences vector contains a measure of cigarette-smoking and body mass index (BMI) for both NLSY samples.

Our second attempt to control for biases uses predicted values of early work experience. We predict high school employment using local labor market conditions measured when the respondent was in high school (Ruhm, 1997; Light, 1999; Neumark, 2002; see also Hoynes, 2000). The instruments we consider include the local unemployment rate faced by each respondent while in high school, various local population and density measures, indicators of the local population's age distribution, the percent of the local population with a high school education and college education, and the local per capita income. Light (1999) suggests it is unlikely high school values of variables affect post-high school economic outcomes (or that post-high school values of the variables affect high school employment). To be valid, the instruments must (i) significantly explain the first-stage high school early work experience variables and (ii) not directly affect later labor market outcomes.

The proposed instrumental variables (IV) procedure has some shortcomings. First, instruments that are weakly correlated with the endogenous covariate in the first stage model often generate large second stage standard errors. The IV literature also shows that IV estimates may still be biased when the identification variables are weakly associated with the endogenous covariate (and when there is a relationship, even if only a weak one, between the instruments and the second stage error). With weak instruments, Nelson and Startz (1990a,b), Bound, Jaeger, and Baker (1995), and Staiger and Stock (1997) argue that IV estimates may be biased in the direction of OLS. Again, for IV to produce unbiased estimates, the instruments must significantly explain the endogenous

covariate. However, Bound et al. (1995) show that in large samples, instruments may appear to have statistically significant effects when, in fact, their relationship to the endogenous covariate is weak. That is, in large samples, testing the null hypothesis that the instruments have no effect may produce statistically significant p-values with relatively small F-statistics. To help determine instrument quality, the IV literature recommends reporting the F-statistic for instruments as well as first stage results (Bound et al., 1995; Staiger and Stock, 1997), and we do both.

In addition, our proposed instruments have some unique shortcomings. First, past labor market conditions (in particular, the high school unemployment rate) may affect subsequent wages even when controlling for current labor market conditions (specifically, the current unemployment rate). Beaudry and DiNardo (1991) show that the lowest past unemployment rate (since beginning a job) affects wages even when controlling for the current employment rate (suggesting that a contract market with costless mobility may most appropriately describe wage determination instead of a spot market). Neumark (2002) uses past unemployment rates as instruments but he includes the lowest unemployment rate instead of the current unemployment rate in his second stage wage model. Given Beaudry and DiNardo's evidence, we follow Neumark and include the lowest unemployment rate in our adult labor market outcomes models as well. Second, Neumark (2002) notes that individual-specific unemployment rates may be endogenous due to migration, where individuals essentially choose their local unemployment rate when they decide where to reside. He estimates some model specifications that instead use cohort average unemployment rates because they should not be susceptible to that source of bias. Following Neumark, we estimate some specifications using cohort averages as well. Third, Neumark (2002) notes that cohort average unemployment rates will be endogenous

if they are calculated from cohort-samples that are self-selected (in Neumark's analysis, cohorts were determined by year of labor market entry). This will be a source of bias in our analysis to the extent that our cohorts, which are based on year of high school graduation, are self-selected. A representative set of results from the first stage models that predict early work experience are available upon request. The first stage results are typically as expected: For example, lower unemployment rates significantly increase the measures of high school employment.

Results

First, we examine the effects of hours worked during the senior year on log hourly wages. We begin with a model (model 1) that contains no other covariates and then we successively add vectors of controls, first adding the demographic covariates, then controls for family background characteristics, ability, and schools successively. Results are presented in table 4. We include a squared work-hours term because descriptive statistics suggest the relationship between early work experience and later economic outcomes in some cases could be nonlinear. Senior hours are divided by the number of weeks and by 40 such that switching from 0 to 1 is the equivalent of working 40 additional hours per week during the high school senior year. For select models, we present the number of senior work hours at which the economic outcome (e.g., wages) is maximized and the size of the premium at that maximum.

The effects of senior work hours are statistically significant across most models, with early work experience consistently increasing wages across the five model specifications. The effects of early work experience change somewhat more when the demographic and family covariates are added (in models 2 and 3) than when the ability and school characteristics are added (in models 4 and 5), but none of these changes are large. This provides little evidence

of negative selection effects, since the effects of senior-year work do not become appreciably more positive as more characteristics are held constant. That is, those who work during the senior academic year do not tend to have characteristics unfavorable to later economic outcomes. When controlling for student ability (in models 4 and 5), the marginal effect of senior work hours remains positive throughout the range of work hours considered (e.g., through 40 hours).¹² Positive effects on wages are about twice as large for the NLSY79 sample in the 1986-1988 period (e.g., a 24.4 percent premium at 40 hours in model 5) as for the NLSY97 sample in 2007-2009 (a 10.9 percent premium in model 5) and the NLSY79 sample in 2006-2010 (a 12.3 percent premium). Although results change in only minor ways as additional covariates are added, we include the full set of covariates in the remainder of the analysis.

Appendix table A2 presents average wages for each sample with senior work hours set at 0, 10, 20, and 40 using regression coefficients from model 5 in table 4, with the full set of covariates. Working 20 hours per week (relative to not working) increases wages from \$17.03 to \$17.64, which is a 3.5 percent increase, for NLSY79 respondents. For the 1986-1988 NLSY79 sample, this increase is from \$14.29 to \$15.85, which is a 10.9 percent increase. The increase for the 2006-2010 NLSY79 sample is from \$24.20 to \$26.48, a 9.4 percent increase. Relative to 20 hours, working 40 hours per week continues to increase wages to \$19.01 for NLSY97 respondents, to \$18.25 for younger NLSY79 respondents, and to \$27.36 for older NLSY79 respondents.

Different Specifications of Early Work

Next, we examine different specifications for early work experience. Presented in table 5, the first adds controls

for hours worked during the freshman, sophomore, and junior high school years. Across the three samples, freshman and sophomore hours have statistically insignificant effects. Junior work experience also has statistically insignificant effects for 2007-2009 NLSY97 respondents and 1986-1988 NLSY79 respondents, while the evidence suggests working during the junior year significantly raises wages for the NLSY79 sample in 2006-2010. The effects of senior work hours remain statistically significant and largely unchanged, although the positive effect for the 2006-2010 NLSY79 sample is somewhat smaller when work hours from other high school academic years are included (with a 7.4% premium from working 40 senior hours, compared to a 12.3% premium in model 5 of table 4).

Model 2 examines the effects of working greater than 0 to 10 hours, greater than 10 to 20 hours, and greater than 20 hours per week during the senior year relative to not working. Early work experience significantly increases wages. Wages are maximized at greater than 20 hours for the NLSY97, 1986-1988 NLSY79, and 2006-2010 NLSY79 samples, increasing wages 7.0 percent, 17.7 percent, and 11.0 percent, respectively. As before, beneficial effects are largest for young NLSY79 respondents.

Last, we examine the effects of working during the summer. For each sample, summer work hours have statistically significant positive effects at the 10 percent level for the NLSY97 sample and at the 5 percent level for the NLSY79 samples. This is different than Ruhm's (1997) findings, where summer experience had statistically insignificant effects. If anything, it seems reasonable that summer work would have a more beneficial effect than work during the senior year because summer work would be less likely to detract from academic pursuits. When

¹²If $W = \beta_{1H} + \beta_2 H^2$, then W is maximized when $H = -\beta_1 / (2\beta_2)$ and the change in W becomes negative relative to not working when $H > \beta_1 / (-\beta_2)$.

controlling for summer work hours, the effects of senior-year work hours are slightly smaller, with wage premiums of 8.5, 20.7, and 8.4 percent for the three samples from working 40 hours, compared to premiums of 10.9, 24.4, and 12.3 percent without controls for summer work. As for the senior academic year, beneficial effects of early work experience during the summer decrease over time within cohorts and have decreased over time across cohorts.

Henceforth, we focus primarily on work experience from the senior year for simplicity. Certainly work experience during this period seems to have a meaningful impact. We also focus on the senior year because junior-year, senior-year, and summer hours are highly correlated, making it difficult to disentangle separate effects for each. However, we note that effects for the junior year and summer can frequently be identified throughout our analysis.

Controls for Unobserved Heterogeneity

Next, we explore whether our results are biased due to unobserved characteristics, even when controlling for our extensive list of covariates, first using two-stage least squares (2SLS) to predict senior-year work hours. We examine two sets of instruments: local labor market conditions with the local unemployment rate (model 1 in table 6) and the market conditions with the cohort-specific unemployment rate (model 2 in table 6). For each sample, both sets of instruments are statistically significant at the 99 percent confidence level, but corresponding F-statistics are below the recommended threshold of 10 described above.

In most second-stage models, the effects of senior work hours increase wages initially, with negative marginal effects for subsequent hours worked, although the negative coefficients on the hours-squared covariates are never individually statistically significant. Otherwise, results

are mixed. Second-stage effects are statistically significant (e.g., the joint p-values for the hours and hours-squared covariates) for 1986-1988 NLSY79 respondents and in model 2 for 2006-2010 NLSY79 respondents but not for NLSY97 respondents or in model 1 for 2006-2010 NLSY79 respondents. This does not necessarily mean senior work hours have no effect for these respondents because Hausman tests cannot reject (at the 5 percent level) the null hypothesis that the ordinary least squares (OLS) and 2SLS results are not statistically different for NLSY97 respondents and older NLSY79 respondents. We subsequently use OLS for these samples for efficiency. However, Hausman tests do reject the null hypothesis of no difference between the OLS and 2SLS results for the younger NLSY79 respondents at the 95 percent confidence level. Although this suggests using 2SLS for 1986-1988 NLSY79 respondents for subsequent models, we instead use OLS to maintain consistency with the other two samples, acknowledging that, if anything, beneficial effects of early work experience in OLS models for these respondents is an underestimate. Certainly no evidence points to negative effects for NLSY79 respondents.

Robustness Tests

Our models have used unbalanced, cross-sectional, and supplemental NLSY samples with regression weights. We explore the implications of this first by re-running our preferred log wages model using a balanced sample (e.g., using only respondents who provide valid work experience information for all four high school years). Preferred estimates from table 4 (i.e., model 5) are represented as model 1 for ease of comparison, and results with the balanced sample are presented as model 2 in table 7. As expected, the balanced samples are substantially smaller, which may account for statistically insignificant effects of early work experience for the NLSY97 and 2006-2008 NLSY79 samples. With the balanced sample, the wage premium from working 40 hours per

week during the senior year decreases to 21.6 percent (compared to 24.4 percent) for NLSY79 respondents in 1986-1988. In model 3, we change our preferred earnings specification by only including NLSY respondents who are part of the nationally representative cross section (e.g., the supplemental black and Hispanic oversamples are excluded). This does not appreciably change results. Nor do results change appreciably when we do not weight our preferred specification (model 4).

We also provide some initial results for males and females separately. Results, presented as models 5 and 6 in table 7, are mixed. Effects are statistically insignificant for female NLSY97 respondents but positive for males. Effects are statistically significant for both genders for NLSY79 respondents in 1986-1988, and the effects of early work experience are larger for males than females. For example, working 40 hours per week during the senior year increases male wages 26.7 percent compared to 18.2 percent for females. It is therefore surprising that the effects of early work experience for NLSY79 males in 2006-2010 are statistically insignificant. While we do not explore further the reasons for gender differences in this analysis, one possible explanation is that there is more selectivity into future employment for females than males.

Other Economic Outcomes

Next, we examine the effects of early work experience on other adult economic outcomes (the probability of being employed, the portion of annual weeks and hours worked, the proportion of annual weeks unemployed, logged annual and weekly earnings, and the receipt of health and retirement benefits). Results are presented in table 8. Early work experience significantly affects most of the outcomes, particularly for the NLSY97 and young NLSY79 respondents. In several instances, the economic outcomes are maximized at more than 25 but less than

40 hours of senior-year work per week (instead of at 40 or more hours of work per week). Nevertheless, harmful effects (relative to not working) typically do not begin for these outcomes within the range considered (e.g., up to 40 hours per week).

Effects are typically, but not always, larger for young NLSY79 respondents (in 1986-1988) than for NLSY97 respondents (in 2007-2009). When working the optimal number of senior-year hours, the premium is larger for NLSY97 respondents only for weekly wages. This suggests beneficial effects of early work experience have diminished over the 20 years separating the two cohorts. For example, shown in appendix table A2, working 20 hours (relative to not working) increases weeks worked, hours worked, and annual earnings by 13.3, 16.0, and 26.2 percent for 1986-1988 NLSY79 respondents versus 7.9, 9.3, and 20.0 percent for NLSY97 respondents.

Results for the 2006-2010 NLSY79 sample are also typically smaller than for these respondents in the 1986-1988 period. Shown in appendix table A2, working 20 hours (relative to not working) increases weeks worked, hours worked, and annual earnings by 4.1, 4.8, and 7.3 percent for NLSY97 respondents. Early work experience does not have a statistically significant effect on health and retirement benefits in 2006-2010 for NLSY79 respondents. This suggests beneficial effects from early work experience have substantially faded or disappear by mid-career.

Education and Post-Secondary Work Experience

Last, we examine the effects of early work experience on academics. In our first model in this section, we examine high school sophomores, regressing the probability of subsequently graduating from high school on sophomore-year work hours. Presented in model 1 of table 9, results show working more than 10.4, 22.9,

and 11.2 hours during the sophomore year significantly decreases the probability of graduating for the NLSY97, 1986-1988 NLSY79, and 2006-2010 NLSY79 samples, respectively. In model 2, we examine juniors, and regress the probability of eventually graduating from high school on junior-year work hours. In these models, students are able to work substantially more hours before graduation rates begin decreasing. We do not examine the effects of senior-year work hours on graduating high school because an extremely high proportion of seniors eventually graduate. In sum, these results suggest early work experience may affect later market outcomes through high school graduation—but this does not significantly affect our estimated effects of senior-year work hours, because almost all seniors graduate.

Related models examine the effects of senior-year work hours on the highest grade completed (model 3 in table 9) and on college graduation (model 4). The effects of senior hours on years of education become negative (relative to not working) for hours greater than 6.3, 0, and 10.5 for the three samples. A similar pattern is found when examining college graduation. Shown in appendix table A2, working 20 hours per week during the high school senior year (relative to not working) decreases college graduation rates from 49.0 to 42.0 percent for the NLSY97 sample and from 25.9 to 25.5 percent for young NLSY79 respondents. Instead working 40 hours decreases college graduation rates to 24.6, 7.7, and 14.2 percent for the three samples. Clearly, extensive early work experience has substantially larger harmful effects on academic outcomes than on labor market outcomes. Of course, few seniors (less than 3 percent in both samples) work 40 or more hours per week. Indeed, approximately 70 percent of seniors in both NLSY samples do not work more than 20 hours per week.

Since early work experience affects academics, we next estimate the partial effect of early work experience on

wages holding years of education constant. Presented in table 9 as model 6, results are not particularly different than results from models without controls for education (re-presented in table 9 as model 5). Perhaps this is because many seniors (approximately 70 percent) do not work more than 20 hours per week, and working 20 hours per week has relatively small effects on college graduation rates. In turn, little of the effect of early work experience on later labor market outcomes operates through education.

A larger portion of the effects of senior work hours can be explained by effects through subsequent work experience. When we control for post-secondary work experience (work experience between high school and the time when adult wages are measured) in table 9's model 7, the effects of early work experience become smaller. Shown in appendix table A2, positive effects of working 20 hours (relative to not working) on wages decrease from 3.5, 10.9, and 9.4 percent when not controlling for subsequent work experience to -0.3, 6.2, and 5.4 percent when controlling for other work experience for the three samples. Thus, a substantial portion of the effect of high school employment operates through increasing future labor market experience. This is consistent with our evidence that early work experience increases subsequent employment.

Conclusions

Our analysis shows NLSY97 high school students do not work less than their NLSY79 high school counterparts did two decades earlier during the academic year. This “school-year” finding can be corroborated by comparing Ruhm's (1997) descriptive statistics for NLSY79 data with Rothstein's (2007) for NLSY97 data. We do find that work hours during the summer between the junior and senior years have decreased by a couple of hours per week between the two NLSY cohorts. Our regression

results consistently show early work experience during the high school senior year increases subsequent adult wages, earnings, and employment. This result is typically largest for economic outcomes measured between 1986 and 1988 for NLSY79 respondents who were in high school between 1978 and 1985. For example, regression results predict a wage premium from working the optimal number of hours per week during the senior year of 10.9 percent for NLSY97 respondents in 2007-2009, 24.4 percent for NLSY79 respondents in 1986-1988, and 12.3 percent for NLSY79 respondents in 2006-2010. Statistically significant, beneficial effects of early work experience are typically supported by supplemental models exploring the potential for unobserved heterogeneity bias and by various robustness checks.

The beneficial effects of early work experience seem to have partially faded for the NLSY79 cohort by 2006-2010, and these effects are smaller (and found less consistently) during approximately the same period (2007-2009) for adults 20 years younger (NLSY97 respondents). These are new findings. For example, early work experience does not have statistically significant effects in 2006-2010 on retirement and health benefits for NLSY79 respondents. Relative to not working, 20 hours of senior-year work per week raise wages for NLSY97 respondents only 3.5 percent.

Perhaps beneficial effects of early work experience have become smaller because students not working are now placing greater emphasis on school and education, as the college wage premium has increased (Aaronson et al., 2006). If so, then the value from working may have decreased relative to the value from activities outside of work. Certainly college graduation rates are higher for NLSY97 respondents than NLSY79 youths. This

is consistent with NLSY students working fewer hours in the summer: perhaps summer employment for 1997 NLSY youths is lower because summer-school enrollment has increased (Camarota, 2011).

Direct effects of modest amounts of early work experience on education are small (e.g., for students who work no more than, say, 20 hours per week), so this channel does not substantially mediate effects on the adult labor market outcomes. Controlling for subsequent work experience has appreciably larger effects on the results, indicating this is a primary pathway through which high school work affects later economic outcomes. This is not surprising. Work experience facilitates subsequent employment. The effects of early work experience are larger when indirect effects through subsequent work experience are not held constant.

Summer work is less likely to take time from academic pursuits, so we might expect it to have a larger positive effect than early work experience from the senior academic year. However, results for summer experience and senior experience are similar, potentially because modest amounts of senior-year work experience have almost no effect on education. This may also provide further evidence that senior-year effects are not biased by unobserved heterogeneity. If modest amounts of academic-year work experience indeed have small effects on education, then the effects of work during the school year and during the summer should be similar. It would seem plausible that any senior-year/summer differences may have then been due to unmeasured individual characteristics.

In addition, we find evidence that senior-year work experience significantly enhances adult labor market

¹³The Fair Labor Standards Act (FLSA) of 1938 prohibits teens under the age of 16 from working more than 3 hours on a school day and 18 hours per week in non-farm work. Adolescents younger than 14 face additional restrictions, and some states have added additional prohibitions on teen and adolescent labor as well (Tyler, 2003).

outcomes, but freshman, sophomore, and junior work hours typically do not. Differences in the effects of early work experience between the senior year and the freshman, sophomore, and junior years could be due to Fair Labor Standards Act (FLSA) restrictions on the labor supply of younger teens or to restrictions placed on younger teens by their parents.¹³ Alternatively, the freelance jobs may have less beneficial effects than employee jobs, and younger youths may be more likely to work freelance jobs.

Our study may be limited in that the analysis contains only high school graduates. In some cases, results show that working more than 10 hours during the sophomore year could reduce the probability of graduating from high school. If so, then early high school employment could affect later economic outcomes by increasing dropout

rates. Results could also be influenced by unobserved heterogeneity. However, we have reason to believe this is not the case. First, we include an unusually comprehensive set of covariates, and the early work experience coefficients change little when these additional covariates are added. We see no evidence that additional controls would drive estimated effects to zero. If working during high school is associated with unfavorable unobserved characteristics, then we would expect positive effects on subsequent labor market outcomes, if anything, to be biased toward zero. Finally, almost all high school seniors graduate, so examining the effects of work hours during the senior year on subsequent economic outcomes should not be substantially influenced by high school graduation.

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Table 1: Descriptive Statistics: Early Work Experience

	NLSY97 (2007-2009)		NLSY79 (1986-1988)		NLSY79 (2006-2010)	
Early Work Experience						
Employed (=1 if employed during HS)	0.819	(0.005)	0.810	(0.006)	0.806	(0.007)
Freshman Hours (average hours per week)	1.543	(0.096)	4.129	(0.257)	4.138	(0.281)
Sophomore Hours (average hours per week)	4.230	(0.126)	4.302	(0.170)	4.233	(0.179)
Junior Hours (average hours per week)	8.543	(0.146)	8.084	(0.178)	8.099	(0.192)
Senior Hours (average hours per week)	13.421	(0.170)	13.066	(0.194)	12.988	(0.210)
Senior Hours = 0 per week	0.260	(0.006)	0.263	(0.007)	0.268	(0.008)
Senior Hours = (0-10] per week	0.213	(0.006)	0.212	(0.007)	0.213	(0.007)
Senior Hours = (10-20] per week	0.227	(0.006)	0.230	(0.007)	0.228	(0.007)
Senior Hours = (20-∞] per week	0.299	(0.006)	0.295	(0.007)	0.292	(0.008)
Senior Weeks Worked (percent)	0.578	(0.006)	0.545	(0.007)	0.545	(0.007)
Summer Hours (average hours per week)	14.394	(0.188)	16.232	(0.240)	15.908	(0.257)
Sample Size	5,314		3,878		3,326	

Weighted means are provided with standard errors are in parentheses. Adult economic outcomes are averaged over the indicated three-survey year period.

Table 2: Descriptive Statistics: Subsequent Labor Market Outcomes

	NLSY97 (2007-2009)		NLSY79 (1986-1988)		NLSY79 (2006-2010)	
Later Economic Outcomes						
Hourly Wages (dollars)	17.531	(0.176)	15.427	(0.157)	25.950	(0.337)
Employed (=1 employed as adult)	0.951	(0.003)	0.946	(0.004)	0.933	(0.004)
Weeks Worked (annual weeks/52)	0.809	(0.004)	0.775	(0.005)	0.838	(0.005)
Hours Worked (annual hours/52)	31.031	(0.193)	30.846	(0.225)	34.153	(0.248)
Unemployed Weeks (annual weeks/52)	0.047	(0.001)	0.043	(0.002)	0.036	(0.002)
Weekly Wages (dollars)	713.308	(17.003)	629.791	(5.839)	997.668	(10.355)
Annual Earnings (thousands of dollars)	32.423	(0.305)	27.943	(0.305)	47.963	(0.549)
Medical Benefits (=1 if in receipt)	0.714	(0.006)	0.713	(0.007)	0.835	(0.006)
Retirement Benefits (=1 if in receipt)	0.548	(0.006)	0.556	(0.008)	0.769	(0.007)
Education (in years)	14.727	(0.032)	13.544	(0.030)	14.179	(0.041)
College Degree (=1 if college education)	0.434	(0.007)	0.244	(0.007)	0.338	(0.008)
Sample Size	5,314		3,878		3,326	

Weighted means are provided with standard errors are in parentheses. All dollar figures are adjusted for inflation to year-2012 dollars. Adult economic outcomes are averaged over the indicated three-survey year period.

Early Work Experience	NLSY97 (2007-2009)					NLSY79 (1986-1988)					NLSY79 (2006-2010)				
	N	Wage	Weeks	College	College	N	Wage	Weeks	College	College	N	Wage	Weeks	College	
Senior Hours = 0	1518	17.061	0.769	0.447	0.447	1257	13.567	0.691	0.232	0.232	1098	22.461	0.802	0.300	
Senior Hours = (0-10]	1107	17.785	0.806	0.527	0.527	755	14.994	0.762	0.279	0.279	645	26.121	0.812	0.382	
Senior Hours = (10-20]	1144	17.658	0.833	0.471	0.471	842	15.573	0.806	0.313	0.313	712	27.931	0.859	0.431	
Senior Hours = (20-∞]	1545	17.660	0.827	0.328	0.328	1024	17.205	0.834	0.178	0.178	871	27.381	0.873	0.267	
Summer Hours = 0	1867	16.986	0.760	0.410	0.410	1439	13.166	0.710	0.199	0.199	1241	22.156	0.797	0.283	
Summer Hours = (0-10]	706	17.204	0.816	0.503	0.503	408	15.857	0.783	0.312	0.312	368	27.285	0.833	0.361	
Summer Hours = (10-20]	1156	17.814	0.842	0.454	0.454	643	16.741	0.816	0.286	0.286	546	27.182	0.870	0.422	
Summer Hours = (20-∞]	1570	18.066	0.832	0.415	0.415	1383	16.519	0.808	0.243	0.243	1166	28.095	0.859	0.337	
Sample Size	5,314					3,878					3,326				

Weighted means are provided with standard errors are in parentheses. All dollar figures are adjusted for inflation to year-2012 dollars. N is number of observations in a particular early work experience category. Wage is the adult hourly wage in dollars. Weeks is average portion of annual weeks worked. College is an indicator for subsequently obtaining a college degree. Adult wages and weeks worked are averaged over the indicated three-survey year period.

Table 4: Regression-Adjusted Estimated Effects of Early Work Experience on Log Hourly Wages, Different Blocks of Control Variables

	Model 1		Model 2		Model 3		Model 4		Model 5	
Time Period	NLSY97 Respondents in 2007-2009 (N = 4,985)									
Senior Hours	-0.007	(0.080)	0.009	(0.078)	0.035	(0.077)	0.022	(0.076)	0.032	(0.076)
Senior Hours ²	0.076	(0.091)	0.042	(0.088)	0.053	(0.087)	0.088	(0.086)	0.077	(0.086)
p-value	0.061		0.170		0.004		0.003		0.003	
Maximum, Premium	40+ hours	6.9%	40+ hours	5.1%	40+ hours	8.8%	40+ hours	11.0%	40+ hours	10.9%
	NLSY79 Respondents in 1986-1988 (N = 3,578)									
Senior Hours	0.418***	(0.078)	0.259***	(0.074)	0.220***	(0.074)	0.178**	(0.073)	0.169**	(0.073)
Senior Hours ²	-0.143	(0.090)	-0.044	(0.086)	0.009	(0.085)	0.065	(0.084)	0.075	(0.084)
p-value	0.001		0.001		0.001		0.001		0.001	
Maximum, Premium	40+ hours	27.5%	40+ hours	21.5%	40+ hours	22.9%	40+ hours	24.3%	40+ hours	24.4%
	NLSY79 Respondents in 2006-2010 (N = 3,053)									
Senior Hours	0.658***	(0.121)	0.405***	(0.115)	0.314**	(0.114)	0.249**	(0.110)	0.236**	(0.110)
Senior Hours ²	-0.496**	(0.141)	-0.324**	(0.133)	-0.207	(0.132)	-0.123	(0.127)	-0.113	(0.127)
p-value	0.001		0.001		0.001		0.001		0.001	
Maximum, Premium	26.53 hours	21.8%	25 hours	12.6%	30.33 hours	11.9%	40+ hours	12.6%	40+ hours	12.3%
Covariates										
Demographic		X	X	X	X					
Family			X	X	X					
Ability							X	X		
School					X					

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. The table shows estimated coefficients on the indicated early work experience covariates. The demographic covariates include controls for gender, race/ethnicity, age, marital status, family size, region of residence, urbanicity, the current unemployment rate, and the lowest unemployment rate. The family background characteristics include controls for mother's and father's education, living with both parents, whether English was spoken, town size, religious affiliation, and church attendance in the NLSY97 and mother's and father's education, living with both parents, parents being foreign born, whether English was spoken, town size, whether the household had a magazine subscription, took a newspaper, and had a library card, the number of siblings, and religious affiliation in the NLSY79. Ability for NLSY97 respondents is the ASVAB score and for NLSY79 respondents is the AFQT score. We also include 8th grade GPA as an ability measure for NLSY97 respondents. The covariate block of school characteristics and experiences contains controls for the student's high school program of study (general, college preparatory, vocational, or combination), the number of math and science courses taken, and the school's type (public, private, or parochial), size, and student-teacher ratio for NLSY97 respondents. For the NLSY79 sample, this block contains the student's program of study (vocational, commercial, college preparatory, or general), the school type (public or private), and student perceptions of boredom, safety, and satisfaction with school. The school experiences vector contains a measure of cigarette-8smoking and body mass index (BMI) for both NLSY samples. The Wages are measured in logs and are averaged over three survey years.

Table 5: Regression-Adjusted Estimated Effects of Early Work Experience on Log Hourly Wages, Different Specifications of Early Work Experience

Time Period	NLSY97 (2007-2009)		NLSY79 (1986-1988)		NLSY79 (2006-2010)	
Model 1						
Freshman Hours	0.106	(0.233)	-0.137	(0.252)	-0.320	(0.375)
Freshman Hours ²	0.094	(0.351)	0.362	(0.430)	0.466	(0.618)
p-value	0.226		0.616		0.693	
Sophomore Hours	-0.023	(0.133)	0.041	(0.149)	-0.353	(0.233)
Sophomore Hours ²	-0.062	(0.192)	-0.228	(0.226)	0.439	(0.367)
p-value	0.490		0.187		0.283	
Junior Hours	0.009	(0.097)	0.131	(0.105)	0.325**	(0.155)
Junior Hours ²	0.004	(0.126)	-0.072	(0.142)	-0.177	(0.209)
p-value	0.945		0.121		0.002	
Maximum, Premium	40+ hours	1.3%	36.38 hours	5.9%	40+ hours	20.8%
Senior Hours	0.043	(0.080)	0.136*	(0.076)	0.188*	(0.115)
Senior Hours ²	0.064	(0.089)	0.091	(0.087)	-0.118	(0.132)
p-value	0.001		0.001		0.047	
Maximum, Premium	40+ hours	10.7%	40+ hours	22.7%	31.86 hours	7.4%
Model 2						
Senior Hours =(0-10]	0.031	(0.021)	0.049**	(0.020)	0.048	(0.031)
Senior Hours =(10-20]	0.044**	(0.021)	0.095***	(0.020)	0.104***	(0.030)
Senior Hours = (20-∞]	0.070***	(0.020)	0.177***	(0.019)	0.110***	(0.028)
p-value	0.006		0.001		0.001	
Model 3						
Senior Hours	-0.013	(0.081)	0.109	(0.076)	0.144	(0.115)
Senior Hours ²	0.098	(0.090)	0.098	(0.086)	-0.060	(0.130)
p-value	0.020		0.001		0.050	
Maximum, Premium	40+ hours	8.5%	40+ hours	20.7%	40+ hours	8.4%
Summer Hours	0.121	(0.077)	0.213***	(0.072)	0.310***	(0.109)
Summer Hours ²	-0.076	(0.081)	-0.153**	(0.073)	-0.259**	(0.110)
p-value	0.061		0.001		0.008	
Maximum, Premium	31.84 hours	4.8%	27.84 hours	7.4%	23.93 hours	9.2%

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. There are 4,985 observations in the 2007-2009 NLSY97 sample, 3,578 observations in the 1986-1988 NLSY79 sample, and 3,053 observations in the 2006-2010 NLSY79 sample. The table shows estimated coefficients on the indicated early work experience covariates. The models include the demographic, family, ability, and school covariates. All dollar figures are adjusted for inflation to year-2012 dollars. Wages are measured in logs and are averaged over three survey years.

Table 6: Regression-Adjusted Estimated Effects of Early Work Experience on Hourly Wage with Controls for Unobserved Heterogeneity

	Model 1		Model 2	
Time Period	NLSY97 Respondents in 2007-2009 (N = 4,985)			
Senior Hours	0.893	(0.839)	1.089	(1.020)
Senior Hours ²	-1.396	(1.114)	-1.697	(1.394)
p-value	0.353		0.153	
Maximum, Premium	12.79 hours	14.2%	12.83 hours	17.4%
F-Statistic for Instruments	3.69		4.32	
Hausman Test (prob > χ^2)	0.200		0.074	
	NLSY79 Respondents in 1986-1988 (N = 3,578)			
Senior Hours	1.366**	(0.547)	0.418	(0.738)
Senior Hours ²	-0.944	(0.641)	0.526	(0.920)
p-value	0.001		0.001	
Maximum, Premium	28.94 hours	49.41%	40+ hours	94.4%
F-Statistic for Instruments	4.87		5.56	
Hausman Test (prob > χ^2)	0.009		0.001	
	NLSY79 Respondents in 2006-2010 (N = 3,053)			
Senior Hours	0.676	(0.775)	1.355	(1.037)
Senior Hours ²	-0.390	(0.922)	-0.985	(1.293)
p-value	0.166		0.022	
Maximum, Premium	34.66 hours	29.2%	27.51 hours	46.59%
F-Statistic for Instruments	4.68		5.17	
Hausman Test (prob > χ^2)	0.507		0.105	
Estimation Method	IV		IV	
Instruments				
Labor Market Conditions	X		X	
Unemployment Rate	X			

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. The table shows estimated coefficients on the indicated early work experience covariates. The models include the demographic, family, ability, and school covariates. All dollar figures are adjusted for inflation to year-2012 dollars. Hourly wages are measured in dollars and in logs. All economic outcomes are averaged over three survey years. The instruments we use in model 1 include the local unemployment rate faced by each respondent while in high school, various local population and density measures, indicators of the local population's age distribution, the percent of the local population with a high school education and college education, and the local per capita income. In model 2, we replace the respondent's county-specific unemployment as an instrument with the cohort-specific average unemployment rate.

Table 7: Regression-Adjusted Estimated Effects of Early Work Experience on Earnings: Robustness Tests

Time Period	Model 1: Original Results	Model 2: Balanced Sample	Model 3: Nationally Representative Sample	Model 4: No Weights	Model 5: Males	Model 6: Females
NLSY97 Respondents in 2007-2009						
Senior Hours	0.032 (0.076)	0.011 (0.109)	0.044 (0.088)	0.050 (0.074)	0.026 (0.106)	0.045 (0.111)
Senior Hours ²	0.077 (0.086)	0.046 (0.125)	0.068 (0.099)	0.044 (0.085)	0.094 (0.118)	0.032 (0.126)
p-value	0.003	0.353	0.001	0.001	0.005	0.134
Max., Prem.	40+ h 10.9%	40+ h 5.7%	40+ h 11.2%	40+ h 9.4%	40+ h 12.0%	40+ h 7.7%
Observations	4,985	2,208	3,872	4,985	2,416	2,569
NLSY79 Respondents in 1986-1988						
Senior Hours	0.169*** (0.073)	0.096 (0.209)	0.156 (0.092)	0.277*** (0.071)	0.053 (0.099)	0.314*** (0.108)
Senior Hours ²	0.075 (0.084)	0.120 (0.241)	0.107 (0.105)	-0.029 (0.083)	0.214* (0.111)	-0.132 (0.129)
p-value	0.001	0.011	0.001	0.001	0.001	0.001
Max., Prem.	40+ h 24.4%	40+ h 21.6%	40+ h 26.3%	40+ h 24.8%	40+ h 26.7%	40+ h 18.2%
Observations	3,578	571	2,336	3,578	1,812	1,766
NLSY79 Respondents in 2006-2010						
Senior Hours	0.236** (0.110)	-0.300 (0.318)	0.248* (0.140)	0.199* (0.108)	0.094 (0.149)	0.380** (0.162)
Senior Hours ²	-0.113 (0.127)	0.396 (0.365)	-0.116 (0.160)	-0.081 (0.126)	-0.053 (0.168)	-0.151 (0.193)
p-value	0.001	0.535	0.002	0.001	0.541	0.001
Max., Prem.	40+ h 12.3%	40+ h 9.6%	40+ h 13.2%	40+ h 11.8%	35.47 h 4.1%	40+ h 22.9%
Observations	3,053	491	1,945	3,053	1,561	1,492

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. The table shows estimated coefficients on the indicated early work experience covariates. The models include the demographic, family, ability, and school covariates. All dollar figures are adjusted for inflation to year-2012 dollars. Wages are measured in logs and are averaged over three survey years.

Table 8: Regression-Adjusted Estimated Effects of Early Work Experience on Later Economic Outcomes													
Time Period	Model 1: Employed	Model 2: Weeks Worked	Model 3: Hours Worked	Model 4: Weeks Unemployed	Model 5: Log Annual Earnings	Model 6: Log Weekly Wage	Model 7: Health Benefits	Model 8: Retirement Benefits					
NLSY97 Respondents in 2007-2009													
Senior Hours	0.586* (0.326)	.199*** (0.038)	.207*** (0.047)	-.046** (0.014)	.434*** (0.120)	0.237** (0.100)	.165*** (0.059)	.193*** (0.064)					
Senior Hours ²	-.720** (0.363)	-.15*** (0.043)	-.139** (0.053)	0.029* (0.016)	-0.136 (0.135)	-0.037 (0.113)	-0.096 (0.067)	-0.115 (0.073)					
p-value	0.132	0.001	0.001	0.001	0.001	0.001	0.001	0.001					
Max., Prem.	16.30 h 1.2%	26.53 h 8.5%	29.78 h 10.4%	31.72 h 33.9%	40+ h 29.8%	40+ h 20.0%	34.37 h 10.3%	33.56 h 16.0%					
Observations	5,314	5,314	5,314	5,314	4,970	4,852	4,699	4,699					
NLSY79 Respondents in 1986-1988													
Senior Hours	0.699* (0.402)	0.281** (0.046)	.302*** (0.052)	-.038** (0.015)	.526*** (0.145)	0.149 (0.100)	.247*** (0.067)	0.150* (0.083)					
Senior Hours ²	-0.408 (0.458)	-.180** (0.053)	-.153** (0.606)	0.012 (0.018)	-0.119 (0.166)	0.111 (0.115)	-0.103 (0.077)	-0.063 (0.095)					
p-value	0.021	0.001	0.001	0.001	0.001	0.001	0.001	0.001					
Max., Prem.	34.26 h 3.3%	31.22 h 15.3%	39.47 h 20.3%	40+ h 60.4%	40+ h 40.7%	40+ h 16.0%	40+ h 22.2%	40+ h 17.0%					
Observations	3,878	3,878	3,878	3,878	3,515	3,502	3,336	3,230					
NLSY79 Respondents in 2006-2010													
Senior Hours	0.554 (0.416)	0.072 (0.052)	0.039 (0.062)	-0.028 (0.019)	0.046 (0.164)	0.060 (0.132)	-0.065 (0.065)	0.025 (0.072)					
Senior Hours ²	-0.176 (0.518)	-0.008 (0.061)	0.082 (0.071)	0.009 (0.023)	0.189 (0.190)	0.124 (0.152)	0.087 (0.075)	-0.067 (0.083)					
p-value	0.013	0.001	0.004	0.001	0.001	0.001	0.493	0.326					
Max., Prem.	40+ h 4.6%	40+ h 7.8%	40+ h 14.8%	40+ h 52.7%	40+ h 23.5%	40+ h 18.4%	40+ h 2.6%	7.46 h 0.2%					
Observations	3,326	3,326	3,326	3,326	3,008	2,983	2,889	2,882					

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. The table shows estimated coefficients on the indicated early work experience covariates. The models include the demographic, family, ability, and school covariates. All dollar figures are adjusted for inflation to year-2012 dollars. Wages and earnings are measured in logs. Earnings are measured in thousands. Weeks and hours worked are annual measures divided by 52 and 52*40, respectively. Health and retirement benefits equal the probability of receipt. All economic outcomes are averaged over three survey years.

Table 9: Regression-Adjusted Estimated Effects of Early Work Experience on Education and Later Economic Outcomes Controlling for Education

Time Period	Model 1: High School Graduate ^a	Model 2: High School Graduate ^b	Model 3: Highest Grade Completed	Model 4: College Graduation	Model 5: Hourly Wage	Model 6: Hourly Wage	Model 7: Hourly Wage
NLSY97 Respondents in 2007-2009							
Hours	0.236 (0.399)	0.545* (0.312)	0.083 (0.271)	-0.046 (0.202)	0.032 (0.076)	0.024 (0.075)	-0.088 (0.076)
Hours ²	-0.900* (0.547)	-1.05** (0.390)	-0.525* (0.299)	-0.674** (0.234)	0.077 (0.086)	0.102 (0.085)	0.164* (0.085)
p-value	0.008	0.001	0.001	0.001	0.003	0.001	0.022
Max, Premium	5.24 h 0.2%	30.38 h 2.6%	3.16 h 0.1%	0 h 0.0%	40+ h 10.9%	40+ h 12.6%	40+ h 7.6%
observations	4,286	5,494	5,314	5,314	4,985	4,985	4,985
NLSY79 Respondents in 1986-1988							
Hours	1.294* (0.736)	0.855 (0.681)	-0.112 (0.274)	0.781** (0.297)	0.169** (0.073)	0.172** (0.072)	0.040 (0.073)
Hours ²	-2.36** (1.003)	-0.391 (0.928)	-0.610** (0.308)	-1.61** (0.366)	0.075 (0.084)	0.087 (0.083)	0.158* (0.082)
p-value	0.032	0.038	0.001	0.001	0.001	0.001	0.001
Max, Premium	10.96 h 1.5%	40+ h 4.1%	0 h 0.0%	9.70 h 10.8%	40+ h 24.4%	40+ h 25.9%	40+ h 19.8%
observations	1,996	2,012	3,480	3,480	3,578	3,578	3,578
NLSY79 Respondents in 2006-2010							
Hours	0.604 (1.032)	2.09** (0.928)	0.284 (0.391)	1.03*** (0.298)	0.236** (0.110)	0.221** (0.108)	0.104 (0.105)
Hours ²	-2.145 (1.511)	-2.03* (1.137)	-1.07** (0.455)	-1.73*** (0.363)	-0.113 (0.127)	-0.050 (0.124)	0.003 (0.121)
p-value	0.030	0.046	0.001	0.001	0.001	0.001	0.007
Max, Premium	5.63 h 0.3%	20.59 h 2.8%	5.26 h 0.1%	19.25 h 10.1%	40+ h 12.3%	40+ h 17.1%	40+ h 10.7%
observations	1,725	1,740	3,326	3,326	3,053	3,053	3,053
Covariates							
Education						X	X
Experience							X

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parentheses. The table shows estimated coefficients on the indicated early work experience covariates. The models include the demographic, family, ability, and school covariates. Additional annual earnings models also control for education and adult experience where indicated. All dollar figures are adjusted for inflation to year-2012 dollars. Wages are measured in logs and are averaged over three survey years. a The first high school graduation model examines the effect of sophomore-year early work experience on the probability of graduating from high school for high school sophomores. b The second high school graduation model examines the effect of junior-year early work experience on the probability of graduating from high school for high school juniors. All other models examine early work experience from the high school senior year.

Appendix Table A1: Descriptive Statistics: Demographic Characteristics

	NLSY97 (2007-2009)		NLSY79 (1986-1988)		NLSY79 (2006-2010)	
Demographic Characteristics						
Male (=1 if male)	0.499	(0.007)	0.510	(0.008)	0.500	(0.009)
Black (=1 if black)	0.140	(0.005)	0.142	(0.006)	0.147	(0.006)
Hispanic (=1 if Hispanic)	0.116	(0.004)	0.054	(0.004)	0.056	(0.004)
Age (in years)	26.749	(0.021)	25.290	(0.022)	46.780	(0.025)
Marital Status (=1 if married)	0.339	(0.007)	0.448	(0.008)	0.636	(0.008)
Family Size (members)	2.924	(0.020)	2.662	(0.024)	2.922	(0.025)
Northeast (=1 if northeast residence)	0.174	(0.005)	0.206	(0.007)	0.176	(0.007)
South (=1 if south residence)	0.356	(0.007)	0.330	(0.008)	0.357	(0.008)
West (=1 if west residence)	0.223	(0.006)	0.175	(0.006)	0.171	(0.007)
Urbanicity (=1 if urban residence)	0.789	(0.006)	0.799	(0.007)	0.729	(0.008)
Current Unemployment Rate (percent)	9.852	(0.037)	6.227	(0.041)	10.039	(0.049)
Lowest Unemployment Rate (percent)	3.296	(0.015)	5.117	(0.027)	3.566	(0.020)
Sample Size	5,314		3,878		3,326	

Weighted means are provided with standard errors in parentheses. Adult economic outcomes are averaged over the indicated three-survey year period.

Appendix Table A2: The Magnitudes of Estimated Effects of Early Work Experience on Later Economic Outcomes										
Time Period	Hourly Wage^a	Hourly Wage^b	Weeks Worked	Hours Worked	Weeks Unemployed	Annual Earnings	Highest Grade	College Graduation	Hourly Wage^c	
NLSY97 Respondents in 2007-2009										
Hours = 0	17.03	17.37	40.22	29.40	2.91	29.97	14.80	0.490	17.45	
Hours = 10	17.75	19.90	42.32	31.13	2.40	33.12	14.79	0.470	17.24	
Hours = 20	17.64	19.15	43.43	32.16	2.08	35.99	14.71	0.420	17.39	
Hours = 40	19.01	10.49	42.70	32.13	2.03	40.37	14.36	0.246	18.82	
NLSY79 Respondents in 1986-1988										
Hours = 0	14.29	11.81	37.37	28.11	2.77	24.96	13.70	0.259	14.67	
Hours = 10	14.98	15.68	40.45	30.75	2.31	28.25	13.63	0.283	14.97	
Hours = 20	15.85	18.48	42.35	32.62	1.93	31.51	13.49	0.255	15.58	
Hours = 40	18.25	18.03	42.64	34.07	1.40	37.49	12.97	0.077	17.91	
NLSY79 Respondents in 2006-2010										
Hours = 0	24.20	22.11	42.42	32.99	2.26	47.58	14.29	0.336	24.67	
Hours = 10	25.49	25.55	43.33	33.59	1.91	48.70	14.30	0.389	25.33	
Hours = 20	26.48	28.12	44.19	34.60	1.64	51.06	14.17	0.366	26.02	
Hours = 40	27.36	29.42	45.74	37.87	1.28	60.25	13.50	0.142	27.50	

The table shows the predicted values of the later economic outcomes with senior-year work hours set equal to 0, 10, 20, and 40 hours. Predictions are based on models that include the demographic, family, ability, and school covariates. a indicates from OLS wage model 5 in table 4. b indicates from IV model 1 in table 6. c indicates the highest grade completed and subsequent work experience are also included as covariates (model 7 in table 9). All dollar figures are adjusted for inflation to year-2012 dollars. Earnings are measured in thousands, and hourly and weekly wages are measured in dollars. Weeks are measured per year and hours worked per week.



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