CrossMark

Teenagers' risky health behaviors and time use during the great recession

Sabrina Wulff Pabilonia[1]

Abstract This paper uses individual-level data from both the 2003–2011 American Time Use Survey and Youth Risk Behavior Survey along with state-level unemployment rates to examine the effects of a weakening economy during the Great Recession on U.S. teenagers' activities. Black male teenagers had less sex and spent more time with their parents. Hispanic male teenagers spent less time playing sports and more time watching time TV, and were more likely to be obese. Female teenagers, on the other hand, spent less time working, but made greater investments in their education. However, there were signs that female teenagers were stressed by the weak economic conditions, because they slept less and were more likely to smoke daily. Black females also consumed more alcohol.

1 Introduction

Job losses during and after the Great Recession of 2008–2009 have had a tremendous impact on the health and incomes of a large number of Americans. Although numerous papers have examined the total effects of the Great Recession

---

✉ Sabrina Wulff Pabilonia
  Pabilonia.Sabrina@bls.gov

[1]   U.S. Bureau of Labor Statistics, 2 Massachusetts Ave. NE, Rm. 2180, Washington, DC 20212, USA

on adults and families, none has specifically focused on effects of the weakening economy during the Great Recession on the health behaviors and human capital investments made by teenagers aged 15–18, an especially vulnerable segment of the population. Teenagers may be affected by changes in macroeconomic conditions through numerous channels, including by direct changes to their own labor demand and future employment expectations, and by the financial and emotional stress resulting from the job losses experienced by their parents or the parents of their classmates (Ananat et al. 2011; Arkes and Klerman 2009; Bell and Blanchflower 2011). The direction of the total effects of an economic downturn on teenagers' risky behaviors and time use is theoretically ambiguous (Arkes and Klerman 2009).

A number of studies have found that during previous economic downturns, some teenagers engaged more than usual in risky health behaviors such as substance abuse and sexual activity (Arkes 2007, 2012; Arkes and Klerman 2009; Levine 2001). Arkes (2009) also found changes in teenage weight over the business cycle, with male teenagers losing weight and female teenagers gaining weight in weaker economic periods. However, these researchers lacked time diary data to examine some of the potential explanations, for example changes in parental supervision, for these changes in behavior over the business cycle. Even though parents may lose their jobs in a recession or have their hours cut, this does not necessarily mean that they will spend more time with their children, especially because their children are in school during the majority of the hours parents would typically be working. In fact, Morrill and Pabilonia (2015) found that mothers, who are still the primary childcare providers in the U.S., work more hours on weekends as the state-level unemployment rate increases, suggesting that parental supervision on weekends could fall. Aizer (2004) has documented that children aged 10–14 who are left unsupervised after school may engage more in risky behaviors such as skipping school, using alcohol or drugs, stealing something, or hurting someone. In addition, family members may choose to spend less time together if they are stressed or depressed due to financial difficulties.

This paper contributes to the literature in the following ways: (1) documents the effects of changes in economic conditions on teenagers' risky health behaviors during a time period that includes the Great Recession, (2) uses time diary data from the 2003–2011 American Time Use Survey (ATUS) to examine several hypotheses about the potential mechanisms for these observed changes in behavior over the business cycle, including changes in the time teenagers spend being supervised by their parents, changes in time spent working, changes in sports participation, and changes in TV watching, and (3) describes other effects that the changing economic conditions over the 2003–2011 period have had on teenagers' other major uses of time, especially effects related to investments in schooling-related human capital, which may affect the future earnings of this new cohort who are just beginning to enter the labor market. I use state-level unemployment rates to proxy for macroeconomic conditions in order to identify the total effects of the economy on teenagers' activities. As in previous articles (e.g. Arkes 2007, 2012; Arkes and Klerman 2009; Ruhm 2000) that examined

how changes in the economy affect behavior, the econometric model in this paper includes both state and year fixed effects, thus exploiting the variation in unemployment rates among states over time in order to identify the relationship between state-level unemployment rates and teenagers' health behaviors and also between state-level unemployment rates and teenagers' time use, while controlling for national trends and time invariant differences across states. It is important to control for national trends, for example, because teenager tobacco use has been falling (Arkes 2012) due to anti-smoking campaigns and changing state and national policies over time. In addition, Aguiar et al. (2013) found that leisure time has been increasing over time pre-Great Recession, and Smith (2012) showed that there has been a long downward trend in teenage employment that began in the 1990's and accelerated in the early 2000's. I do not examine the effects of a teen's or parent's employment status, because job loss may not be exogenous to intra-household time allocation and individuals may also respond to potential job loss by working harder or be assigned fewer hours due to reduced demand; my goal is to understand the total effects of macroeconomic conditions on teenagers' activities rather than the partial effects.

Results indicate that the effects vary by both gender and by race/ethnicity within gender groups. Black male teenagers engage less in sexual activity during poorer economic conditions, which is consistent with their spending more time with at least one of their parents. Consistent with a decrease in parental supervision, Hispanic male teenagers were more likely to have consumed alcohol or smoked marijuana in the past 30 days when the unemployment rate was higher. However, even though non-black, non-Hispanic (NBNH) male teenagers spent less time with their parents as the economy weakened, I do not find any significant changes in risky behaviors for this group. As the unemployment rate increased, Hispanic male teenagers were more likely to be obese, which is consistent with their also spending less time playing sports and working but more time watching TV. At the same time, female teenagers were not any more or less likely to spend time with their parents over the business cycle, but they did spend less time working during the recession and more time on educational activities, which could lead to future benefits. However, there are signs that teenage girls were stressed, because they slept less, smoked more regularly and, in the case of black female teenagers, were more likely to drink alcohol as the economy weakened.

2 Data and descriptive statistics

This paper primarily uses two pooled cross-sectional data sets covering the period from 2003 to 2011: the Centers for Disease Control and Prevention's (CDC) National Youth Risk Behavior Survey (YRBS) and the Bureau of Labor Statistics' (BLS) American Time Use Survey (ATUS). In addition, I supplement information on youths' behaviors with information on state laws and state-level unemployment rates that may affect teenagers' activities. I describe each of these sources of data in more detail below.

2.1 YRBS

In 1991, the YRBS began interviewing high school students biannually. Data are available through 2011. This data set is unique in providing information on teenagers' risky behaviors before, during, and following the Great Recession. I focus on high school students aged 15–18 during the period of time that matches the ATUS collection period (2003–2011), as I want to examine potential time use explanations for the effects of changing state-level economic conditions on risky behaviors. The upper age limit is 18, because many youths older than 18 are likely to have graduated from high school and be living away from their parents. (I also include estimates for all high school students in the YRBS and the entire sampling period in the online Appendix).[1] Almost all students were interviewed between January and June. One of the drawbacks of the YRBS compared to other surveys capturing information on risky behaviors, such as the NSLY97, is the limited demographic information collected. The YRBS collects individual-level information such as age and grade in school as well as race and ethnicity but no information about the teens' parents or siblings. The YRBS also cannot capture the effects of changes in state-level economic conditions on risky behaviors that may operate through changes in school enrollment. State indicators are available upon request from the CDC. Therefore, I can control for state-level economic conditions as well as state laws that may affect teenagers' activities. Even though weights are available that when applied make this survey nationally representative of 9th through 12th graders, not all states were surveyed. From 2003 to 2011, there were respondents in 13 states in all survey years, respondents in 4 states for 4 of the survey years, respondents in 8 states for 3 of the survey years, respondents in 11 states for 2 of the survey years, and respondents in 7 states for only one of the survey years. The 7 states (Connecticut, the District of Columbia, Hawaii, Maine, Maryland, South Dakota, and Vermont) that were surveyed in only 1 year do not contribute to the estimated effects of the unemployment rate on teenager behavior in the main econometric analyses discussed below in Sect. 3.

The YRBS sample of high school students aged 15–18 includes 33,260 males and 32,940 females. More details on the sample selection can be found in the online Appendix Table A1. Table 1 shows the weighted percentage of high school students participating in various risky behaviors each year, by gender, and by race/ethnicity subgroups within gender groups. The table covers three basic groupings of health-risk behaviors: sexual activity, drug and alcohol use, and carrying excessive weight. Teenage sexual activity in the 3 months preceding the survey fell slightly overall between 2003 and 2011, with the largest decrease occurring among black male youths, who were more likely to have engaged in this activity than other youths. Smoking (both occasional and daily) and alcohol use fell in each consecutive survey year. Thus, there appears to be a long-run trend toward less smoking and alcohol use among teenagers, which may or may not have been moderated by the recession.

---

[1] Height and weight were not reported before 1999. Therefore, it is possible to examine the effects of changes in economic conditions on the probability of being overweight or obese only between 1999 and 2011.

Table 1 Percentage of teenagers aged 15–18 participating in risky behaviors (youth risk behavior survey)

	Boys					Girls				
	2003	2005	2007	2009	2011	2003	2005	2007	2009	2011
Sexual activity in past 3 months										
ALL	36.1	34.7	36.6	34.6	35.2	37.9	37.1	38.9	38.6	37.5
NBNH	31.4	30.9	31.7	30.8	32.2	35.8	35.3	37.4	37.5	37.7
Non-Hispanic black	56.6	53.0	52.8	52.2	48.3	46.8	46.4	46.2	48.0	39.5
Hispanic	41.8	38.7	43.0	37.6	37.2	39.5	37.2	38.3	36.1	35.1
Smoke in past 30 days										
ALL	23.2	24.0	22.2	20.8	20.6	23.0	24.0	20.1	20.0	17.4
NBNH	24.2	25.1	24.1	22.7	22.2	26.6	27.2	23.5	23.3	19.8
Non-Hispanic black	20.6	15.4	15.7	11.3	14.2	11.0	12.3	8.8	9.1	7.7
Hispanic	20.6	26.4	20.0	20.7	19.5	17.8	20.1	15.8	16.7	16.2
Smoke daily in past 30 days										
ALL	8.2	7.6	6.8	6.2	5.5	8.1	7.5	6.4	4.9	4.7
NBNH	9.1	8.6	8.0	7.5	6.5	10.3	9.3	8.4	6.6	6.1
Non-Hispanic black	7.3	4.7	4.4	2.4	3.0	2.2	2.0	1.0	0.6	1.7
Hispanic	4.7	5.0	3.7	4.2	4.0	3.8	4.4	2.5	2.1	1.8
Alcohol use in past 30 days										
ALL	45.7	45.3	46.6	43.0	41.1	47.7	44.0	45.8	44.6	39.4
NBNH	47.3	46.9	48.0	44.5	42.8	49.1	45.6	47.6	46.5	39.4
Non-Hispanic black	38.3	31.3	35.9	32.2	29.6	38.3	34.2	35.0	36.7	32.3
Hispanic	44.8	50.9	49.7	45.2	43.0	50.0	46.0	47.9	43.6	44.5
Marijuana use in past 30 days										
ALL	26.4	22.9	23.5	24.7	26.9	20.1	18.8	18.1	18.7	21.2
NBNH	25.1	21.6	23.3	23.9	26.1	20.2	18.8	18.4	18.7	20.5
Non-Hispanic black	30.5	23.8	27.2	26.3	30.4	18.9	19.8	17.7	18.9	22.7
Hispanic	29.0	28.6	21.4	26.6	27.1	20.7	17.9	16.9	18.8	22.1
Overweight (BMI ≥ 85 %, by age and sex)										
ALL	30.2	32.6	33.3	31.7	30.8	22.3	25.8	25.1	25.0	24.8
NBNH	27.7	31.5	31.4	28.7	29.6	18.6	22.3	20.7	20.5	21.3
Non-Hispanic black	32.8	32.8	36.5	36.8	30.2	35.3	39.2	39.5	37.0	39.1
Hispanic	39.2	38.1	38.7	39.4	35.6	26.3	29.2	30.5	31.3	26.3
Obese (BMI ≥ 95 %, by age and sex)										
ALL	15.1	17.4	17.0	16.3	16.3	8.0	10.9	10.4	9.5	9.8
NBNH	13.6	16.3	15.3	14.8	15.3	6.2	9.1	7.5	7.5	8.2
Non-Hispanic black	17.5	17.5	19.7	18.9	17.4	13.8	17.4	20.5	15.7	18.9
Hispanic	19.6	22.9	21.7	20.2	19.3	10.6	13.0	13.3	11.6	8.8

YRBS weights used. Race and ethnicity are mutually exclusive

Among girls, very few black and Hispanic youths smoked compared to non-black, non-Hispanic youths. Marijuana use, however, did not follow any specific trend over the period and was more equally prevalent amongst the demographic groups. Finally, the percentage of teens considered overweight or obese was slightly lower during the recession and its aftermath (2009–2011) than during the preceding expansion from 2005–2007, but still higher than in 2003. In all years, non-Hispanic black females were much more likely to be overweight or obese than their peers, while Hispanic males were more likely to be overweight or obese than their peers.[2]

2.2 ATUS

This paper uses data from the nationally representative cross-sectional American Time Use Survey (ATUS)—2003–2011. This time use survey is unique in that it is an ongoing survey of individuals aged 15 and older and thus now well suited for examining the effects of the business cycle on time use. Individuals may be interviewed any day of the year, except on major holidays. One respondent aged 15 and older per household is randomly selected from a subset of households that have completed their final interview for the Current Population Survey (CPS). Unlike in the CPS, which allows proxy responses, ATUS respondents answer all questions for themselves.

The ATUS updates some information from the CPS as well as collects a 24-h diary that begins at 4 A.M. the day prior to the interview.[3] Respondents are asked to sequentially list their activities as well as where the activity took place and, for most activities, who was in the room with them if they were at home or who accompanied them on an activity if they were away from home ("with whom" information was not collected for times when the respondent reported sleeping, grooming, private activities, refused to classify type or can't remember, and working, the last category only prior to 2010).[4] The response rate exceeded 53 % in each year. Approximately half of the diaries were recorded for weekdays and the other half for weekend days. ATUS final weights, reweighted for equal day of the week representation for the male and female teen subsamples separately, are used in all analyses. Estimates from time diaries of time spent on activities are thought to be more accurate than those from usual retrospective questions, as they are less subject to aggregation bias, recall bias, and social desirability bias (Bianchi et al. 2006).

---

[2] Height and weight were self-reported by students. Overweight is defined as greater than or equal to 85 % on the body-mass-index (BMI) percentile chart based upon age and gender. Obese is defined as greater than or equal to 95 % on the BMI percentile chart based upon age and gender.

[3] For the labor force questions, the reference period in the ATUS is the 7 days prior to the interview with interviews occurring throughout the month while the reference period in the CPS is the week including the 12th of the month. Thus, the recall period is shorter in the ATUS. This difference could impact the analyses in this paper as many teenagers work sporadically at jobs such as babysitting and lawn mowing. The CPS reference week was chosen to avoid holidays. Frazis and Stewart (2004) found that average weekly hours were greater during CPS reference weeks than non-CPS reference weeks. Thus, the reference week is not representative of the entire month.

[4] For consistency across years, when examining parental supervision, I did not include any time when the teen was doing paid work.

The ATUS sample includes 2625 boys and 2417 girls who were aged 15–18, lived with at least one parent, and were interviewed during the school year.[5] Youths in all family structures and both enrolled and non-enrolled students are included in the sample in order to measure the total effects of the economy on the time use of all teenagers.[6] All analyses in the paper are done separately for boys and girls, given the large differences in time they spend on some activities and the types of jobs they hold, and increasing differences in educational outcomes between the sexes.

The time use outcomes I examine include primarily continuous measures of the amount of time teens spend on various activities, in minutes per day, except for in the case of work, where I examine additional dichotomous measures for whether or not the teen was employed or worked on the diary day. In most cases, the time a teen spends doing an activity is measured by aggregating minutes spent on that activity during the 24-h diary day. However, the ATUS diary also includes the end time of the last activity that was recorded in the diary. Usually, the respondent's last activity was sleeping; thus, it is possible to also construct a measure of the full night time sleep episode following the diary day. I first examine the time a teen spends with either parent, one potential measure of the level of parental supervision. I also consider the total time a teen spends with his or her mother and then the total time a teen spends with his or her father. A reduction in a teenager's time spent with parents may be detrimental, both because time spent unsupervised may be used for engaging in counterproductive or risky behaviors and because time with parents may be positively associated with cognitive and social development. Then, I examine the time and timing of teens' paid work. Finally, I examine other major activities that teens spend time on, including various educational activities, sports, sleep, watching television, and playing computer games, which may affect their current and future well-being.

2.3 Macroeconomic conditions

The main independent variable used in the analysis is the state yearly unemployment rate, a standard proxy for macroeconomic conditions. The state yearly unemployment rate is created from monthly and annual data obtained from the BLS' Local Area Unemployment Statistics (LAUS) database. It is measured as either the average of the last 12 monthly unemployment rates, ending with the interview month when using the ATUS, or the previous year's annual unemployment rate when using the YRBS. A yearly rate is used instead of a shorter rate to smooth some of the volatility in the CPS estimate (Arkes and Klerman 2009; Morrill and Pabilonia 2015).[7] The overall state unemployment rate is used as opposed to a teenager unemployment rate because the goal of this paper is to examine how teenagers' behaviors change with an exogenous shock and not just how teenagers respond to changes in their own labor demand. In

---

[5] Youths interviewed from Memorial Day through Labor Day are excluded from the sample, because many teenagers are on summer vacation and the YRBS covered risky behaviors occurring during the school year.

[6] Online appendix Table A2 explains the sample selection criteria.

[7] However, a three-month rate produced similar estimates.

addition, although the teenager unemployment rate moves together with the overall unemployment rate (Arkes 2007), the teenager unemployment rate is definitely more volatile and is not reported as an official BLS statistic at the state level because of the increased sampling error.

2.4 State laws

In all regressions, I control for state and federal minimum wage laws, the state maximum compulsory schooling age, and the state minimum age to obtain a driver's license. The minimum wage is the natural logarithm of the higher of the federal or state minimum wage in each state. Using the ATUS, Song (2012) found that a higher minimum wage leads to a decrease in teen employment and an increase in teen school enrollment and time spent on education. The magnitude of these effects varied with the legal dropout age. Thus, I also include the state maximum compulsory schooling age, which ranged from 15 to 18 over the period. In addition, there were several increases during the period in the minimum age required to obtain a driver's license that would permit a student to drive legally to a place of employment without a parent present in the car, thus further decreasing student job opportunities at the time the recession hit. During the Great Recession, many states increased their cigarette sales taxes. Thus, in the smoking regressions, I include the real state cigarette sales tax, which is measured as of June 30th of the year prior to the survey year as reported in the Tax Burden on Tobacco: Historical Compilation (Orzechowski and Walker 2012).[8] Arkes (2009) argues in favor of including the tax rather than the price because the latter could be affected by demand.

3 Estimation and results

3.1 Teenagers' risky health behaviors

I first estimate the following series of linear probability models using Ordinary Least Squares (OLS):

$$Y_{ist} = \alpha + \beta Urate_{s,t-1} + \gamma X_{ist} + \eta Z_{st} + \delta_s + \theta_t + \varepsilon_{ist} \qquad (1)$$

where Y_{ist} is an indicator equal to one if teen i, living in state s, participated in a risky behavior in survey year t (where the length of time in which the behavior could occur varies by the behavior measured), δ's and θ's are state and year fixed effects respectively, $Urate_{s,t-1}$ is the state-level unemployment rate in year $t-1$, X_{ist} is a vector of individual-level variables, Z_{st} is a vector of state-level laws, and ε_{ist} is a stochastic disturbance term assumed to follow a normal distribution. X_{ist} includes indicators for age, race and ethnicity (non-Hispanic black, Hispanic), and grade in school. Z_{st} includes the state maximum compulsory schooling age, the natural logarithm of the minimum wage, and the state minimum age for getting an unrestricted driver's license. In the smoking models, I also include the real state cigarette

---

[8] The wage and tax were adjusted for inflation using the CPI-U/100 (base year 1982–84).

sales tax. The key coefficient of interest is β, the effect of the unemployment rate on a teen's probability of participating in a risky behavior, which captures the effect of within-state variation in economic conditions over time relative to other states.[9] Sample means for all variables used in these regressions are in the online Appendix Table A3.

Table 2 presents the estimated coefficients of interest using pooled cross-sectional data from the 2003–2011 YRBS, with separate estimates by gender, and by race/ethnicity subgroups within gender groups. For all regressions reported in the paper, robust standard errors are adjusted for clustering by state. The sample sizes for these analyses vary due to different nonresponse rates for the dependent variables.

Black male teenagers aged 15–18 are less likely to have engaged in sexual activity in the prior 3 months during weaker economic times as measured by the previous year's state unemployment rate. For a one-percentage-point increase in the unemployment rate, the probability of having had sexual intercourse decreases by 2.8 percentage points. To put these effects of changes in macroeconomic conditions on behaviors in perspective, it may be useful to consider the effects of a five-percentage-point increase in the state unemployment rate (the increase in the national unemployment rate between December 2007 and October 2009, although the state unemployment rates for this sample ranged from 2.9 to 13.7 % over the period considered) on behavior relative to the sample mean. For a five-percentage point increase in the unemployment rate, the probability that a black male teenager would engage in sexual intercourse fell 27 % relative to the mean. I do not find any significant effects of the unemployment rate on female teenagers' sexual behavior. These findings for the period from 2003 to 2011 contrast with the finding in Arkes and Klerman (2009) that female teenagers' probability of sexual activity over an entire year was counter-cyclical while male teenagers' (in general) probability of sexual activity over a year did not respond to changes in economic conditions, although they did find positive effects of the unemployment rate on Hispanic male's sexual activity (my estimate of the latter effect is positive over this period but not significant at conventional levels).

I find a few statistically significant positive effects of the unemployment rate on drug and alcohol use. Hispanic male teenagers were 2.2 percentage points more likely to have consumed any alcohol in the last 30 days for each one-percentage-point increase in the unemployment rate (a 24 % increase relative to the mean when the unemployment rate increases 5 percentage points). For each one-percentage-point increase in the unemployment rate, Hispanic male teenagers were 1.1 percentage points more likely to have used marijuana, and black male teenagers were 1.8 percentage points more likely to have used marijuana (a 21 and 31 % increase, respectively, relative to the mean when the unemployment rate increases 5 percentage points). Black female teenagers were 2.1 percentage points more likely to have consumed alcohol in the past 30 days (a 30 % increase relative to the mean when the unemployment rate increases 5 percentage points). These findings are consistent with Arkes' (2007) finding that teenage drug and alcohol use is

---

[9] The year effects absorb the effects of the national business cycle.

Table 2 Effects of the unemployment rate on teen risky behaviors for teens aged 15–18, by gender and race/ethnicity (YBRS 2003–2011)

Subsample	Sexual intercourse in past three months	Smoke in past 30 days	Smoke every day in past 30 days	Alcohol use in past 30 days	Marijuana in past 30 days	Overweight	Obese
(A) Boys							
All	0.001	0.006	0.004	0.006	0.003	0.001	0.003
	(0.006)	(0.009)	(0.004)	(0.009)	(0.007)	(0.006)	(0.005)
NBNH	0.007	0.005	0.003	0.006	−0.006	0.005	0.001
	(0.009)	(0.010)	(0.006)	(0.009)	(0.008)	(0.009)	(0.005)
Black	−0.028*	0.016	0.006	−0.012	0.018*	−0.015	0.004
	(0.014)	(0.015)	(0.007)	(0.014)	(0.009)	(0.011)	(0.008)
Hispanic	0.008	0.006	−0.000	0.022***	0.011*	0.005	0.013*
	(0.006)	(0.008)	(0.003)	(0.008)	(0.006)	(0.008)	(0.007)
N (All)	29,506	31,091	31,091	29,996	31,983	31,080	31,080
(B) Girls							
All	0.006	0.005	0.007*	0.007	0.006	−0.001	−0.002
	(0.009)	(0.008)	(0.004)	(0.007)	(0.007)	(0.007)	(0.004)
NBNH	0.012	0.008	0.009*	0.002	0.007	0.007	0.003
	(0.012)	(0.012)	(0.005)	(0.012)	(0.010)	(0.010)	(0.005)
Black	0.007	−0.010	0.001	0.021*	−0.005	−0.004	−0.010
	(0.012)	(0.009)	(0.003)	(0.010)	(0.008)	(0.013)	(0.011)
Hispanic	−0.011	−0.001	0.003	−0.005	0.005	−0.012	−0.002
	(0.010)	(0.008)	(0.003)	(0.008)	(0.011)	(0.009)	(0.004)
N (All)	30,558	32,030	32,030	30,883	32,716	30,980	30,980

Linear probability models were estimated. N refers to the number of non-missing values for the dependent variable in the sample of all boys or all girls. YRBS weights used. Standard errors adjusted for clustering by state are reported in parentheses. Control variables include indicators for age, race and ethnicity (non-Hispanic black, Hispanic), grade in school, state laws (maximum compulsory schooling age, ln[minimum wage], minimum driver's license age), state and year fixed effects. In the smoking regressions, I also include the state cigarette price. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

counter-cyclical. In the next section, I look for any evidence of changes in parental supervision that could potentially explain these changes in sexual activity and drug and alcohol use over the business cycle.

Even though regular smoking among teenagers has fallen each year over the period, I find that NBNH female teenagers were 0.9 percentage points more likely to have smoked every day in the past 30 days for each one-percentage-point increase in the unemployment rate (a 56 % increase relative to the mean when the unemployment rate increases 5 percentage points), which is consistent with Arkes' (2012) finding that a weak economy leads to more frequent cigarette use among teenagers. This finding is also consistent with recent evidence by Cheng and Kenkel (2010) that smoking has recently shifted from being a normal good to an inferior

good. It is possible that I do not find similar effects for black and Hispanic girls because relatively few of them smoke regularly.

Finally, I find that Hispanic male teenagers' probability of being obese increased when the unemployment rate rose. For a one-percentage-point increase in the unemployment rate, they were 1.3 percentage points more likely to be considered obese (a 33 % increase relative to the mean when the unemployment rate increases 5 percentage points). There were no changes in female teenagers' weight in response to changing economic conditions. Thus, these results differ from Arkes' (2009) findings that males were less likely to be obese and females more likely to be obese in the previous recession as the economy weakened. In the next section, I look for any evidence of changes in time use, such as a corresponding decrease in physical activity or increase in TV-watching, which could help to explain this change in weight for Hispanic male teenagers; however, I note here that their increased marijuana and alcohol use as the unemployment rate increased could have also led to their weight gain.[10]

I also ran the above specifications for all high school students aged 12–18 and over the entire YRBS sampling period. Results are available in the online Appendix (Tables A4 and A5). I note that among all high school students (2003–2011), I do not find statistically significant changes in male teenagers' participation in sexual activity over the business cycle. I find similar effects of the unemployment rate on drug and alcohol use for Hispanic and black males and daily smoking by NBNH girls. There are no significant effects of the unemployment rate on teenagers' weight. Over all YRBS survey years (1991–2011), now the effect of the unemployment rate on Hispanic male teenagers' sexual activity is statistically significant, which is consistent with Arkes and Klerman (2009). I find that Hispanic male teenagers' alcohol and marijuana use is again counter-cyclical. When I include the time period covering the previous recession, NBNH male teenagers were less likely to be obese when the unemployment rate increased, which is closer to Arkes' (2009) estimate for all males using data covering the period from 1997 to 2004. These latter findings using all years suggests that some behavioral responses to changing economic conditions appear to be different during the Great Recession.

3.2 Teenagers' time use

Using data from the ATUS, I estimate the following model using OLS: [11]

$$Time_{ist} = \alpha + \beta Urate_{s,t-1} + \gamma X_{ist} + \eta Z_{st} + \delta_s + \theta_t + \varepsilon_{ist} \qquad (2)$$

where $Time_{ist}$ is the number of minutes per day that teen i spends on various activities, living in state s, at time t; $Urate_{s,t-1}$ is the state-level unemployment rate averaged over the last 12 months ($t - 1$), X_{ist} is a vector of observable individual

---

[10] Physical activity could change because of changes in recreational sports or work-related exertion over the business cycle. For example, Colman and Dave (2011) found that among low-educated adult males, total physical exertion declined as work-related exertion due to job-loss decreased more than recreational sports, TV-watching, sleeping, childcare, and housework increased during the Great Recession.

[11] When examining the probability of being employed or working on the diary day, I estimate linear probability models.

and family-level variables, Z_{st} is a vector of state-level laws, α is a constant, δ's are state fixed effects, θ's are year fixed effects, and ε_{ist} is a stochastic disturbance term assumed to follow a normal distribution. The key coefficient of interest is β, the effect of the unemployment rate on a teen's time use. X_{ist} includes mother's and father's age and age squared, and indicators for age, mother's and father's education level (high school dropout, some college, college, missing), race and ethnicity (non-Hispanic black, other, Hispanic), 1st or 2nd generation immigrant, family structure (living with single mom, living with single dad), age of youngest household child (infant, preschooler, elementary), number of household children (two, three or more), household child older than age 18, lives with other adults, gender composition of the children (all boy, mixed gender), season, and respondent lives in SMSA. These controls are included based upon the previous literature on teenagers' time use derived from the ATUS, including Porterfield and Winkler (2007), Wight et al. (2009), Kofman and Bianchi (2012), and Kalenkoski and Pabilonia (2012). Z_{st} includes the log of the state minimum wage, state minimum driving license age, and state maximum compulsory schooling age. Online Appendix Table A6 shows the means for the variables used in the time use regressions.

I first examine the effects of the state-level unemployment rate on the total time spent by a teenager in the presence of at least one parent (one measure of parental supervision) to determine whether these effects could potentially explain some of the previously observed changes in the probability of participating in risky health behaviors over the business cycle.[12] Table 3 shows that teenage boys spent on average 6 min less per day with a parent for each one-percentage-point increase in the unemployment rate.[13] For a five-percentage-point increase in the unemployment rate, parental supervision time fell by 26 % relative to the mean. However, non-Hispanic blacks spent more time with a parent (10 min more per day); but the estimate is imprecise due to the smaller sample size. This effect likely differs, because black teenage boys typically spend much less time with a parent than NBNH boys (on average 75 min per day versus 127 min per day). These differences in time spent by race/ethnicity also correspond to the differences found in Table 2 in male teenagers' patterns of sexual activity over the business cycle. It is possible that these results differ by race/ethnicity because the Great Recession disproportionately affected the unemployment rate of black adults, potentially allowing them more time for parental supervision (U.S. Department of Labor 2012). Although the estimates are imprecise, the time that male teenagers spend with parents also appears to fall mostly on non-school days and among the employed as the unemployment rate rises. It is possible that these effects result from changes in the timing of work that made it more difficult for families to coordinate joint activities, which I discuss further below. I do not find any statistically significant differences in the time female teenagers spend with a parent over the business cycle, which is consistent with the findings in Table 2 that for females there is no change in sexual

---

[12] The ATUS collects only secondary childcare time for children under the age of 13. I also examined an alternative measure as the sum of both parents' time with children (as suggested in Folbre et al. 2005), with similar results.

[13] Estimates for all the covariates in this specification are in online Appendix Table A7.

Table 3 Effects of the unemployment rate on time with either parent (in minutes) for teens aged 15–18, by gender (ATUS 2003–2011)

Subsample	N	Mean	Urate	R^2
(A) Teen boys				
All boys	2625	114.95	−6.26* (3.40)	0.07
Race/ethnicity				
NBNH	1898	126.77	−9.58* (4.83)	0.09
Non-Hispanic black	275	74.66	10.02 (13.15)	0.29
Hispanic	452	105.24	−7.75 (7.90)	0.21
Day of week				
School day	1211	87.31	−2.13 (3.47)	0.13
Non-school day	1414	176.44	−8.83 (6.88)	0.14
Teens' earner status				
Employed	867	102.78	−7.40 (6.26)	0.17
Not employed	1758	120.63	−4.85 (4.85)	0.01
(B) Teen girls				
All girls	2417	144.85	−0.99 (6.42)	0.09
Race/ethnicity				
NBNH	1779	142.76	−2.40 (7.05)	0.10
Non-Hispanic black	252	111.67	−0.27 (15.86)	0.36
Hispanic	386	180.15	−2.97 (14.76)	0.23
Day of week				
School day	1145	113.22	−6.46 (5.71)	0.14
Non-school day	1272	213.88	5.40 (9.13)	0.18
Teens' earner status				
Employed	810	118.68	−7.38 (8.05)	0.17
Not employed	1607	157.54	0.71 (7.72)	0.11

Unemployment rates are measured at the state level and all specifications include state and year fixed effects. ATUS final weights used. Standard errors adjusted for clustering by state are reported in parentheses. Control variables include mother and father's age and age squared, ln(minimum wage), state minimum driving license age, state maximum compulsory schooling age, and indicators for age, mother's and father's education level (high school dropout, some college, college, missing), family structure (single mother, single father), race and ethnicity (non-Hispanic black, Hispanic), 1st or 2nd generation immigrant, age of youngest household child (infant, preschooler, elementary), number of household children (two, three or more), household child older than age 18, lives with other adults, gender composition of the children (all boy, mixed gender), season, and respondent lives in SMSA. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

behavior that is more likely to occur at home when a parent is not present. However, I also note that black female teenagers had more parental supervision, on average, than black male teenagers (112 min per day versus 75 min per day).

I next examine the effects of the state-level unemployment rate on the time and timing of paid work by gender (Table 4). It is not possible to consider all the effects of the unemployment rate on minutes worked by race/ethnicity, given the smaller sample sizes due to the additional weekend/weekday restrictions. However,

Table 4 Effects of the unemployment rate on teenagers' time and timing of work, by gender (ATUS 2003–2011)

	All days		Weekdays		Weekend days	
	Pr(Employed)	Minutes worked	Pr(Worked)	Minutes worked	Pr(Worked)	Minutes worked
(A) Teen boys						
All (N = 2625)	−0.01 (0.01)	−5.71** (2.75)	−0.01 (0.01)	−9.93** (3.77)	0.01 (0.01)	2.30 (3.46)
Mean	0.32	45.09	0.14	42.04	0.14	52.54
(B) Teen girls						
All (N = 2417)	−0.02* (0.01)	−10.13** (3.88)	−0.03** (0.01)	−13.67*** (4.08)	−0.01 (0.02)	0.18 (6.16)
Mean	0.33	45.17	0.14	42.26	0.15	52.28

Unemployment rates are measured at the state level and all specifications include state and year fixed effects. ATUS final weights used. Standard errors adjusted for clustering by state are reported in parentheses. See notes for Table 3 for covariates. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Table 5 Top 8 primary jobs held by teens as a % of those holding jobs, by gender (ATUS 2003–2011)

	2003–2011		2003–2007		2008–2011	
	Male	Female	Male	Female	Male	Female
Athletes, coaches, umpires, and related workers	0.02	0.02	0.02	0.01	0.01	0.02
Food preparation and serving related occupations	0.22	0.25	0.23	0.24	0.22	0.26
Building and grounds cleaning and maintenance occupations	0.13	0.04	0.13	0.06	0.13	0.03
Childcare	0.01	0.12	0.01	0.13	0.01	0.12
Sales and related occupations	0.15	0.29	0.16	0.27	0.13	0.32
Stock clerks and order fillers	0.04	0.01	0.04	0.02	0.03	0.01
Miscellaneous agricultural workers	0.04	0.02	0.03	0.01	0.04	0.03
Laborers and freight, stock and material movers	0.07	0.00	0.06	0.00	0.09	0.00
Multiple job holders	0.09	0.07	0.09	0.10	0.08	0.06
Number employed	867	810	596	556	271	254

ATUS final weights used. Only the occupation of the primary job is recorded in the ATUS

Hispanic female teenagers are significantly less likely to work on a weekday when the unemployment rate increases (estimates available upon request). As the state-level unemployment rate increases, teenagers are less likely to be employed, with girls 2 percentage points less likely to be employed and boys 1 percentage point less likely to be employed with each percentage point increase in the state-level unemployment rate (although the latter effect is imprecise). In addition, girls work significantly fewer minutes per day when state unemployment rates are higher compared to boys (10 min per day versus 6 min per day fewer per one-percentage-point increase in the state unemployment rate). This negative effect of the unemployment rate on minutes worked is concentrated on weekdays. These gender differences in minutes worked may be due to the types of jobs that teens hold. For example, girls are much more likely to babysit or do sales work than are boys, and boys are more likely to hold maintenance jobs than are girls (Table 5). The hours on these jobs may have been differently affected by the recession. For example, it may have been easier for families to cut back on babysitting hours. As a sensitivity analysis, I also examined a specification that did not include the year fixed effects that removed the national trend from the previous estimates. I find that the effects on the probability that a teenager is working are slightly larger in magnitude and increase in statistical significance due to the increase in variation; however, the magnitude of the effect of the unemployment rate on minutes worked is diminished (see online Appendix Table A8). Given the volatility in the official national teenager unemployment rate compared to the adult aged 20+ unemployment rate in the CPS over this period (U.S. Department of Labor 2015), one might expect to find larger estimates of the effect of the state unemployment rate on the probability a teen is

Table 6 Effects of the unemployment rate on teen boys aged 15–18 time use (ATUS 2003–2011)

Dependent variable	N	Mean	Urate	R^2
Minutes with mother	2625	84.84	−5.29* (2.67)	0.07
Minutes with father	2625	74.10	−1.36 (2.22)	0.13
Minutes in class	2625	199.1	0.28 (6.62)	0.08
Minutes of homework	2625	38.85	−3.71** (1.73)	0.11
Minutes homework and extracurricular activities	2625	45.42	−2.86 (2.47)	0.11
Minutes of total education	2625	244.6	−2.58 (7.05)	0.09
Minutes in sports (All)	2625	52.84	−1.57 (1.90)	0.06
NBNH	1898	52.86	2.22 (2.94)	0.07
Non-Hispanic black	275	61.23	−18.91** (8.07)	0.44
Hispanic	452	47.65	−8.56** (3.88)	0.15
Minutes sleeping on diary day	2625	558.3	3.17 (5.57)	0.05
Minutes sleeping on night following diary day	2625	514.0	5.35 (3.40)	0.07
Minutes TV	2625	130.9	4.51* (3.40)	0.07
Minutes games and TV	2625	195.0	7.58 (4.74)	0.08

Unemployment rates are measured at the state level and all specifications include state and year fixed effects. ATUS final weights used. Standard errors adjusted for clustering by state are reported in parentheses. Control variables include mother and father's age and age squared, ln(minimum wage), state minimum driving license age, state maximum compulsory schooling age, and indicators for age, mother's and father's education level (high school dropout, some college, college, missing), family structure (single mother, single father), race and ethnicity (non-Hispanic black, Hispanic), 1st or 2nd generation immigrant, age of youngest household child (infant, preschooler, elementary), number of household children (two, three or more), household child older than age 18, lives with other adults, gender composition of the children (all boy, mixed gender), season, and respondent lives in SMSA. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

employed in the ATUS. Indeed, when I estimated specifications including only a constant and the state unemployment rate, I find that the effect of the state unemployment rate on the probability of being employed doubled (−0.04 for girls and −0.02 for boys). However, there are several differences between the ATUS and CPS surveys that could lead to additional differences in estimates. For example, the CPS allows for proxy responses and parents may underreport marginal employment (Martin et al. 1995; Sum et al. 2008).[14] In addition, the official teenager unemployment rate is based upon teenagers aged 16–19 while this paper examines those aged 15–18. At age 15, teenagers are more likely to work sporadically at a freelance-type job than an employee-type job that has more consistent weekly hours (Pabilonia 2001).

I also consider the time teenagers spend with their mothers separately from the time they spend with their fathers. Results in Table 6 indicate that teenage boys spend significantly less time with their mothers when the unemployment rate increases, which accounts for the large reduction in total parental supervision. This is not surprising, because much of the time that fathers spend with their children is

---

[14] Ninety-three percent of the sample had a proxy response in the CPS.

Table 7 Effects of the unemployment rate on teen girls aged 15–18 time use (ATUS 2003–2011)

Dependent variable	N	Mean	Urate	R^2
Minutes with mother	2417	125.2	−0.62 (5.49)	0.10
Minutes with father	2417	64.74	2.82 (4.04)	0.14
Minutes in class	2417	193.7	1.38 (4.69)	0.11
NBNH	1779	193.3	−1.31 (4.26)	0.12
Non-Hispanic black	2052	205.1	−16.45 (18.83)	0.46
Hispanic	386	185.9	17.57* (10.28)	0.12
Minutes of homework	2417	58.58	5.30 (3.24)	0.11
Minutes of homework and extracurricular activities	2417	67.19	6.06* (3.42)	0.12
Minutes of total education	2417	260.9	7.44 (5.39)	0.12
Minutes in sports	2417	22.45	0.27 (1.68)	0.07
Minutes sleeping on diary day	2417	548.5	−3.75 (2.74)	0.08
Minutes sleeping on night following diary day	2417	510.7	−9.55** (4.27)	0.06
Minutes TV	2417	119.1	−4.50 (3.89)	0.08
Minutes games and TV	2417	149.0	−1.59 (3.39)	0.08

Unemployment rates are measured at the state level and all specifications include state and year fixed effects. ATUS final weights used. Standard errors adjusted for clustering by state are reported in parentheses. See notes for Table 6 for covariates. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

time that they also spend with the mother (Folbre et al. 2005). This is also consistent with Morrill and Pabilonia's (2015) finding that mothers in two-parent households were more likely to work on weekend days when the unemployment rate was relatively high, which also may explain why results for total parental supervision were stronger on non-school days. One reason that I do not find similar results in Table 7 for teenage girls may be that mothers usually spend more time, on average, with teenage daughters than with teenage sons (on average 125 min per day versus 85 min per day). This could be either because mothers prefer spending time with daughters or because daughters need more developmental time with mothers, making it a priority (Lundberg et al. 2008).

Finally, I examine teenagers' other major uses of time: school-related activities, sports, sleep, and screen time (e.g. TV and video games).[15] Where I find large differential effects by race/ethnicity within gender groups, they are presented in Tables 6 and 7. For example, I find that black and Hispanic male teenagers play sports less when the unemployment rate increases (Table 6). For each percentage-point increase in the state unemployment rate, black male teenagers played 19 fewer minutes of sports and Hispanic male teenagers played 9 fewer minutes of sports (a five-percentage-point increase in the unemployment rate would result in a 154 % decrease in playing time for blacks and a 90 % decrease in playing time for Hispanics relative to the mean). This differential finding by race/ethnicity could be related to the costs of participating in high school sports (or club sports), because many schools increased after school sports fees and even eliminated some sports

---

[15] I also examined housework; but teens do little housework, and all the effects were insignificant.

programs during the Great Recession (Garcia 2009). Given that Hispanic male teenagers are the least physically active of the three groups examined (they do 48 min of sports per day on average while blacks do 66 min per day and NBNH males do 53 min per day), changes in time playing sports could be a plausible mechanism through which a weaker economy could increase the probability of Hispanic males being obese. Another contributing factor could be the effect of the unemployment rate on TV-viewing, because I find that male teenagers also spent less time doing homework and more time watching TV as the unemployment rate increased.

Hispanic female teenagers are much more likely to be attending classes (and enrolled in school—estimate not shown) at higher unemployment rates (Table 7), which is consistent with their being less likely to be working on weekdays at higher unemployment rates. However, the net effect of the recession on the future wage returns to Hispanic female teenagers' human capital investments (i.e., educational attainment minus the loss in job experience) is unknown, as the literature on the returns to early job experience suggests positive effects on wages (Stephenson 1981; Michael and Tuma 1984; Ruhm 1995, 1997; Light 1999, 2001; Neumark and Joyce 2001). Female teenagers also spent more time doing homework (a five-percentage-point increase in the unemployment rate would result in a 45 % increase in homework time relative to the mean), but less time sleeping (a five-percentage-point increase in the unemployment rate would result in a 9 % decrease in sleep time relative to the mean) at higher unemployment rates.

4 Conclusion

The Great Recession of 2008–2009 has had significant effects on the activities of today's youths that have the potential to affect their future health and economic opportunities in both positive and negative directions. In this paper, I examined how 15–18 year olds' participation in risky behaviors, such as sexual activity, smoking, consuming alcohol, drug use, and weight gain, as well how they spent their time changed as state-level economic conditions changed. Behavioral responses varied by gender and race/ethnicity as did their general participation level in activities through the 2003–2011 sample period, with larger responses often more likely to occur for the group that had larger or smaller participation relative to the other demographic groups. As the state unemployment rate increased, I find that black male teenagers decreased their sexual activity and spent more time with their parents (though the latter effect was imprecise due to the small sample size). Black teenagers may have been less likely to engage in sexual intercourse at home because their parents spent more time at home during the recession due to the lack of employment opportunities. NBNH male teenagers spent statistically significantly less time with their parents as the economy weakened; however, I do not find any corresponding increases in the risky behaviors I examined. This different response to time spent with parents may be because black male teenagers are, in general, less supervised. Hispanic male teenagers also spent less time with their parents as the unemployment rate increased (again the effect is imprecise), which could explain

why Hispanic male teenagers were more likely to have consumed alcohol or smoked marijuana in the past 30 days during weaker economic conditions. However, changes in parental supervision cannot explain why black male teenagers are more likely to smoke marijuana. This effect could potentially result because there are more teenage drug sellers in a weak economy as other job opportunities dry up, thus increasing teenagers' access to drugs during hard economic times and potentially counteracting any positive effects of increased parental supervision for blacks in a weak economy (Arkes 2007). The effects are also consistent with black communities being harder hit during the Great Recession. Hispanic male teenagers were more likely to be obese as the unemployment rate increased, which could be explained by their corresponding increase in TV watching and decrease in sports participation and paid work.

Female teenagers, especially Hispanic teenagers, shifted their time toward educational activities as opportunities for employment shrank. However, there are still signs that female teenagers were stressed, because they slept less and were more likely to smoke daily as the economy weakened. In addition, black female teenagers were more likely to consume alcohol as the unemployment rate increased. These changes in risky behaviors for girls cannot be explained by changes in parental supervision over the business cycle.

References

Aguiar, M., Hurst, E., & Karabarbounis, L. (2013). Time use during the great recession. *American Economic Review, 103*(5), 1664–1696.

Aizer, A. (2004). Home alone: Supervision after school and child behavior. *Journal of Public Economics, 88*, 1835–1848.

Ananat, E., Gassman-Pines, A., Francis, D., & Gibson-Davis, C. (2011). *Children left behind: The effects of statewide job loss on student achievement*. NBER Working Paper No. 17104.

Arkes, J. (2007). Does the economy affect teenage drug use? *Health Economics, 16*, 19–36.

Arkes, J. (2009). How the economy affects teenage weight. *Social Science and Medicine, 68*, 1943–1947.

Arkes, J. (2012). How does youth cigarette use respond to weak economic periods? Implications for the current economic crisis. *Substance Use and Misuse, 47*, 375–382.

Arkes, J., & Klerman, J. (2009). Understanding the link between the economy and teenage sexual behavior and fertility outcomes. *Journal of Population Economics, 22*, 517–536.

Bell, D., & Blanchflower, D. (2011). Young people and the great recession. *Oxford Review Economic Policy, 27*(2), 241–267.

Bianchi, S., Robinson, J., & Milkie, M. (2006). *Changing rhythms of American family life*. New York: Russell Sage.

Cheng, K., & Kenkel, D. (2010). U.S. cigarette demand: 1944-2004. *The B.E. Journal of Economic Analysis & Policy, 10*(1).

Colman, G., & Dave, D. (2011). Exercise, physical activity, and exertion over the business cycle. *Social Science and Medicine, 93*, 11–20.

Folbre, N., Finnoff, Y., & Fuligni, A. (2005). By what measure? Family time devoted to children in the United States. *Demography, 42*(2), 373–390.

Frazis H., & Stewart, J. (2004). What can time-use data tell us about hours of work? *Monthly Labor Review,* December, 3–9.

Garcia, M. (2009). At some schools, budget cuts put the kibosh on sports. *USA Today*, 2 September. http://usatoday30.usatoday.com/sports/preps/2009-09-02-budget_sports_cuts_N.htm

Kalenkoski, C., & Pabilonia, S. W. (2012). Time to work or time to play: The effect of student employment on homework, sleep, and screen time. *Labour Economics, 19*, 211–221.

Kofman, Y., & Bianchi, S. (2012). Time use of youths by immigrant and native-born parents: ATUS results. *Monthly Labor Review, 135*(7), 3–24.

Levine, P. (2001). The sexual activity and birth-control use of American teenagers. In J. Gruber (Ed.), *Risky behavior among youths: An economic analysis* (pp. 167–217). Chicago: University of Chicago.

Light, A. (1999). High school employment, high school curriculum, and post-school wages. *Economics of Education Review, 18*(3), 291–309.

Light, A. (2001). In-school work experience and the returns to schooling. *Journal of Labor Economics, 19*(1), 65–93.

Lundberg, S., Pabilonia, S.W., & Ward-Batts, J. (2008). Time allocation of parents and investments in sons and daughters. Mimeo.

Martin, E. A., Hess, J., & Siegel, P. M. (1995). Some effects of gender on the meaning of 'work': An empirical examination. Census Statistical Research Division Report Series, https://www.census.gov/srd/papers/pdf/sm9509.pdf. Accessed 22 April 2015.

Michael, R., & Tuma, N. (1984). Youth employment: Does life begin at 16? *Journal of Labor Economics, 2*(4), 464–476.

Morrill, M. S., & Pabilonia, S. W. (2015). What effects do macroeconomic conditions have on the time couples with children spend together? *Review of Economics of the Household,*. doi:10.1007/s11150-015-9285-x.

Neumark, D., & Joyce, M. (2001). Evaluating school-to-work programs using the new NLSY. *The Journal of Human Resources*, *36*(4), 666–702.

Orzechowski, W., & Walker, R. (2012). *The tax burden on tobacco: Historical compilation, volume* 46, 2011. Arlington, VA: authors.

Pabilonia, S. W. (2001). Evidence on youth employment, earnings, and parental transfers in the national longitudinal survey of youth 1997. *Journal of Human Resources, 36*(4), 795–822.

Porterfield, S., & Winkler, A. (2007). Teen time use and parental education: Evidence from the CPS, MTF, and ATUS. *Monthly Labor Review, 130*(5), 37–56.

Ruhm, C. (1995). The extent and consequences of high school employment. *Journal of Labor Research, 16*(3), 293–304.

Ruhm, C. (1997). Is high school employment consumption or investment? *Journal of Labor Economics, 15*(4), 735–776.

Ruhm, C. (2000). Are recessions good for your health? *Quarterly Journal of Economics, 115*, 617–650.

Smith, C. (2012). The impact of low-skilled immigration on the youth labor market. *Journal of Labor Economics, 30*(1), 55–89.

Song, Y. (2012). Minimum wages and teen time use. Mimeo.

Stephenson, S. (1981). In-school labour force status and post-school wage rates of young men. *Applied Economics, 13*(3), 279–302.

Sum, A., Khatiwada, I., McLaughlin, J., & Palma, S. (2008). The collapse of the national teen job market and the case for an immediate summer and year round youth jobs creation program. Northeastern University, Center for Labor Market Studies.

U.S. Department of Labor. (2012). The African-American labor force in the recovery. http://www.dol.gov/_sec/media/reports/BlackLaborForce/BlackLaborForce.pdf. Accessed 2 Nov 2012.

U.S. Department of Labor, U.S. Bureau of Labor Statistics. (2015). Charting the labor market: Data from the Current Population Survey (CPS). http://www.bls.gov/web/empsit/cps_charts.pdf. Accessed 25 April 2015.

Wight, V., Price, J., Bianchi, S., & Hunt, B. (2009). The time use of teenagers. *Social Science Research, 38*(4), 792–809.