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Forward-Thinking Teens: The Effects of College Costs on Adolescent Risky Behavior

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Abstract

This paper analyzes the effect of college costs on teenagers' engagement in risky behaviors before they are old enough to attend college. Individuals with brighter prospects for future schooling attainment may engage in less drug and alcohol use and risky sexual activity because they have more to lose if such behaviors have harmful effects in their lives. If teens correctly predict that higher college costs make future college enrollment less likely, then adolescents facing different expected costs may choose different levels of risky behavior. I find that lower college costs in teenagers' states of residence raise their subjective expectations regarding college attendance and deter teenage substance use and sexual partnership. Specifically, a $1,000 reduction in tuition and fees at two-year colleges in a youth's state of residence (roughly a 50% difference at the mean) is associated with a decline in the number of sexual partners the youth had in the past year (by 26%), the number of days in the past month the youth smoked (by 14%), and the number of days in the past month the youth used marijuana (by 23%). These findings suggest that the often-studied correlation between schooling and health habits emerges in adolescence because teenagers with brighter college prospects curb their risky behavior in accordance with their expectations. The results also imply that policies that improve teenagers' educational prospects may be effective tools for reducing youthful involvement in such behaviors.

1 Introduction

Individual educational attainment is a robust correlate of good health behaviors and outcomes as shown in many studies. However, the association between schooling and health is still not fully understood.[1] Economic theories on the relationship between these variables generally fall into one of three broad categories.[2] Building on the influential work of Grossman [1972, 2000], the first strand of the literature proposes a causal relationship from schooling to health outcomes. Another group of papers focuses on causality running in the opposite direction, from health to schooling.[3] A third set of papers contend that schooling and health are only spuriously correlated.

In a widely cited study, Farrell and Fuchs [1986 [1982]] document a negative relationship between individuals' smoking behavior and their educational attainment at age 24. Interestingly, this correlation is fully accounted for by smoking differences at age 17.

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[1]See Grossman [2008] for a discussion of the issues at hand.
[2]Reviews of this literature can be found in Cutler and Lleras-Muney [2006], Grossman and Kaestner [1997] and Grossman [2005].
[3]See Case, Fertig, and Paxson [2005] for one example.

Because differences in realized schooling were very small at age 17, the correlation between schooling and smoking cannot be the result of any causal effect of the former on the latter. Rather, the authors posit that unobserved "third factors" (e.g. heterogeneous discount rates) that influence both smoking and schooling are responsible for the observed correlation between the two variables.

This paper proposes a different explanation for the phenomenon observed by Farrell and Fuchs [1986 [1982]]. I hypothesize that teenagers who eventually go on to realize different schooling levels anticipate (with some degree of accuracy) their future outcomes; and that differences in youths' prospects for future schooling attainment cause them to choose different levels of engagement in risky health behaviors.

An implication of my hypothesis is that factors that affect youths' expectations of future schooling events (for reasons that are exogenous to their health decisions) will in turn have an effect on their involvement in risky behaviors as teenagers. This implication is not shared by the"third factors" hypothesis of Farrell and Fuchs [1986 [1982]], which contends that schooling and health are only related spuriously. Furthermore, though similar arguments have been noted in papers such as de Walque [2010], Becker [2007], and Grossman [2005], empirical work examining whether schooling has a causal effect on health has focused almost exclusively on health outcomes that are realized subsequent to schooling decisions.[4] In contrast, little is known about how health practices change with respect to *anticipated* schooling. This is the focus of this paper.

I empirically examine the hypothesis that youths' prospects for future schooling affect their risky behavior. To do so, I analyze the effect of college costs on high-school aged youths' engagement in smoking, heavy drinking, marijuana use, and sexual activity. Since these youths are not yet old enough to attend college, any observed effect of costs on behavior must work through their expectations of future schooling outcomes rather than the outcomes themselves. The direction of the effect of college costs on teenage risky behavior is not predicted by theory *a priori*, even if teens' expectations of the future are perfectly rational. In general, the sign of the effect of college costs on risky behavior will depend on whether the expected harm of such behavior is larger when individuals plan to attend college than when they do not. If, for example, the potential loss of lifetime earnings due to the negative consequences of risky behavior is higher for college-educated individuals, teenagers may curb their participation in risky behavior when college enrollment is more likely.[5] I discuss this point in more detail in the next section.

I find evidence that teenage risky behavior becomes less attractive as college becomes more viable (through lower costs). Teenagers living in states with lower community college tuition rates have fewer sexual partners and engage in less smoking, heavy drinking, and marijuana use than their peers in higher-tuition states, *ceteris paribus*.

As I explain below, the validity of these results hinges on my main identification assumption, which is that two-year college tuition rates across states are uncorrelated with unobserved factors that affect teenage risky behavior. To account for the effect of such factors, I employ an extensive set of controls in all of my empirical specifications, including individual test scores, family income, parental education, and state characteristics such as excise taxes on beer and cigarettes. Two additional findings provide support for my identification strategy. First, using data from the National Longitudinal Survey of Youth, 1997 cohort (NLSY97), I observe respondents before and after college outcomes are

[4]These studies, which are numerous, are discussed in Grossman [2005] and Chou, Liu, Grossman, and Joyce [2010].
[5]This intuition is similar to that of Lochner [2004], who considers how human-capital investments affect criminal activity.

realized. I find that tuition rates are not only negatively related to respondents' college outcomes, but are also negatively correlated with a measure of subjective college expectations taken while youths are still in high school. This is evidence that, on average, teenagers act as if they are aware of the effect that college costs will have on their eventual schooling outcomes. Since college costs enter teens' expectations, it is plausible that they have an effect on behavior.

Second, two-year college costs have the greatest effect on behavior for those who, based on observable teenage characteristics, are most likely to be two-year college enrollees. I argue that these youths are more likely to be near the margin of the college decision than their peers. Thus, if tuition is merely correlated with some other factor that drives risky-behavior differences across states, then that factor should also tend to disproportionately affect students near the college margin. For these reasons, my results are not likely to be due to an unobserved"third factor" as proposed by Farrell and Fuchs [1986 [1982]].

In the United States, many policies have been enacted with the goal of discouraging teenage risky behaviors such as smoking, drug and alcohol use, and risky sex (see Gruber, 2001). My findings imply that subsidizing two-year college attendance may be used as a policy tool to curb teenage risky behavior. However, tuition is not the only means by which policymakers can change young adults' college expectations. For example, nancial investments in primary or secondary education may have a similar effect on educational prospects. Though I do not address alternative policies in this paper, my results suggest that well-targeted policies that raise teenage college prospects may be an effective way to deter risky behavior among youths.

2 The Relationship between College Prospects and Risky Behavior

The effect of college costs on teenagers' engagement in risky behavior depends on two major factors. The first is the extent to which teenagers are forward-looking in their behavior. If teenage decision-making is not motivated in part by expectations of the future, then factors that affect teens tomorrow (e.g. the price of college) should have no effect on behavior today. The economic literature on this subject is sparse, but recent work by Coppejans, Gilleskie, Sieg, and Strumpf [2007] shows that teens' current smoking decisions are influenced by expected future cigarette price volatility. This is inconsistent with the notion that teenagers are merely myopic consumers of cigarettes. Other work has examined youths' subjective expectations (and outcomes associated with those expectations), such as those available in the NLSY97, to gauge forward-lookingness. Teenagers in the NLSY97 appear to be overly optimistic when it comes to forecasting their future college outcomes (Reynolds and Pemberton, 2001; Walker, 2001). Nevertheless, as I discuss later in the paper, NLSY97 teens' expectations are highly predictive of future schooling attainment, even after accounting for a variety of individual and family characteristics. Moreover, two-year college tuition rates have similar effects on youths' college expectations and outcomes, indicating that it is plausible that college costs have an effect on teenage behavior.

The second factor that affects the relationship between college costs and teenage risky behavior is the extent to which such behavior is harmful to health or human capital; and how the potential losses from such behavior change as individuals obtain (or plan to obtain) additional schooling. The four behaviors I analyze in this paper (heavy drinking, marijuana use, smoking, and sexual partnership) are very different in terms of their potential consequences, so I discuss them in turn. As I argue below, each kind of behavior is plausibly influenced by youths' college prospects, albeit for different reasons.

Alcohol and marijuana use may impair judgment and memory, take time away from productive activities (such as sleeping or doing homework), and carry penal risks. In

addition, these behaviors (especially heavy drinking) are likely to be addictive to some degree. Many papers have documented negative human-capital consequences associated with teenage drug and alcohol use, though such results are not universal in the literature.[6] Youthful alcohol consumption has been linked to a reduction in years of schooling (e.g. Cook and Moore, 1993), a reduction in study hours and GPA in college (e.g. Wolaver, 2002; Williams, Powell, and Wechsler, 2003), lower employment and increased unemployment (e.g. Mullahy and Sindelar, 1993, 1996), delayed graduation (Renna, 2007, 2008), and lower earnings (e.g. Keng and Huffman, 2007). Many papers also find that marijuana and other illegal drugs have harmful effects on human-capital accumulation (e.g. Bray, 2000; Chatterji, 2006b; Roebuck, French, and Dennis, 2004; DeSimone, 2002).

The consequences associated with teenage drug and alcohol use may be more harmful when individuals plan to attend college instead of quitting school during or after high school. For example, suffering poor performance in high school as a result of these activities is likely not as important to youths who have no plans for college afterward. Kenkel and Wang [2001] posit that maintaining a drinking habit is more difficult in a higher-skill job (suggesting the costs of heavy alcohol consumption rise with schooling). Another reason that drug and heavy alcohol use may become less attractive as (planned) human-capital investments rise is due to peer effects associated with these activities. Engagement in risky behavior tends to be lower for higher-educated people in general.[7] If the utility one derives from consumption of these activities is positively related to one's peers' consumption, then individuals who expect to complete more schooling may choose lower levels of risky behavior in their youth.

Although smoking is unlikely to have direct effects on teenagers' health and productivity, it is both addictive and subject to negative ramifications in adulthood. Levine, Gustafson, and Velenchik [1997], van Ours [2004], and Auld [2005] provide evidence that smoking leads to lower wages. Auld [2005] in particular finds that the wage penalty associated with smoking is almost fully concentrated among individuals with at least some college education.

In addition, the expected costs associated with the harmful health effects of smoking may increase when individuals plan to obtain more schooling because they will earn (and likely consume) a larger share of their lifetime resources at later ages. Since the utility one derives from such consumption may depend on one's morbidity (or whether one is alive, in the extreme case), smoking may be less attractive to youths who plan to obtain more education (see Viscusi and Evans, 1990; Becker, 2007). Thus, if the expected costs (to health and/or productivity) rise with educational attainment, forward-looking youths may curb their tobacco use when college becomes more likely. This is a familiar result in forward-looking models of addiction (e.g. Becker and Murphy, 1988 and Gruber and Koszegi, 2001) in which the cost of addictive behavior in the future (usually stated in terms of its price) affects consumption of that behavior in the present. The only difference here is that the cost of addictive behavior is in terms of health or productivity rather than in terms of prices.

Lastly, increasing the number of people with whom one is sexually active raises the probability of contracting a sexually transmitted disease (which may have adverse effects on health, as in the case of smoking) as well as the likelihood of teenage pregnancy. The latter event likely makes college attendance more difficult. Recent papers regarding the effects of

[6]Bray [2005], Dee and Evans [2003], and Chatterji [2006a] are examples of papers that find no significant effects of drinking on school-related outcomes. Furthermore, some papers find evidence of a"drinker's bonus" in earnings (see van Ours, 2004 for one example), a result that is controversial and depends on what is held constant when the relationship between wages and alcohol consumption is estimated (see Cook and Peters, 2005).

[7]Illicit drug use, heavy and binge drinking (but not alcohol use in general), and tobacco use all fall as education level rises, as documented at http://www.oas.samhsa.gov/NSDUH/2k7NSDUH/2k7results.cfm.

teenage childbearing on educational outcomes have arrived at disparate conclusions. Using teenage girls who miscarry as a control group for those who give birth to a child, Hotz, McElroy, and Sanders [2005] find no negative consequences (and sometimes positive consequences) associated with teenage childbearing. Fletcher and Wolfe [2009] build on this same strategy and make use of community-level controls to construct more accurate control groups for teenage mothers; this leads to the finding that teenage childbearing reduces the probability of graduating from high school by five to ten percentage points.

I have provided several reasons why the expected harm (in terms of human or health capital) of the risky behaviors considered in this paper are likely to rise when individuals plan to go to college. This implies that improving college expectations among youths–by lowering college costs, for example–will lead to lower levels of engagement in these behaviors. However, there are arguments that imply just the opposite conclusion.[8] For example, if additional schooling produces higher lifetime income, individuals may be able to spend additional resources on risky activities (Fuchs, 2004). In this case, brighter expectations will be accompanied by more risky behavior. Because theory does not clearly predict the sign of the effect of college prospects on teenage risky behavior, empirical analysis is needed to answer this question. Estimating this effect is the focus of the rest of the paper.

3 Empirical Model

Consider the following empirical model of young adults' engagement in risky behavior as a function of their college prospects:

$$RB_{i,t}=X_{i,t}\alpha+CP_{i,t}\beta+\varepsilon_{i,t}, \tag{1}$$

where $RB_{i,t}$ is risky behavior by individual i in period t, $X_{i,t}$ is a vector of observed individual and state characteristics, $CP_{i,t}$ represents an individual's perceived college prospects, and $\varepsilon_{i,t}$ represents unobserved factors that affect risky behavior. There are two problems associated with determining the causal effect of prospects on behavior using Equation (1). First, $CP_{i,t}$ is difficult to define and may have multiple components, some of which are likely hard to measure. Second, even if prospects are observed, they are likely to be endogenous. That is, prospects are correlated with unobserved factors that affect risky behavior (such as individual time preferences). In addition, causality may run in the opposite direction: from risky-behavior decisions to college expectations.

The endogeneity problem can potentially be solved through the use of instruments–factors that affect college prospects but are not correlated with unobserved components of risky behavior. As explained below, I argue that college tuition in an individual's state of residence is a valid instrument for college prospects. The relationship between prospects and tuition is specified as follows:

$$CP_{i,t}=X_{i,t}\gamma+\delta * \text{tuition}_{i,t}+u_{i,t}, \tag{2}$$

where $tuition_{i,t}$ is college tuition that individual i faces at time t and $u_{i,t}$ represents unobserved components of prospects.[9] I assume that $X_{i,t}$ is exogenous in both Equation (1)

[8] In the Appendix, I consider a two-period model with two consumption goods, one of which lowers the likelihood of survival to the second period. In this context, I discuss why the sign of the effect of tuition on consumption of the harmful good in the first period is likely to be ambiguous.

[9] For ease of exposition, I assume here that $CP_{i,t}$ is a scalar. If $CP_{i,t}$ is a vector, then the model is under-identi ed with just one instrument ($tuition_{i,t}$). However, the direct (reduced-form) effect of tuition on risky behavior, which I discuss below, can still be estimated.

and Equation (2) and that $E(u_{i,t} \mid tuition_{i,t}, X_{i,t}) = 0$, which implies that tuition is uncorrelated with unobserved factors that affect youths' college prospects. Since $CP_{i,t}$ is the only endogenous right-hand side variable in Equation (1), the instrumental variables (IV) assumption is that $Cov(tuition_{i,t}, \varepsilon_{i,t}) = 0$.

I attempt to shed light on the effect of college prospects on teenage risky behavior in two ways. First, even if youths' college prospects are not observed, we can estimate the direct effect of tuition on teenage risky behavior. Combining Equations (1) and (2), the relationship between risky behavior and tuition can be expressed by the following reduced-form equation:

$$RB_{i,t} = X_{i,t}\zeta + \eta * \text{tuition}_{i,t} + v_{i,t}, \tag{3}$$

where $\zeta = \alpha + \gamma * \beta$, $\eta = \delta * \beta$, and $v_{i,t} = u_{i,t} * \beta + \varepsilon_{i,t}$.

I present estimates of η in Section 4.1. η can be interpreted as the causal effect of tuition on risky behavior under the assumptions given above (i.e. $E(u_{i,t} \mid tuition_{i,t}) = 0$ and $Cov(tuition_{i,t}, \varepsilon_{i,t}) = 0$). The latter of these implies that the effect of tuition on risky behavior works through youths' college prospects, broadly defined. This assumption would be violated if, for example, tuition were correlated with unobserved state characteristics in Equation (1) (such as elementary and secondary education programs that discourage risky behavior). As discussed in Section 4.1, all of my models include individual and state controls to mitigate this concern. I also show that the effect of tuition on risky behavior is heavily concentrated among youths who are plausibly closest to the college margin. Thus, it is more likely that tuition itself (and not some unobserved factor) drives differences in risky behavior across states after controlling for observed factors. These results support the claim that tuition is indeed a valid instrument.

An estimate of η is useful to policymakers who wish to know how risky behavior will be affected by changes in tuition policy. However, we may also be interested in how college prospects affect risky behavior more generally. This leads me to my second empirical strategy for analyzing the effect of prospects on behavior. As stated earlier, college prospects are difficult to define and measure, but my data (the NLSY97) contain some measures of youths' subjective schooling expectations. One of these measures, the subjective probability that respondents give of being enrolled in school in one year, can be treated as a proxy for college expectations for youths who are in their last of year of high school (high-school seniors). For these teens, Equation (1) becomes:

$$RB_{i,t} = X_{i,t}\alpha + \beta * \text{oneyear}_{i,t} + \varepsilon_{i,t}, \tag{4}$$

where $oneyear_{i,t}$ is the subjective probability at time t that high-school senior i will be enrolled in school in one year. Due to the fact that $oneyear_{i,t}$ is endogenous (as argued above), I estimate β via instrumental variables (with $tuition_{i,t}$ serving as the excluded instrument) in Section 4.3.

The IV assumption required to interpret β as the causal effect of one-year enrollment prospects on risky behavior is stronger than the corresponding assumption regarding η (from the reduced-form analysis). In the reduced-form case, the assumption is that tuition only affects behavior through college prospects broadly defined, whereas the assumption in the IV analysis is that tuition only affects behavior through one-year enrollment prospects specifically. Put differently, tuition may not only affect youths' perceptions regarding the likelihood of college enrollment in one year, but also expectations regarding college

graduation, living at home while attending college, or working part- or full-time during college (all of which are unobserved). Since these aspects of college prospects may also affect teenage risky behavior (and are indeed subsumed in the reduced-form effect of tuition on risky behavior addressed above), the IV estimator of one-year expectations on behavior may be biased. Nevertheless, I expect that the dominant effect of tuition on behavior is via college enrollment prospects; as a result, I believe it is worthwhile to perform the IV analysis in addition to the reduced-form analysis.

In Section 4.3, I compare IV and OLS estimates of one-year expectations on risky behavior (β). In both cases, I find that higher expectations are associated with lower levels of smoking, heavy drinking, marijuana use and sexual partnership.

4 Empirical Results

My empirical analyses employ the NLSY97 dataset, an ongoing longitudinal survey that includes annual data since 1997 on young adults who were ages 12-16 in 1996. The last wave of data used in this study is from 2006. The NLSY97 began with 8,984 youths including a black and Hispanic oversample. In every year of the survey, respondents are asked detailed questions regarding their use of various substances as well as their sexual behavior. In this study, I focus on youths' smoking, drinking, marijuana use, and sexual activity at age 17 as dependent variables. Summary statistics for these and all other variables used in the analysis are shown in Table 1.

In all of my empirical models, I include the following covariates that are likely to influence youths' risky-behavior decisions: individuals' Armed Forces Qualifying Test (AFQT) scores, parents' education, family income in adolescence, whether both biological parents were living with the youth at age 12, number of siblings, sex, age, race/ethnicity, census region, and whether the youth resides in an urban area. After dropping all observations with at least one missing variable, I am left with 4,913 observations for my main analysis. Table 2 shows how I obtain this sample.[10]

I use the geo-coded version of the NLSY97, which contains respondents' states of residence in each year they are interviewed, to match respondents to public tuition rates in their state. Tuition data by state and year were generously provided by the state of Washington Higher Education Coordinating Board (HECB). These data have been used in other economic studies to estimate the effect of tuition on college outcomes (Kane, 1994; Card and Lemieux, 2000). The measure of college costs I use in this paper is average resident tuition and fees at public community (two-year) colleges in a given state.

There are two reasons for focusing on two-year tuition as a proxy for college costs. First, previous work has found that the own-price elasticity of enrollment at these institutions is higher than it is at four-year institutions (Rouse, 1994; Kane, 1995; Cameron and Heckman, 2001). For example, using NLSY79 data, Cameron and Heckman [2001] find that total enrollment at two and four-year colleges declines significantly when two-year tuition rates rise, but total enrollment is practically unaffected by changes in four-year rates. Second, two- and four-year tuition rates at public institutions are highly correlated across states. Since the HECB tuition data varies only at the state level, including both two- and four-year rates in my regressions introduces a multicollinearity issue. Thus, I focus on two-year college tuition rates, recognizing that the measured effect of two-year tuition on outcomes may be a combination of two- and four-year price effects.

[10]Because a relatively large number of respondents have missing AFQT score information, I estimated my empirical models without AFQT score and found results that were similar to those presented in the paper.

Tuition rates are not determined randomly across states. One concern with my empirical approach is that tuition may appear to have an effect on behavior when in actuality it proxies for one or more unobserved factors that also vary at the state level. To control for differences in states that may be correlated with two-year tuition rates, I also include the median income, unemployment rate, per-pupil spending on elementary and secondary education, cigarette tax, and beer tax in an individual's state in all of the regressions presented in the paper.[11]

4.1 The effect of tuition on risky behavior

I begin by presenting my baseline empirical results regarding the effect of two-year tuition rates (denoted in thousands of constant 2007 dollars) on various teenage risky behaviors in Table 3.[12] These results correspond to the estimation of the reduced form model in Equation (3). In Table 3, and throughout the paper, I focus on the following four dependent variables: the number of sexual partners the youth had in the year prior to being interviewed, the number of days the youth smoked at least one cigarette in the previous month, the number of days the youth had at least five alcoholic drinks in the previous month, and the number of days the youth smoked marijuana in the previous month.[13] All behaviors are analyzed in the year in which youths turn 17, and all regressions are performed using OLS with clustering of standard errors at the state level.[14]

Table 3 shows that the effect of tuition on behavior is positive in every instance and fails to achieve significance at the 5% level only once (in the case of heavy drinking). Point estimates show that a $1,000 increase in two-year tuition (just more than a 50% difference at the mean) leads to an increase of just under one-third in sexual partners (a 26% increase at the mean), an increase in smoking days of slightly less than one day (a 14% change), an increase in heavy-drinking days of almost one-tenth of a day (though this effect is not significant at conventional levels), and an increase in marijuana days of just more than four-tenths of a day (a 23% change). A broad look at other covariates suggests that girls, minorities, youths from two-parent homes, and high-achieving youths (in terms of AFQT score) engage in less risky behavior. Family income has little effect on behavior once other factors are accounted for.

As discussed in Section 1, the validity of the tuition results hinges on whether two-year state tuition rates are uncorrelated with unobserved factors that determine teenage risky behavior. Low-tuition states may tend to be different from high-tuition ones in other ways that also affect youthful involvement in risky activities. Because there is relatively little longitudinal variation in tuition rates over the short period covered by my data, I cannot address concerns

[11]These data come from the following sources:
Median income: http://www.census.gov/did/www/saipe/county.html
Unemployment rate: http://www.census.gov/prod/www/statistical-abstract-us.html
Educational spending: http://nces.ed.gov/programs/digest/2007menu_tables.asp
Excise taxes: http://www.impacteen.org/tobaccodata.htm, http://www.taxfoundation.org/publications/show/245.html
Adding the percentage of the population with a college degree in a given state as a control produced nearly identical results to those presented below.

[12]I also tried de ating tuition by average income at the state level and found very similar effects on risky behavior.

[13]I performed a variety of robustness checks with respect to the de nitions of the dependent variables. For example, to analyze the effect of tuition on the extensive margin of risky behavior only, I ran probits in which each dependent variable was equal to one for anything other than a value of zero in its respective dependent variable used in Table 3 (and zero otherwise). The effect of tuition in these regressions was uniformly positive (as in Table 3), but coefficients were slightly less precisely estimated. Owing to the countable nature of the dependent variables as they are defined in Table 3, I also performed Poisson regressions for all four variables; marginal effects in these models (evaluated at the mean) were always very similar to but slightly smaller than their respective OLS point estimates.

[14]For all results presented in the paper, standard errors that are not adjusted for clustering at the state level are very similar to but generally slightly larger than those presented in the paper. 17 is the earliest year of age for which I have data on all five NLSY97 cohorts.

regarding the correlation between tuition and unobserved (time-invariant) state characteristics by including state xed-effects in my models.[15]

To provide evidence that tuition is truly responsible for differences in risky behavior, I utilize the notion that, due to the discreteness of the college decision, the effect of tuition on behavior ought to be largest for those youths near the margin of that decision. Intuitively, tuition should have a smaller impact on those individuals who will attend college with near certainty (at observed prices) as well as those individuals who have little intention of pursuing a college education. Unfortunately, proximity to the college margin is not directly observable. However, because I observe individuals both before and after college outcomes are realized, I can use teenagers' observable characteristics to predict the occurrence of schooling outcomes that are realized later in life. I hypothesize that individuals who are relatively likely to eventually attend two-year college (without considering the effect of tuition) are more likely to be near the margin of the college decision on average.

To begin, I use individuals' characteristics at age 17, which comprise all covariates shown in Table 3 except two-year tuition, in a multinomial logit model with three dependent outcomes realized later in young adulthood: having never enrolled in college, having enrolled at a two-year college (but never at a four-year institution), and having enrolled at a four-year institution.[16] The point estimates from this model are then used to predict each youth's likelihood of realizing each of the three college-related outcomes. I divide youths into three equally sized groups in the following manner: first, those whose propensities to attend two-year college are in the top third of all youths are separated into the"High 2" group. Youths in this category would seem to be especially susceptible to two-year tuition rates in making their post-secondary schooling decisions, which should lead to tuition having a relatively large effect on their behavior. The second group ("Low 2, High 4") comprises the half of all remaining youths whose propensities to attend four-year college are highest (that is, above the median propensity in the remaining sample). Finally, the last group ("Low 2, Low 4") is made up of all remaining youths.

After splitting the sample into three college types, I estimate the reduced-form model in Equation (3) for each college type separately. The goal of this exercise is to determine whether the effect of two-year tuition on teenage risky behavior is heterogeneous in the likelihood of two-year college attendance. Rather than report the full set of model estimates for each group (as I did with the full sample in Table 3), I graph the point estimates and confidence intervals associated with the effect of tuition on each risky behavior for each college type in Figure 1.[17]

The evidence in Figure 1 is broadly consistent with the notion that tuition has the largest effect on youths who are most likely to attend community college. Point estimates for the"High 2" type are positive and significant at the 5% level for every behavior considered. For this group, a $1,000 increase in two-year tuition raises the number of sexual partners in the past year by 0.67 partners, the number of smoking days in the past month by almost two days, the number of heavy-drinking days in the past month by 0.17 days, and the number of marijuana days in the past month by 0.80 days. For youths who are relatively likely to attend four-year schools (the"Low 2, High 4" group), tuition effects are generally weak and not significantly different from zero (the exception is smoking days, for which the point estimate is actually negative and significant). The hypothesis that tuition effects are the same

[15]For example, a regression of two-year tuition on state and year dummies produces an R-squared of 0.98. Interestingly, Kane [1995] finds that including state xed effects in his models reduces the impact of two-year college tuition on enrollment only slightly.
[16]The results of this regression are not presented in the paper but are available upon request. In the last year of my sample (2006) youths were between 22 and 26 years old, which is when their college outcomes are measured.
[17]The full set of results from the regressions for each college type separately are available upon request.

for the“High 2” and“Low 2, High 4” groups is rejected at the 5% level for all four risky behaviors.

Tuition point estimates for the“Low 2, Low 4” types are positive but smaller than or roughly equal to the corresponding estimates for the“High 2” types. Although differences in tuition coefficients across these two groups are not statistically significant at conventional levels, point estimates for the“High 2” group are roughly five times larger than those for the“Low 2, Low 4” group in both the cases of sexual partners and heavy-drinking days.

Youths whose teenage characteristics correlate with future two-year college attendance are more likely to be near the college-decision margin than other youths. The results in Figure 1 provide evidence that the effect of tuition on teenage risky behavior is most powerful for this set of individuals. Thus, if tuition is merely a proxy for some other state-varying factor that explains the correlation between tuition and risky behavior, that factor should also tend to disproportionately affect youths near the college margin. This reduces the set of competing explanations for my results, and, in so doing, lends confidence in my identification strategy. The next section shows that in addition to affecting youthful risky behaviors, two-year tuition rates affect teens’ subjective expectations over future college outcomes.

4.2 The effect of tuition on subjective college expectations

In this section, I provide direct evidence that lower college costs raise youths’ prospects regarding future college attendance or completion. The NLSY97 obtains data on the subjective probabilities youths give themselves of realizing various future schooling outcomes. One of these probabilities is the percentage chance a youth will be enrolled in a regular school one year from the time of their interview.[18] Examining the relationship between one-year schooling expectations and my measure of college tuition provides two additional ways to examine the validity of the hypothesis that college costs affect teenage risky behavior. First, if tuition affects risky behavior via college prospects, then it ought to affect the one-year enrollment expectations of those youths who are either in their last year of high school or have recently completed a high-school diploma (or G.E.D.). For the purposes of this paper, I call these youths high-school seniors.[19]

Second, if tuition is not merely proxying for other differences across low- and high-tuition states that influence teenagers’ college expectations, then the effect of tuition on one-year enrollment expectations should be smaller for non-seniors (those who have not yet completed the 11th grade) than it is for seniors. It is true that tuition may affect non-seniors’ expectations regarding future high-school enrollment, since one of the benefits of a diploma or G.E.D. is the option of college attendance in the future. However, this effect is likely to be small relative to the direct effect on seniors’ college expectations. Thus, observing a difference in the effect of tuition on expectations between seniors and non-seniors would be consistent with my identification strategy.

As seen in Table 1, the mean chance of being enrolled in school in one year is roughly 83 percent for high-school seniors. However, only 56 percent of seniors are actually enrolled in school one year after their expectations were measured. This is consistent with the literature that claims that teenagers tend to“overshoot” when assessing the likelihood of various college outcomes (Reynolds and Pemberton, 2001; Walker, 2001).[20] Nevertheless, seniors’

[18]This question was asked in two survey years, 1997 and 2000. The other two subjective expectations elicited at various points in the survey are the percentage chance of being enrolled in school in five years and the percentage chance of obtaining a four-year college degree by age 30. I focus on one-year prospects over these two longer-term expectations for reasons discussed below.

[19]Specifically, high-school seniors are defined as youths who are 17-18 years old and have completed at least their junior year of high school but have not yet enrolled in college. Roughly 97 percent of these youths are either in their senior year of high school or have recently received their high-school diploma or GED.

expectations are strongly predictive of future college outcomes. In results that are available upon request, I find that after controlling for the full set of individual covariates shown in Table 3, a one percentage-point increase in the subjective likelihood of one-year enrollment is associated with an increase of more than one-half of a percentage point in the objective probability of being enrolled after one year (which effect is statistically significant at the 1% level).

I present results on the effect of tuition on teenagers' one-year schooling expectations in Table 4. These results correspond to the estimation of Equation (2) in Section 3. In what follows, I analyze those youths whose one-year expectations were elicited in their seventeenth year (1,779 observations, which is a subset of the 4,913 observations used in Table 3). These youths are then further divided into high-school seniors (582 observations) and non-seniors (1,197 observations). For each of these groups, I analyze the effect of tuition on the subjective percentage chance of being in school in one year as well as a binary variable that is equal to one if the youth was in fact enrolled in school one year later (and zero otherwise). All regressions are again performed using OLS with state-level clustering of standard errors.

Table 4 shows that for high-school seniors, a $1,000 increase in tuition is associated with a reduction in expectations of around 5.7 percentage points (roughly a seven percent difference at the mean).[21] This point estimate is more than three times as large as the tuition effect for non-seniors, which is not significantly different from zero. In addition, the difference between the tuition coefficients for seniors and non-seniors is statistically significant at the 10% level. When actual college enrollment after one year is the dependent variable, a similar pattern arises, though the difference in tuition effects for seniors and non-seniors is even more pronounced (a $1,000 increase in tuition is associated with a reduction in the probability of being enrolled next year of around 7.7 percentage points for seniors while the effect for non-seniors is small and insignificant).

These results provide evidence that the effect of tuition on college enrollment is incorporated into teenagers' short-term college expectations. This serves to support the hypothesis that the correlation between two-year tuition in teens' states of residence and their risky behavior works through the effect of tuition on college prospects. In the next section, I make the additional assumption that the effect of college prospects on teenage risky behavior is fully captured by the effect of one-year enrollment prospects on behavior. This allows me to estimate the effect of prospects on behavior using an instrumental-variables (IV) technique.

4.3 The effect of college expectations on risky behavior

In this section, I estimate the effect of one-year enrollment expectations on teenage risky behavior (i.e. Equation (4) in Section 3). College prospects are likely to be endogenous in a

[20] I conduct a formal test of rational expectations by regressing the binary outcome (which is equal to one if the youth is enrolled one year later and zero otherwise) on one-year expectation probabilities and a constant. The joint test that the constant is zero and the expectation coefficient is one is easily rejected at conventional levels, so the rational-expectation hypothesis is rejected (see Bernheim and Levin, 1989).

[21] I also analyzed the effect of tuition on the other two expectations elicited in the survey (i.e. the subjective probability of obtaining a four-year degree and the subjective probability of being enrolled in school in five years) for all high-school aged youths. The effect of tuition on four-year degree expectations is small and insignificant. This is consistent with the finding in the literature (e.g. Rouse, 1994; Kane, 1995; Cameron and Heckman, 2001) that four-year college outcomes tend to be relatively inelastic with respect to tuition rates (indeed, I also find that the effect of tuition on four-year enrollment and completion is small and insignificant). The effect of tuition on five-year enrollment expectations is relatively small (a $1,000 increase in tuition leads to 3% reduction in expectations at the mean) but marginally significant at the 5% level. I choose to focus on one-year expectations over five year ones out of necessity (i.e. I have only one instrument–college tuition–to estimate the effect of expectations on risky behavior) and because a larger percentage of one-year enrollment outcomes are at two-year colleges (28% compared to 22% of five-year outcomes).

regression of teenage risky behavior for two reasons. First, causality may also run from risky behavior to youths' expectations of the future. Second, prospects are probably correlated with important unobservables (such as teens' risk and time preferences). I have argued that two-year state tuition is unlikely to be correlated with unobserved factors (at the state and individual level) that contribute to risky behavior among youths. Furthermore, in Table 4, I show that tuition has a significant negative effect (at the 1% level) on high-school seniors' enrollment prospects (after netting out other covariates). Thus, I estimate the effect of one-year enrollment prospects on seniors' engagement in the same four risky behaviors considered thus far via Two-Stage Least Squares (TSLS), with community college tuition rates serving as an instrument for prospects.[22] The results are reported in Table 5.

To begin, I consider whether my instrument (tuition) is weak in the sense that it may lead to poor inference on TSLS parameters. Stock and Yogo [2002] show that in order to guarantee that the size of a nominal 5% t-test on TSLS parameters is no greater than 15%, the first-stage F-statistic on a single excluded instrument should be at least 8.96. The corresponding critical value for ensuring that the size of such a test is no more than 20% is 6.66. The F-statistic on tuition in my first-stage regression (of one-year expectations on two-year tuition rates; see Section 4.2) falls in between these values at 7.32. This finding suggests caution in interpreting my TSLS estimates (discussed below), which are generally significant at the 5 or 10% level.

Because my models of risky behavior are just-identi ed, the TSLS estimator of the effect of one-year prospects on a given behavior is simply the ratio of the reduced-form coefficient (from a regression of the behavior on tuition) to the first-stage coefficient (from a regression of one-year expectations on tuition). As discussed in Section 4.2, I have data on the one-year enrollment expectations of 582 high-school seniors from my original sample. This sample is used to estimate the first stage. However, since not all seniors are asked to provide their expectations, I can calculate reduced-form effects using all 2,154 seniors from my full regression sample. Taking the sub-sample of seniors who provided their expectations as random (since this only depends on whether they were seniors in 1997 or 2000 instead of the other years), I calculate TSLS point estimates of one-year expectations on each behavior by simply dividing reduced-form coefficients of tuition on each behavior by the first-stage coefficient of tuition on expectations. In doing so, I employ the same set of right-hand side control variables I have used throughout the paper.

I bootstrap the procedure just described 10,000 times in order to do inference. Table 5 reports TSLS estimates of one-year expectations on each behavior as well as associated 95% confidence intervals. For comparison, I also report OLS estimates of the effect of one-year enrollment expectations on each risky behavior (and their respective 95% confidence intervals) in Table 5.

All OLS and TSLS estimates of one-year expectations on risky behavior are negative. OLS estimates are significant at the 5% level in the cases of sex partners, smoking days, and marijuana days, but not in the case of heavy-drinking days. TSLS estimates are consistently larger (in absolute value) than their OLS counterparts, particularly in the case of heavy-drinking days. The TSLS effect of expectations on heavy-drinking days implies that a 10 percentage-point increase in one-year enrollment expectations (roughly a 12% increase at the mean) reduces heavy-drinking days in the past month by a little less than one-half of one day, which is a 48% difference at the mean. The corresponding decreases in sex partners,

[22]Clark, Kim, Poulton, and Milne [2006] estimate the effect of low expectations on hazardous consumption, but their proxies for expectations are not subjective probabilities over well-defined events (e.g. college) as contained in the NLSY97, and they do not employ a similar instrumental-variables strategy to the one I use here.

smoking days, and marijuana days are 58%, 17%, and 47%, respectively. 95% confidence intervals for TSLS estimates do not overlap zero in the cases of sexual partners and heavy-drinking days, and the 90% confidence interval associated with marijuana days (not reported) does not include zero.

The TSLS coefficients of expectations on teenage risky behavior are large (but their associated confidence intervals are also relatively large). One explanation for why TSLS estimates are bigger than OLS ones is that TSLS estimates represent local average treatment effects (Angrist, Imbens, and Rubin, 1996). That is, since tuition does not affect the prospects or decisions of all youths (as demonstrated in Figure 1), IV estimates re ect a weighted average of effects for those who are induced to change their expectations when college tuition changes. Figure 1 provides evidence that these youths do experience large changes in their behavior when tuition changes.

Though both OLS and IV estimates are subject to some potential weaknesses, they consistently suggest that manipulating college expectations in late adolescence can have significant effects on risky behavior. I have provided evidence that tuition is one means whereby policymakers can affect teenagers' college prospects. Future work is needed to uncover other mechanisms by which educational expectations can be altered to change behavior.

5 Conclusions

Controlling for a rich set of individual and state characteristics, teens living in states in which two-year college is relatively inexpensive engage in lower levels of sexual activity, smoking, heavy drinking, and marijuana use. The major assumption required to interpret these results as causal effects of college costs on teenage behavior is that tuition is only correlated with behavior through its effect on teens' college prospects. The validity of this assumption is supported by two additional findings. First, youths' subjective short-term college expectations, like their eventual college outcomes, are negatively affected by community college tuition rates. This shows that the behavioral effects mentioned above are indeed plausible. Second, the fact that community-college tuition does not affect all teens equally, but rather has the largest effect on youths who are plausibly closest to the college enrollment margin, casts doubt on whether the results can be explained by some unobserved factor that varies at the state level and is correlated with tuition.

My results have implications for the debate regarding the mechanisms by which schooling and risky health practices are related. Like Farrell and Fuchs [1986 [1982]], I find that teenagers who will eventually complete more schooling engage in better health practices; however, I conclude that this is an optimal response to differences in their college expectations rather than differences in their time preferences or some other "third factor." In short, I find that *anticipated* schooling has an effect on behavior above and beyond any effect that *realized* schooling has on behavior.

For policymakers wishing to discourage teenage drug use and risky sexual activity, my results imply that tuition policy may be an effective way to do so. However, this policy is likely to be costly to state or federal governments. There were approximately 6.3 million students enrolled in public two-year colleges in 2007 (Digest of Education Statistics, 2008). Any across-the-board subsidy to two-year enrollment necessitates a large transfer to inframarginal enrollees.

Other policies that influence teenagers' college expectations may provide less expensive ways of achieving a reduction in teenage risky behavior. The cost-effectiveness of such

policies is likely to depend on the degree to which they target youths near the college-decision margin. This is a topic for future study.

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6 Appendix

I outline a simple two-period model with forward-looking agents to illustrate how the cost of college (tuition) may affect risky behavior among young adults.[23] The first period is denoted as“youth,” and the second period is denoted as“adulthood.” Lifetime utility is given by:

$$V=U(C_1,X_1)+\beta Q(C_1)\,U(C_2,X_2), \tag{5}$$

where U is increasing and concave in each argument. C_j is a harmful (i.e.“risky”) consumption good in period j (j = 1, 2), X_j is a regular consumption good in period j (j = 1, 2), β is the discount factor, and Q is the probability of surviving into the second period (so that $0 < Q \leq 1$). I model the probability of survival Q as decreasing in the consumption of C_1 such that $Q = Q(C_1)$ and $Q'(C_1) < 0$.[24] Though this accurately captures a significant part of the effect of cigarette smoking on health, it would not immediately seem to capture the main health effects of binge drinking, marijuana use, and sexual partnership. However, if these latter three behaviors jeopardize opportunities such as college enrollment, certain career choices, job promotions, etc., then for my purposes the effect of these risky behaviors on utility works similarly to a reduction in the probability of survival, $Q(C_1)$, in Equation (5).

For simplicity, the price of C_j is assumed to be the same in both periods and is denoted by p. I assume the price of X_j is also the same in each period, and it is normalized to one. Aside from consumption, youths invest in human capital (K) at the tuition price of τ. K affects wages in adulthood according to the function $W(K)$, where $W'(K) > 0$ and $W''(K) < 0$. I assume agents can buy annuities at an actuarially fair price, so the lifetime budget constraint is given by:

$$pC_1+X_1+\tau K+QR^{-1}pC_2+QR^{-1}X_2=Y+QR^{-1}W(K), \tag{6}$$

where $R = 1 + r$, r is the interest rate, and Y is the youth’s endowment. In what follows, I let $\beta R = 1$.

I focus on interior solutions to the individual’s problem. The first-order condition associated with C_1 can be written as:

[23] I thank Michael Grossman for sharing his notes on this framework with me.

[24] It is often assumed in the substance use literature that $Q''(C_1) < 0$, but I do not require that assumption here.

$$\frac{\partial U}{\partial C_1}=\lambda\left[p-\beta Q'\left(C_1^*\right)*\left(\frac{U\left(C_2^*,X_2^*\right)}{\lambda}-pC_2^*-X_2^*+W\left(K^*\right)\right)\right], \tag{7}$$

where λ is the Lagrange multiplier. The right-hand side of Equation (7) represents the fullprice of C_1, which contains the monetary price p as well as the potentional loss of adult utility due to the reduced probability of surviving into the second period. A sufficient condition for the latter to be positive is that $U(C_j, X_j)$ is homogeneous of degree $d < 1$.[25] If this is the case, then Equation (7) becomes:

$$\frac{\partial U}{\partial C_1}=\lambda\left[p-\beta Q'\left(C_1^*\right)*\left(\left(\frac{1}{d}-1\right)\left(pC_2^*+X_2^*\right)+W\left(K^*\right)\right)\right]. \tag{8}$$

26

The optimal level of C_1, C_1*, is in part a function of τ. If a reduction in τ leads youths to invest in more human capital K (as is consistent with the literature on the elasticity of college demand with respect to two-year tuition), then the individual's wage W in the second period increases (and, as a result, so do her lifetime resources). In part, this increases the cost of C_1 (as highlighted in Equation (8)), as the utility one could enjoy in adulthood (were she to survive) increases. At the same time, however, both a reduction in τ and an increase in K raise lifetime income, and some of that increase may be used to consume more C_1 (if it is indeed a normal good). Thus, the intuition of this simple model suggests that the effect of tuition on youthful risky behavior $\left(\frac{\partial C_1^*}{\partial \tau}\right)$ is ambiguous in sign, which underscores the value of estimating this relationship empirically.

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[25]If $U(C_j, X_j)$ is homogeneous of degree d, then $U\left(C_j,X_j\right)=\frac{1}{d}\left(U_cC_j+U_xX_j\right)$.

[26]Here we also utilize the fact that $U_{X_2}=\lambda$ and $\frac{U_{C_2}}{U_{X_2}}=p$.

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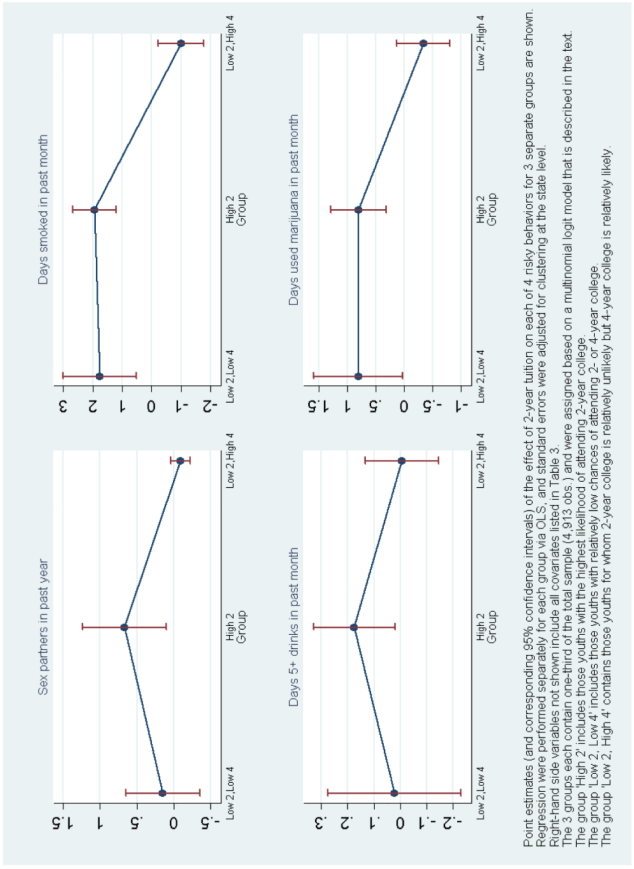

Figure 1.
The effect of 2-year college tuition on risky behavior at age 17, by likelihood of college attendance

Table 1

Summary statistics

Variable	Obs	Mean	Std. Dev.
Sexually active in past year	4913	0.40	0.49
Number of sexual partners in past year	4913	1.18	4.40
Smoked in past month	4913	0.32	0.46
Days smoked in past month	4913	6.17	11.34
Had 5+ alcoholic drinks in past month	4913	0.23	0.42
Days had 5+ drinks in past month	4913	0.90	2.53
Used marijuana in past month	4913	0.18	0.38
Days used marijuana in past month	4913	1.79	5.91
Average annual state 2-year college tuition ($1000's)	4913	1.97	0.83
State median income ($1000's)	4913	50.36	6.03
State unemployment rate (%)	4913	4.39	0.93
Educational expenditure per pupil ($1000's)	4913	8.69	1.70
State cigarette tax (cents per pack)	4913	52.06	33.42
State beer tax (cents per gallon)	4913	24.67	17.18
Number of siblings	4913	2.07	1.52
Age 17 in 1997	4913	0.19	0.39
Age 17 in 1998	4913	0.20	0.40
Age 17 in 1999	4913	0.20	0.40
Age 17 in 2000	4913	0.19	0.40
Age 17 in 2001	4913	0.21	0.41
Female	4913	0.49	0.50
Black	4913	0.13	0.33
Hispanic	4913	0.11	0.31
Mother less than high school diploma	4913	0.14	0.35
Mother high school graduate	4913	0.36	0.48
Mother some college or more	4913	0.49	0.50
Father less than high school diploma	4913	0.18	0.38
Father high school graduate	4913	0.37	0.48
Father some college or more	4913	0.45	0.50
Annual family income in adolescence ($1000's)	4913	71.62	60.51
At least one biological parent absent at age 12	4913	0.45	0.50
AFQT score (percentile)	4913	53.05	28.74
Urban residence	4913	0.69	0.46
Northeast region	4913	0.18	0.38
Midwest region	4913	0.28	0.45
South region	4913	0.33	0.47
West region	4913	0.20	0.40
Subjective percentage chance in school in one year (High-	582	82.92	30.27

Variable	Obs	Mean	Std. Dev.
school seniors only)			
Enrolled in school one year after expectations given (High-school seniors only)	559	0.56	0.50

All monetary figures are denoted in 2007 dollars. All observations are weighted by their 1997 (Round 1) sampling weights.

Table 2

Description of samples used in the paper

Path to full regression sample	
Total respondents in NLSY97	8,984
Of these, those with non-missing AFQT score	7,093
Of these, those with non-missing information on sexual partnership	6,391
Of these, those with non-missing information on drug and alcohol use	6,347
Of these, those with non-missing paternal education	5,953
Of these, those with non-missing maternal education	5,925
Of these, those with non-missing parental living arrangement	5,378
Of these, those with non-missing sibling information	5,223
Of these, those with non-missing parental income	5,140
Of these, those with non-missing state of residence	5,068
Of these, those with non-missing urban status	4,913

Paths to supplementary regression samples	
Full regression sample	4,913
Of these, those who are high school seniors	2,154
Of these, those who provided 1-year enrollment expectations (1997 and 2000 only)	582
Full regression sample	4,913
Of these, those who are high school juniors or less	2,592
Of these, those who provided 1-year enrollment expectations (1997 and 2000 only)	1,197

Table 3

The effect of 2-year college tuition on risky behavior at age 17

	Sex partners in past year	Days smoked in past month	Days 5+ drinks in past month	Days marijuana in past month
2-year college tuition ($1000's)	0.308** (0.117)	0.890*** (0.303)	0.080 (0.060)	0.407** (0.178)
Number of siblings	−0.004 (0.038)	0.016 (0.091)	−0.022 (0.016)	−0.115*** (0.042)
Female	−0.852*** (0.134)	−0.303 (0.296)	−0.479*** (0.070)	−1.231*** (0.163)
Black	0.326 (0.209)	−6.463*** (0.515)	−0.864*** (0.087)	−0.637** (0.279)
Hispanic	0.218 (0.248)	−3.766*** (0.456)	−0.383*** (0.119)	−0.721** (0.310)
Mother high school graduate	−0.521* (0.309)	−0.070 (0.581)	−0.066 (0.101)	−0.219 (0.254)
Mother some college or more	−0.532 (0.354)	−0.062 (0.577)	0.067 (0.134)	0.038 (0.259)
Father high school graduate	−0.218 (0.208)	−0.821 (0.539)	−0.037 (0.087)	−0.461** (0.206)
Father some college or more	−0.271 (0.244)	−2.092*** (0.595)	−0.136 (0.093)	−0.624** (0.238)
2nd family income quartile	0.349 (0.226)	0.544 (0.586)	−0.018 (0.079)	0.305 (0.214)
3rd family income quartile	0.195 (0.265)	0.508 (0.483)	−0.028 (0.097)	0.184 (0.296)
4th (high) family income quartile	−0.132 (0.262)	0.141 (0.591)	0.013 (0.117)	0.294 (0.282)
At least one bio. parent absent	0.291* (0.170)	2.222*** (0.417)	0.080 (0.081)	0.378* (0.195)
2nd AFQT score quartile	−0.077 (0.321)	−0.407 (0.355)	0.010 (0.128)	0.149 (0.267)
3rd AFQT score quartile	−0.531** (0.233)	−1.967*** (0.505)	−0.176* (0.103)	−0.191 (0.304)
4th (high) AFQT score quartile	−0.762*** (0.259)	−3.398*** (0.582)	−0.432*** (0.113)	−0.890*** (0.289)
Urban residence	0.113 (0.158)	0.583* (0.342)	0.027 (0.085)	0.475** (0.211)
Constant	1.687 (1.359)	11.458*** (2.197)	1.045* (0.530)	2.980** (1.250)
Year dummies	yes	yes	yes	yes
Region dummies	yes	yes	yes	yes
Additional state characteristics	yes	yes	yes	yes
Observations	4913	4913	4913	4913
R-squared	0.031	0.076	0.034	0.031

*** p<0.01,

** p<0.05,

*p<0.1.

All regressions were performed via OLS. Robust standard errors (in parentheses) are adjusted for clustering at the state level. Additional state characteristics include the median household income, unemployment rate, expenditure per pupil in fall enrollment in public elementary and secondary schools, cigarette tax, and beer tax in the youth's state of residence.

Table 4

The effect of 2-year college tuition on subjective schooling expectations and objective outcomes

	Percent chance in school in 1 year		Enrolled in school 1 year later	
	Non-seniors	Seniors	Non-seniors	Seniors
2-year college tuition ($1000's)	−1.760 (1.197)	−5.680** (2.116)	−0.362 (2.455)	−7.733** (3.284)
Number of siblings	−0.587 (0.830)	−1.514* (0.856)	−1.595** (0.696)	−2.613** (1.096)
Female	1.483 (1.587)	11.785*** (1.762)	0.935 (3.229)	9.069*** (3.029)
Black	4.076** (2.006)	2.360 (3.925)	5.273 (4.877)	15.545** (6.009)
Hispanic	3.027 (2.435)	4.027 (5.325)	2.957 (4.813)	2.976 (5.872)
Mother high school graduate	3.285 (2.632)	6.839 (4.477)	6.043 (4.974)	10.906* (6.326)
Mother some college or more	4.481 (2.846)	7.871* (4.481)	5.358 (5.440)	22.927*** (6.814)
Father high school graduate	5.436** (2.142)	4.101 (3.857)	6.032 (3.777)	−8.578 (6.215)
Father some college or more	7.423*** (2.570)	5.534 (5.135)	11.149** (4.218)	1.595 (8.126)
2nd family income quartile	6.366** (3.049)	−8.831* (4.373)	3.221 (5.122)	−13.935* (7.435)
3rd family income quartile	8.430*** (2.397)	−13.177*** (4.751)	4.568 (4.988)	−16.007* (9.213)
4th (high) family income quartile	6.087** (2.728)	−3.436 (3.622)	6.810 (4.756)	−9.087 (7.610)
At least one bio. parent absent	−3.832*** (1.368)	−3.414 (3.318)	−11.764*** (2.587)	−10.246 (6.186)
2nd AFQT score quartile	1.615 (2.296)	13.357*** (4.790)	−2.809 (4.225)	18.410*** (6.440)
3rd AFQT score quartile	3.152 (2.379)	14.760*** (3.889)	−1.552 (4.543)	22.985*** (7.481)
4th (high) AFQT score quartile	7.817*** (1.821)	19.417*** (5.496)	9.808** (4.615)	30.812*** (6.073)
Urban residence	−2.319 (1.923)	6.481** (3.016)	−3.374 (3.178)	6.886* (4.076)
Constant	64.742*** (8.839)	48.692** (20.575)	52.495*** (17.869)	11.989 (30.729)
Year dummies	yes	yes	yes	yes
Region dummies	yes	yes	yes	yes
Additional state characteristics	yes	yes	yes	yes
Observations	1197	582	1157	559
R-squared	0.112	0.182	0.087	0.194

*** p<0.01,

** p<0.05,

*p<0.1.

All regressions were performed via OLS. Robust standard errors (in parentheses) are adjusted for clustering at the state level. Additional state characteristics include the median household income, unemployment rate, expenditure per pupil in fall enrollment in public elementary and secondary schools, cigarette tax, and beer tax in the youth's state of residence.

Table 5

The effect of subjective one-year enrollment expectations on risky behavior among high-school seniors

	Sex partners in past year		Days smoked in past month	
	OLS	**IV**	**OLS**	**IV**
Percent chance in school in 1 year	−0.010	−0.059	−0.054	−0.086
95% confidence interval	[−.019, −.002]	[−.202, −.004]	[−.089, −.022]	[−.350, .091]

	Days 5+ drinks in past month		Days marijuana in past month	
	OLS	**IV**	**OLS**	**IV**
Percent chance in school in 1 year	−0.002	−0.044	−0.018	−0.073
95% confidence interval	[−.010, .004]	[−.144, −.007]	[−.037, −.001]	[−.236, .011]

Confidence intervals for OLS estimates and IV estimates are derived from a non-parametric bootstrapping routine (see text for more details). Right-hand side variables not shown include all covariates listed in Table 3. 582 observations were used in the OLS regressions as well as the first-stage regressions of expectations on 2-year college tuition. 2,154 observations were used in the reduced-form regressions of each risky behavior on 2-year college tuition.