Seasonal and sectoral patterns in youth employment

Data comparing employment patterns among high-school-age youth show that student employment is highly seasonal and concentrated in just a few industries and occupations, while dropouts tend to work year round and in a more diverse set of jobs

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The youth labor market has captured the attention of labor economists over the years for a variety of reasons. Interest in the distribution of earnings and the sources of earnings growth has stimulated study of the transition from school to work and the "job shopping" process through which youths settle into stable career employment.[1] The relatively high rate of youth unemployment has spawned research on such topics as the dynamics of youth unemployment spells, the subsequent labor market consequences of youth unemployment, and racial differences in youth unemployment experiences.[2] Finally, interest in the labor market effects of the minimum wage often has led economists to analyze youth labor markets, where statutory minimum wages are most likely to bind.[3]

Surprisingly, however, the evidence for some of the most distinctive aspects of youth employment—in particular, the seasonal variation and the distribution across industries and occupations—is somewhat limited, with most of the evidence coming from the Current Population Survey (CPS).[4] This article examines the seasonal and sectoral patterns in youth employment using data from the 1979 National Longitudinal Survey of Youth (NLSY79). The panel structure and detailed educational data in the NLSY79 allow youths to be reliably distinguished by educational attainment and current enrollment status, thereby allowing a comparison of youth employment patterns across these groups that cannot be performed using the CPS. Additionally, unlike the CPS, the NLSY79 allows one to observe trends and seasonal fluctuations in employment activity for fixed samples of youths as they enter the labor force over a period of several years.

Description of data and sample

The NLSY79 began in 1979 with a sample of 12,686 youths born between 1957 and 1964. Interviews were conducted on an annual basis from 1979 through 1994, when a biennial survey schedule was adopted. Two features of the NLSY79 make it a valuable data source for an analysis of youth employment. First, an essentially complete employment history has been collected for each respondent from January 1, 1978, through the present.[5] This employment history includes the starting and ending dates for each job and usually also contains job-specific information on usual weekly hours worked, average hourly earnings, and industry and occupation affiliation. Thus, week-by-week data on employment status, total hours worked, and current job characteris-

tics are available for each sample respondent; for those from the latest birth cohorts, these data cover the high school years. Second, data on highest grade attended, highest grade completed, and dates of last school enrollment are collected at each interview. These detailed data make it possible to determine a respondent's education and enrollment status as of each interview date with more precision than is possible with the CPS.

This study focuses on the seasonal and sectoral employment patterns of two subgroups of the youth population: high school students and young high school dropouts. High school students make up a large fraction of the youth population and available evidence shows that their employment patterns are highly seasonal. Because young high school dropouts possess skill levels roughly comparable to those of current high school students, seasonal changes in the labor market activity of students could have significant effects on the labor market outcomes of young dropouts.

To avoid changes in sample composition over time, which could cause spurious time series movements in employment activity, fixed samples of both groups are used in the empirical analysis. The high school student sample consists of individuals who were enrolled in high school at some time during the calendar years of each of their 16th, 17th, and 18th birthdays. For each of these individuals, the 156-week employment history—beginning with the first week of January in the year of the 16th birthday and ending with the last week of December in the year of the 18th birthday—is examined. Because the weekly employment histories in the NLSY79 only go back as far as January 1978, all of the respondents in the high school student sample come from the 1962–64 birth cohort. For those born in 1962, the employment history spans the period January 1978 through December 1980; for those born in 1963, the employment history runs from January 1979 to December 1981; and for those born in 1964, the employment history goes from January 1980 to December 1982.

Whether an individual is appropriately classified as a high school dropout becomes clear only after the normal high school graduation age has been reached. Accordingly, the high school

Table 1.	Employment activity of high school students, aged 16 to 18 years		
Item	16-year-olds	17-year-olds	18-year-olds
Total, all youths			
Mean weekly employment rate (in percent):			
During the school year	37.0	46.0	44.0
During summer vacation	48.0	50.0	51.0
Mean weekly hours of work, employed youths:			
During the school year	15.2	16.8	21.3
During summer vacation	20.5	22.6	26.2
Mean weekly hours of work, all youths:			
During the school year	5.4	7.7	9.4
During summer vacation	9.7	11.2	13.2
Males			
Mean weekly employment rate (in percent):			
During the school year	40.0	48.0	46.0
During summer vacation	55.0	55.0	55.0
Mean weekly hours of work, employed youths:			
During the school year	16.1	17.8	22.4
During summer vacation	21.8	24.0	27.7
Mean weekly hours of work, all youths:			
During the school year	6.3	8.5	10.0
During summer vacation	11.7	13.2	15.1
Females			
Mean weekly employment rate (in percent):			
During the school year	33.0	44.0	43.0
During summer vacation	41.0	44.0	46.0
Mean weekly hours of work, employed youths:			
During the school year	14.0	15.7	20.2
During summer vacation	18.7	20.7	24.3
Mean weekly hours of work, all youths:			
During the school year	4.40	6.80	8.70
During summer vacation	7.50	9.20	11.20

dropout sample is constructed as the set of individuals who had not completed high school and were never enrolled in school in the calendar years of each of their 19th, 20th, and 21st birthdays. To facilitate comparison with the high school student sample, a 156-week employment history again is examined, this time beginning with the first week of January in the year of the 19th birthday and ending with the last week of December in the year of the 21st birthday. Moreover, to ensure that the dropout sample is observed over exactly the same calendar years as the student sample, only respondents from the 1959–61 birth cohort are included in the dropout sample. Thus, the employment history for dropouts born in 1959 spans the period January 1978 through December 1980—the same period as for the high school students born in 1962. Similarly, the employment history for those born in 1960 runs from January 1979 to December 1981, and the employment history for those born in 1961 runs from January 1980 to December 1982.

Seasonal employment patterns

High school students. Among all NLSY79 youths born during the 1962–64 period, 86 percent are included in the high school student sample—that is, they were enrolled in high school in the calendar years of each of their 16th, 17th, and 18th birthdays.[6] Table 1 shows sample means for three differ-

ent measures of high school student weekly employment activity: the "employment rate" (or, the percent of a given population that is employed), average weekly hours worked among employed students, and the average weekly hours worked among all students. Sample averages of the employment measures are reported separately by sex, age, and season of year (summer and school year).[7] The age categories in the table actually correspond to the calendar years during which the respondents turned 16, 17, and 18 years of age, respectively. The sample means were calculated by first computing sample averages for each employment measure in each of the 156 weeks for the appropriate group of students, and then taking simple averages of these weekly means across the appropriate intervals of weeks.

The data in the table shows that high school student employment activity trends upward across calendar years (that is, it increases with age) and peaks during the summer months within calendar years. For example, the mean number of hours worked per week during the school year among male high school students rises from 16.1 hours at age 16 to 22.4 hours per week at age 18. This rise in the employment activity of high school students with age occurs among both males and females; it also occurs during the summer weeks and during the school year. The only departure from this upward trend is the absence of a rise in the fraction of students who were employed between ages 17 and 18. This finding likely stems from

Chart 1. Mean weekly hours and real mean hourly earnings of 16- to 18-year-old high school students employed over the 1978–82 period
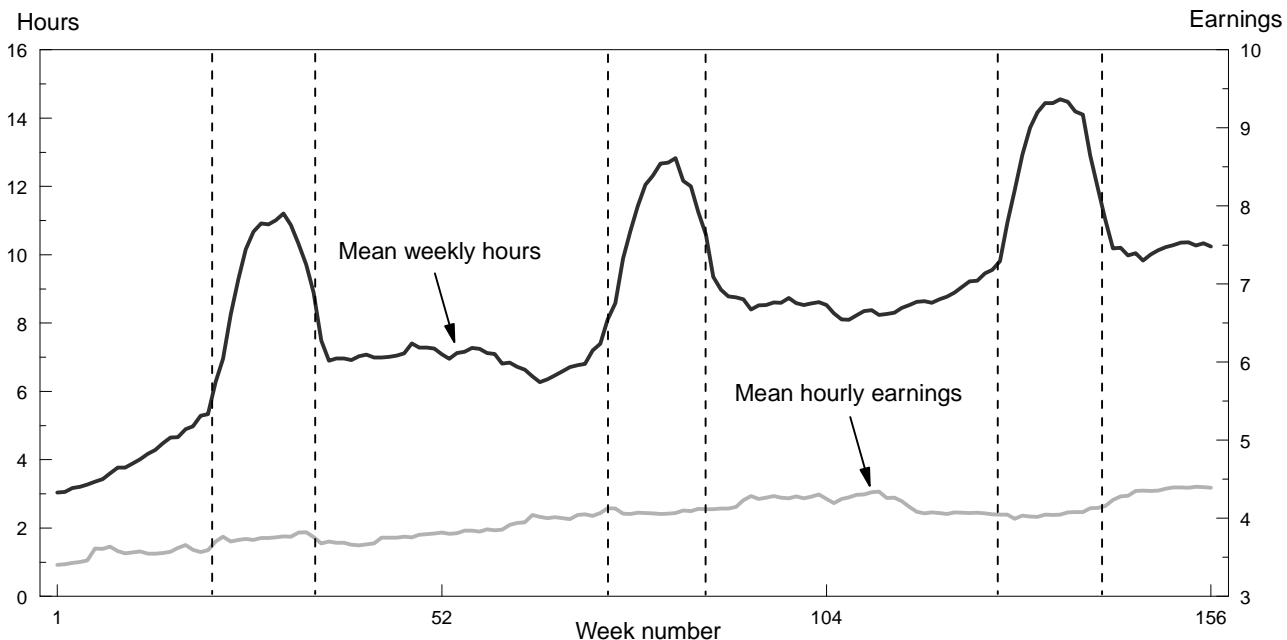
NOTE: Chart represents 156-week employment histories for high school students born from 1962 to 1964 who were enrolled during the calendar years including their 16th, 17th, and 18th birthdays. Due to the different birth years, the 3-year histories cover different periods (1978 80, 1979 81, and 1980 82 for those born in 1962, 1963, and 1964, respectively) and are averaged for this analysis. Areas bracketed by dotted lines represent the weeks during summer vacation. Earnings figures are adjusted for inflation.

Table 2.	Employment activity of high school dropouts, aged 19 to 21 years			
Item		19-year-olds	20-year-olds	21-year-olds
Total, all youths				
Mean weekly employment rate (in percent):				
During the school year		43.0	50.0	51.0
During summer vacation		48.0	51.0	49.0
Mean weekly hours of work, employed youths:				
During the school year		39.6	40.0	40.1
During summer vacation		39.5	40.5	39.8
Mean weekly hours of work, all youths:				
During the school year		17.0	20.1	20.1
During summer vacation		18.9	20.5	19.6
Males				
Mean weekly employment rate (in percent):				
During the school year		58.0	66.0	65.0
During summer vacation		64.0	70.0	66.0
Mean weekly hours of work, employed youths:				
During the school year		41.8	41.4	41.5
During summer vacation		41.6	41.6	40.7
Mean weekly hours of work, all youths:				
During the school year		24.1	27.5	27.0
During summer vacation		26.4	29.1	26.8
Females				
Mean weekly employment rate (in percent):				
During the school year		28.0	33.0	35.0
During summer vacation		32.0	30.0	32.0
Mean weekly hours of work, employed youths:				
During the school year		34.7	36.8	37.1
During summer vacation		34.9	37.7	37.7
Mean weekly hours of work, all youths:				
During the school year		9.4	12.0	12.8
During summer vacation		11.0	11.2	11.8

the fact that the data for 18-year-olds include employment activity from 1982 (for the 1964 birth cohort) when the U.S. unemployment rate was at a peak, and hence probably represents a time effect rather than a true attenuation in the rise in student employment activity with age.

The seasonal variation in high school student employment within calendar years is even more dramatic than the between-year trend. As table 1 clearly shows, employment activity rises sharply during the summer months and drops off during the school year. Among employed female high school students, for example, mean weekly hours worked rises from 14.0 hours per week during the school year to 18.7 hours per week during the summer. This within-year rise in employment during the summer weeks occurs at all ages for both males and females, although male students are more likely to be employed and to work more hours per week when they are employed.

Chart 1, which plots mean weekly hours and real mean hourly earnings, illustrates even more clearly the overall trend and the seasonal pattern in high school student employment. Mean weekly hours worked are shown for the full sample of high school students over the 3 calendar years containing the

16th, 17th, and 18th birthdays. (The areas bracketed by dotted lines represent the summer vacation weeks—as defined in this study—for each of the 3 calendar years.) Average weekly hours are roughly 3 times greater at the end of the period, when the respondents are aged 18 years, as at the beginning. At the same time, average weekly hours during the summer peak are 50 to 100 percent higher than the trend implied by employment activity during the school year.

Given the nature of the academic calendar, it seems quite clear that labor supply shifts are a major force behind the surge in high school student employment in the summer months. However, seasonal shifts in labor demand might also contribute to the rise in summer employment. Chart 1 also shows that the dramatic rise in high school student employment during the summer months is not accompanied by substantial declines in their real average hourly earnings, although it appears that earnings may grow somewhat more slowly during the summer months.[8] The data on average hourly earnings are not entirely satisfactory because any within-year changes in pay on a given job are not measured. Nevertheless, these data suggest that the very large seasonal changes in high school student em-

ployment are accommodated with only minor movements in the wages of high school students.

High school dropouts.   Only 11.1 percent of the youths in the 1959–61 birth cohort are counted as high school dropouts (meaning they were not enrolled in high school at any time during the calendar years including their 19th, 20th, and 21st birthdays, and they had attained less than a high school diploma). Table 2 summarizes the employment activity of the dropouts in the sample over the 3 calendar years including their 19th, 20th, and 21st birthdays. As in Table 1, sample means are reported for three different measures of employment and are broken down by sex, age, and season of year.

The main finding shown in table 2 is that, in sharp contrast to the pattern for high school students, the employment activity of high school dropouts exhibits little seasonal variation. The employment rate for male dropouts appears to rise slightly during the summer but is not accompanied by any increase in weekly hours worked conditional on employment. Among female dropouts, small increases during the summer in some of the employment measures are offset by small decreases in other measures. Overall, employment of high school dropouts appears to be quite stable throughout the calendar year. Thus, the large summer increases in high school student employment do not coincide with any substantial movements in the employment activity of high school dropouts.

The other notable result shown in table 2 is the very large difference in employment rates between male and female high school dropouts. In a typical week, roughly two-thirds of male dropouts are employed while only about one-third of female dropouts have a job. Moreover, employed male dropouts work 3 to 7 hours more per week than employed female dropouts. These gender differences in employment activity among high school dropouts are much larger than the analogous differences for high school students. In fact, while male dropouts are both more likely to work and to work longer weekly hours than their enrolled counterparts, female high school dropouts actually have a substantially lower employment rate than female high school students. Among those who are working, however, female dropouts work more hours per week than do female students.

Sectoral employment of youths

Which sectors of the economy are the primary employers of youths? Table 3 lists the eight narrow occupations and seven narrow industries that employed the largest share of high school students at age 17.[9] For comparison, the table also presents the share of high school students employed in these same occupations and industries at age 18 and the share of high school dropouts employed in these same occupations and industries at ages 19 and 20.

Table 3.	Share of total employment held by high school students and high school dropouts in selected three-digit industries and occupations

[In percent]

Census code	Occupation and industry	Employment share			
		Students		Dropouts	
		17-year-olds	18-year-olds	19-year-olds	20-year-olds
	Occupation				
910–16	Food service workers	20.0	22.1	10.9	10.3
264, 266, 280	Sales clerks and newsboys	7.5	9.6	1.0	.4
980–84	Private household workers	7.3	3.9	2.1	.1
901–03	Cleaning service workers	6.9	5.0	9.5	4.4
822–23	Farm laborers	6.8	3.8	2.9	2.2
762	Stock handlers	6.3	7.6	1.4	2.0
755	Gardeners and groundskeepers	4.5	3.9	3.5	3.6
932, 953	Recreation and amusement workers	4.4	3.9	1.6	.3
	Industry				
669	Eating and drinking places	20.8	20.4	13.1	13.1
769	Private households	8.8	4.4	1.9	.1
017–19	Agricultural production and services	7.9	5.3	7.5	4.8
628	Grocery stores	6.5	8.6	3.5	3.0
857	Elementary and secondary schools	5.7	2.7	1.5	2.0
917, 927, 937	Public administration	5.6	4.6	4.8	3.5
807–09	Entertainment and recreation services	5.0	6.8	3.2	.3

NOTE: The three-digit industry and occupation codes are from the *1970 Classified Index of Industries and Occupations* (Bureau of the Census, 1970). Respondents are classified in an industry and occupation on the basis of the primary job they held during the second week of July. Sample proportions are calculated using the NLSY79 sample weights.

The data indicate that high school students are highly concentrated in a few narrow occupations and industries. In particular, nearly two-thirds of high school students who hold jobs at age 17 are in one of the eight listed occupations, and this percentage falls only slightly (to 60 percent) at age 18. Similarly, 60 percent of the students with jobs at age 17 and 53 percent of the students with jobs at age 18 are employed in one of the seven listed industries. Fully one-fifth of employed high school students are employed as food service workers, with nearly all working in eating and drinking places (usually as servers, buspersons, dishwashers, cooks, and so on). The other leading occupations and industries employing high school students include stock handlers (primarily in grocery stores), sales clerks and newsboys, and recreation and amusement workers (almost exclusively in the entertainment and recreation services industry). Most high school students working in private households appear to be babysitters, and the fraction of students working in private households falls sharply from age 16 to 18.[10]

Young high school dropouts are much less concentrated in the occupations and industries in which their student counterparts are primarily found. Only a third of dropouts who are employed at age 19 and only 23 percent of dropouts employed at age 20 are found in the eight listed occupations in table 3. Likewise, the seven listed industries employ just 36 percent of dropouts at age 19 and only 27 percent at age 20.

One may wonder whether employment among the dropouts is as concentrated as among students, but in a different set of occupations and industries. The data show this not to be the case. Perusal of the occupation and industry distributions for high school dropouts did not reveal any three-digit occupations or industries not listed in table 3 that employed a large fraction of dropouts. Indeed, by far the most common occupation and industry for high school dropouts are, respectively, food service worker and eating and drinking places—the same as for high school students.

More generally, the correlation between the sectoral employment shares of high school students and high school dropouts is 0.50 when sectors are defined as three-digit occupations and 0.79 when sectors are defined as three-digit industries. Thus, high school students and young high school dropouts tend to be employed in the same sectors. But as table 3 makes clear, employment among high school students is much more concentrated in relatively few occupations and industries than is employment among dropouts.

THIS ARTICLE DOCUMENTS some of the distinct seasonal and sectoral patterns of high school student employment activity—namely that employment surges dramatically in the summer months and that the majority of high school students are employed in a narrow set of occupations and industries. Although young high school dropouts tend to be employed in the same sectors as their student counterparts and presumably have similar skill levels, they exhibit very little seasonal variation in their employment activity. These findings raise interesting questions for future research about the sources of the seasonal variation in youth employment, the overall elasticity of demand for youth labor, and the substitutability of different types of youth labor in production. □

Notes

[1] Studies that analyze the transition from school to work include Paul Osterman, *Getting Started* (Cambridge, MA, MIT Press, 1980) and Robert H. Meyer and David A. Wise, "High School Preparation and Early Labor Force Experience," in Richard B. Freeman and David A. Wise, eds., *The Youth Labor Market Problem* (Chicago, University of Chicago Press, 1982), pp. 277–339. Evidence on the job search process of youths is provided in Robert H. Topel and Michael P. Ward, "Job Mobility and the Careers of Young Men," *Quarterly Journal of Economics*, May 1992, pp. 439–479.

[2] Evidence on youth unemployment dynamics is provided by Kim B. Clark and Lawrence H. Summers, "The Dynamics of Youth Unemployment," in Richard B. Freeman and David A. Wise, eds., *The Youth Labor Market Problem* (Chicago, University of Chicago Press, 1982), pp. 199–230. Evidence on the consequences of youth employment can be found in David T. Ellwood, "Teenage Unemployment: Permanent Scars or Temporary Blemishes?," in Freeman and Wise, eds., *The Youth Labor Market Problem*, pp. 349–85. Evidence on demographic differences in youth unemployment is presented in several articles in Richard B. Freeman and Harry J. Holzer, eds., *The Black Youth Employment Crisis* (Chicago, University of Chicago Press, 1986).

[3] Relevant studies include Charles Brown, Curtis Gilroy, and Andrew Kohen, "Time-Series Evidence of the Effect of the Minimum Wage on Youth Employment and Unemployment," *Journal of Human Resources*, Winter 1983, pp. 1–31; Janet Currie and Bruce C. Fallick, "The Minimum Wage and the Employment of Youth: Evidence from the NLSY," *Journal of Hu-*

man Resources, Spring 1996, pp. 404–28; and John M. Abowd, Francis Kramarz, Thomas Lemieux, and David N. Margolis, "Minimum Wages and Youth Employment in France and the United States," in David G. Blanchflower and Richard B. Freeman, eds., *Youth Employment and Joblessness in Advanced Countries* (Chicago, University of Chicago Press, forthcoming).

[4] The Current Population Survey (CPS), conducted monthly by the Bureau of the Census for the Bureau of Labor Statistics, gathers data from a scientifically selected sample of about 50,000 households. Questions on school enrollment and labor force status are asked of appropriate respondents each month as part of the standard questionnaire. Table A-15 in the monthly publication, *Employment and Earnings* (Bureau of Labor Statistics), shows the employment status of 16- to 24-year-olds by enrollment status and other variables. In addition, BLS publishes a news release each year on the work activity of students. (See *College enrollment and work activity of 1998 high school graduates*, USDL 99–175.) For more information on the Current Population Survey, see BLS *Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, April 1997), pp. 4–14.

BLS also publishes data on youth employment activity from the National Longitudinal Surveys. See, for example, *Employment experience and other characteristics of youths: results from a new longitudinal survey*, USDL 99–110 (U.S. Department of Labor), April 30, 1999.

[5] For sample respondents from the latest birth cohorts, the em-

ployment histories begin after January 1, 1978 but before the respondents' 16th birthday.

[6] All of the sample means and sample proportions reported in this paper are calculated using the NLSY79 sample weights and are therefore consistent estimates of the population means and proportions for the corresponding youth population.

[7] Summer is defined as the set of weeks including any days from the months of June, July, and August. The school year is defined as all of the other weeks in the calendar year.

[8] The average real hourly earnings series is calculated as the weighted average (using the NLSY79 sample weights) of the real hourly earnings of all employed students for whom wage data are available on the main job in the given week.

[9] The reported occupation and industry distributions are for (main) jobs held as of the second week of July. The occupation and industry distributions at other times during the calendar year are very similar.

[10] The vast majority of high school students who work as private household workers are female.

Erratum

In the article, "Comparing earnings inequality using two major surveys," by Mark S. Handcock, Martina Morris, and Annette Bernhardt (*Monthly Labor Review*, March 2000), some data are incorrect in several tables, charts, and footnotes. A corrected version of the article is on the Internet at the following address:

http://www.bls.gov/opub/mlr/mlrhome.htm

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