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.

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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. 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

[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.

levels of engagement in risky health behaviors. The implications of this hypothesis differ from those of the "third factors" theory of Farrell and Fuchs [1986 [1982]] and the "causal schooling" theory initiated by Grossman [1972]. My hypothesis predicts that factors that change youths' schooling outcomes affect behavior before that schooling ever takes place, inasmuch as those factors are incorporated into youths' expectations. 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, 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. 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 marginal expected harm of such behavior is larger when individuals plan to attend college. 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 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 more likely to be two-year college enrollees. I argue that these youths are more likely to be near the margin of the college decision. 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. Tuition is not the only means by which policy-makers can change young adults' college expectations. For example, financial investments in primary or secondary education may have a similar effect on 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 a cost-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, NLSY97 teens' expectations are highly predictive of future schooling attainment, even after accounting for a variety of individual and family characteristics. As I discuss later in the paper, 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.[4]. 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,

[4]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).

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, Kenkel and Wang [2001] posit that maintaining an alcohol addiction is more difficult in a higher-skill job (suggesting the costs of heavy alcohol consumption may 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.[5] 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

[5]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.

increase when individuals plan to obtain more schooling because that decision effectively delays their earnings profiles. If markets are imperfect (due to borrowing constraints at the time educational investments are made, for example), then better-educated individuals may also 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 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.[6] 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. For example, if additional schooling produces higher lifetime income, individuals may choose 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:

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

where $RB_{i,t}$ is risky behavior by individual i in period t, $X_{i,t}$ is a vector of observed characteristics, $CP_{i,t}$ is a vector of components that make up an individual's college prospects,

[6] In the Appendix, I consider a simple model with no uncertainty regarding the detrimental effects of risky behavior. In this context, I show that the effect of college costs on youthful risky behavior depends (not surprisingly) on whether the marginal harm of such behavior is larger or smaller when individuals attend college.

$U_{i,t}$ represents unobserved factors that affect risky behavior, and $\varepsilon_{i,t}$ is random noise. There are two problems with attempting to derive the causal effect of prospects on behavior (β) via an OLS regression of behavior on prospects (controlling for observables). First, college prospects are difficult to measure and not generally observed by the econometrician. 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, there is also likely to be causality running in the opposite direction: from risky-behavior decisions to college expectations.

For the time being, assume that all components of a youth's college prospects are known to the econometrician. Then the second problem can potentially be solved through the use of instruments, i.e. factors that affect college prospects without being correlated with unobserved components of teenage 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 first-stage equations (one for each component of college prospects) relating college prospects to tuition are then:

$$CP_{i,j,t} = X_{i,t}\delta_j + \eta_j tuition_{i,t} + v_{i,j,t},\ j = 1, ..., k \tag{2}$$

where j indexes the j^{th} component of $CP_{i,t}$, $tuition_{i,t}$ is college tuition that individual i faces at time t, and $v_{i,j,t}$ is an error term that is mean independent of $X_{i,t}\delta_j + \eta_j tuition_{i,t}$ by construction. Thus, if $CP_{i,t}$ is perfectly observed, and the researcher has at least as many instruments (e.g. college tuition) at her disposal as components of $CP_{i,t}$, then the effect of college prospects on risky behavior (β) can theoretically be estimated via Two-Stage Least

Squares (TSLS) or Generalized Method of Moments (GMM) estimation.

Unfortunately, I do not perfectly observe youths' college prospects, and I have only one candidate instrument (college tuition) at my disposal for estimation. As a result, I perform two "second-best" exercises that shed light on the effect of prospects on behavior. The first is to estimate the reduced-form effect of tuition on risky behavior, which, by substitution of equation (2) into equation (1), is $\phi = \eta_1\beta_1 + ... + \eta_k\beta_k$. This parameter is useful for policymakers who wish to know how risky behavior will be affected by changes in the policy instrument (tuition). I present estimates of this reduced-form effect in Section 4.1 and consider them to be the main results of this paper. The major assumption necessary for interpreting these estimates as the causal effect of tuition on behavior is that tuition is only related to teenage behavior through its effect on college prospects.

The second exercise I perform assumes that the only means by which college prospects affect risky behavior is through one component of prospects I do observe in my data: the subjective probability that high-school seniors give themselves of being enrolled in school in one year. That is, I assume that for this group, the vector $CP_{i,t}$ may be reduced to a scalar term, $oneyear_{i,t}$. This assumption is stronger than the one required for interpretation of the reduced-form results, but it allows me to estimate the effect of youths' subjective expectations on their risky behavior (a scalar β).[7] I estimate the effect of one-year expectations on all four teenage behaviors via instrumental variables, with college tuition serving as the lone excluded instrument, and compare them to OLS estimates of one-year expectations on behavior in Section 4.3.

[7]To see why this assumption matters, consider that changes in tuition rates may not only affect a youth's decision to attend college, but may also affect her decision about whether to live at home while attending school, whether to work part- or full-time while attending school, etc. Each of these factors may contribute to the total effect of tuition on behavior.

4 Empirical Results

My empirical analyses employ the NLSY97 dataset, an ongoing 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 as dependent variables.

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. 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 is most likely a combination of two- and four-year price effects.

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 actually 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.[8] Summary statistics for all variables used in my empirical analyses are shown in Table 1.

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 on various teenage risky behaviors in Table 2. In this table, and throughout the paper, I focus on the following four dependent variables: the number of sexual partners the youth

[8]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

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.[9] All behaviors are analyzed in the year in which youths turn 17, and all regressions are performed using OLS with clustering at the state level.[10]

Table 2 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

[9] I performed a variety of robustness checks with respect to the definitions 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 2 (and zero otherwise). The effect of tuition in these regressions was uniformly positive (as in Table 2), but coefficients were slightly less precisely estimated. Owing to the countable nature of the dependent variables as they are defined in Table 2, 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.

[10] 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.

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 regarding the correlation between tuition and unobserved (time-invariant) state characteristics by including state fixed-effects in my models.[11]

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 very little effect on those individuals who will attend college with near certainty (at observed prices) as well as those individuals who have no intentions 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.

I use individuals' characteristics at age 17, which comprise all covariates shown in Table 2 except two-year tuition, to predict (in a probit model) a binary outcome that is equal to one if the respondent ever enrolls at a two-year college but never enrolls at a four-year college (and zero otherwise).[12] Youths with high propensities to realize this outcome would seem to

[11]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 fixed effects in his models reduces the impact of two-year college tuition on enrollment only slightly.

[12]The results from this regression, which are available upon request, are as expected: teens in the middle of the AFQT, family income, and parental education ranges are most likely to be two-year college enrollees.

be especially susceptible to two-year tuition rates in making their post-secondary schooling decisions. This should lead to tuition having a relatively large effect on their behavior.

In Table 3, I split the sample from Table 2 into two different groups: those whose propensity scores of attending two-year college (but not four-year college) were above the median, and those whose scores were below the median.[13] The effect of tuition on all four risky behaviors is shown for each group.[14] The results in Table 3 indicate that the tuition effect on behavior is highly concentrated among those who are most likely to attend community college (Group 2). In fact, the hypothesis that the effect of tuition on behavior is the same across the two groups is rejected at better than the 1% level for smoking and heavy drinking, at better than the 5% level for marijuana use, and at better than the 10% level for sexual partnership. Baseline mean values of each risky behavior are also reported in Table 3 for Groups 1 and 2. Although mean values are larger among the Group 2 population, the differences in Group 1 and 2 means are not large enough to explain the differences in point estimates on their own.

I have argued that youths who attend two-year college without attending four-year college are more likely to be "marginal" college enrollees. The results in Table 3 provide evidence that the effect of tuition on teenage behavior is much stronger for this set of individuals. Thus, if tuition is merely a proxy for some other state-varying factor that explains the corre-

[13]For robustness, I also defined the dependent variable to be equal to one if individuals ever enroll in two-year college and zero otherwise (regardless of four-year college outcomes). The results from this exercise were similar to those reported in Table 3.

[14]I also examined youths' cumulative high-school grade point averages (GPA's) as a dependent variable in this part of the analysis, since it provides an additional check of the plausibility of my results on teenage risky behavior. That is, if tuition is really affecting risky behavior via college prospects, then it is also likely to affect youths' grades. I find that a $1,000 increase in tuition lowers high-school GPA (which is on a 4 point scale) by almost 7 hundredths of a point for those who are most likely to attend 2-year college (this is significant at the 10% level). Among those who are least likely to attend 2-year college, this same tuition increase raises high-school GPA by 2 hundredths of a point (though this is not statistically different from zero). The two point estimates are significantly different from one another at the 1% level.

lation 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.[15] 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.[16]

Second, if tuition is not merely proxying for other differences across low- and high-

[15]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.

[16]Specifically, high-school seniors are defined as youths who are 17-18 years old and have completed 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.

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 possibility 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).[17] Nevertheless, teens' expectations (including one-year enrollment expectations) are strongly predictive of future college outcomes, suggesting that youths may be capable of updating their expectations when their objective chances of attending college change.

I present results on the effect of tuition on teenagers' one-year schooling expectations in Table 4. In these models, I analyze those youths whose one-year expectations were elicited in their seventeenth year (1,876 observations, which is a subset of the 4,913 observations used in Tables 2 and 3). These youths are then further divided into high-school seniors (582 observations) and non-seniors (1,294 observations). For each of these groups, I analyze the

[17] 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).

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).[18] This point estimate is more than twice as large as the tuition effect for non-seniors, and the difference between the two coefficients is significant at the 11% level. When actual one-year college enrollment 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

[18] 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).

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 the same four teenage risky behaviors considered in Section 4.1. College prospects are likely to be endogenous in a 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 Section 4.2, I showed 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 risky behavior via TSLS (with community college tuition rates serving as an instrument for prospects).[19]

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

[19] 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.

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-identified, 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 17 year-old 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), 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, 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. It is worth considering why instrumenting for one-year expectations may yield larger effects of expectations on behavior than OLS does. A likely explanation 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 Table 3), IV estimates reflect a weighted average of effects for those who are induced to change their expectations when college tuition changes. Table 3 provides evidence that these youths do experience large changes in their behavior when tuition changes.

Though the IV results are subject to some potential weaknesses, they suggest that manipulating college expectations in late adolescence can have substantial 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.

6 Appendix

Consider a two-period model with no uncertainty in which a representative agent derives utility according to the function

$$V = U_1(c_1, a_1, s_1) + \beta U_2(c_2, a_2, s_2),$$

where c_j is consumption of a composite regular good in period j, a_j is consumption of a harmful, potentially addictive good in period j, and s_j is the stock of the harmful, potentially addictive consumption carried into period j. In Period 1, the individual decides whether to go to college and consumes according to her endowment (e.g. allowances from parents) and any borrowing she makes against earnings in Period 2. Thus, the budget constraint in the

first period is

$$p_1 a_1 + c_1 + \tau e_1 = \omega_1 - z_1.$$

p_1 is the normalized price of a_1 in the first period, e_1 is a binary variable that is equal to 1 if the youth attends college (and zero otherwise), τ is the tuition cost of college, ω_1 is an individual's endowment in the first period, and z_1 is first-period savings. The second-period budget constraint is given by

$$p_2 a_2 + c_2 = w_2(e_1, a_1, a_2) + (1 + r)z_1.$$

p_2 is the normalized price of a_2 in the second period, r is the real interest rate, and w_2 is the individual's wage in Period 2. Finally, s_1 is zero (because a "young" person has no addictive capital) and s_2 is simply depreciated addictive consumption from Period 1, $(1 - \delta)a_1$. Following Becker and Murphy [1988] and Gruber and Koszegi [2001], I specify a quadratic utility function:

$$U_j(c_j, a_j, s_j) = \alpha_c c_j + \frac{\alpha_{cc}}{2} c_j^2 + \alpha_a a_j + \frac{\alpha_{aa}}{2} a_j^2 + \alpha_s s_j + \frac{\alpha_{ss}}{2} s_j^2 + \alpha_{as} a_j s_j,$$

where $\alpha_c, \alpha_a \geq 0$; $\alpha_{cc}, \alpha_{aa} \leq 0$; $\alpha_s \leq 0$; $\alpha_{ss} \leq 0$; $\alpha_{as} \geq 0$. $\alpha_s \leq 0$ captures the tolerance-inducing aspect of addictive consumption (i.e. as past consumption rises, an individual requires a larger and larger amount of current consumption to achieve the same "high"), and $\alpha_{as} \geq 0$ captures the habit-forming aspect of addictive consumption (i.e. the marginal utility of consumption is increasing in the stock of addictive capital built up in previous

periods). The wage function is specified as follows:

$$w_2 = \gamma_0 + \gamma_1 e_1 + \gamma_2 a_1 + \gamma_3 e_1 a_1 + \gamma_4 a_2 + \gamma_5 e_1 a_2,$$

where $\gamma_1 \geq 0$; $\gamma_2 \leq 0$; $\gamma_4 \leq 0$. In this way, consumption of the harmful good in either period potentially reduces wages. For young individuals, consumption of a_1 may hinder human-capital accumulation; when individuals are old, consumption of a_2 may affect productivity on the job. The key parameters for determining $\frac{\partial a_1}{\partial \tau}$, the effect of tuition on the harmful good when the individual is young, are γ_3 and γ_5, which determine how the productivity cost of a_j changes when one goes from being uneducated to educated.

It is difficult to obtain a closed-form solution to this model for all parameter values. My purpose is to illustrate that under reasonable parameter values, the sign of $\frac{\partial a_1}{\partial \tau}$ will depend on the signs of γ_3 and γ_5. Thus, for simplicity, I parameterize the model as follows: $\alpha_c = 6$; $\alpha_a = 2$; $\alpha_{cc} = \alpha_{aa} = -1$; $\alpha_s = \alpha_{ss} = 0$; $\alpha_{as} = 1$; $\beta = 1$; $p_1 = p_2 = 0$; $\omega_1 = 0$; $r = 0$; $\gamma_0 = 10$; $\gamma_1 = \frac{1}{10}$; $\gamma_2 = \gamma_4 = -1$. I illustrate three cases to show how the signs of γ_3 and γ_5 affect a_1 as a function of τ:

Case 1: No complementarity ($\gamma_3 = \gamma_5 = 0$). In this case, the harmful effects of addictive consumption do not depend on one's education status. In particular, the optimal consumption of a_1 as a function of τ is:

$$a_1 = \begin{cases} 1 & \text{if } \tau > 1/10 \\ 21/20 - (1/2)\tau & \text{if } \tau \leq 1/10 \end{cases}$$

Thus, at the point at which the individual is indifferent about college enrollment ($\tau = \frac{1}{10}$), a_1 is equal to 1 in each arm of the function. As τ continues to fall, the individual "spends" some of her additional lifetime resources on a_1.

Case 2: Positive complementarity ($\gamma_3 = \gamma_5 = \frac{1}{20}$). In this case, the harmful effects of addictive consumption are mitigated when one obtains college. The optimal consumption of a_1 is now:

$$a_1 = \begin{cases} 1 & \text{if } \tau > 39/190 \\ 439/361 - (10/19)\tau & \text{if } \tau \leq 39/190 \end{cases}$$

Now at the indifference point ($\tau = \frac{39}{190}$), a_1 is equal to 1 when the individual does not enroll in college and $\frac{400}{361}$ when she does obtain college. Thus, there is a discrete positive jump in a_1 when τ falls just below the point at which the individual is indifferent about college.

Case 3: Negative complementarity ($\gamma_3 = \gamma_5 = -\frac{1}{20}$). In this case, the harmful effects of addictive consumption are exacerbated when one obtains college. The optimal consumption of a_1 is now:

$$a_1 = \begin{cases} 1 & \text{if } \tau > 1/210 \\ 401/441 - (10/21)\tau & \text{if } \tau \leq 1/210 \end{cases}$$

Now at the indifference point ($\tau = \frac{1}{210}$), a_1 is equal to 1 when the individual does not enroll in college and $\frac{400}{441}$ when she does obtain college. Thus, there is a discrete negative jump in a_1 when τ falls just below the point at which the individual is indifferent about college.

As shown here, college tuition has a theoretically ambiguous effect on youthful risky consumption, which highlights the importance of estimating the effect empirically.

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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-school seniors only)	582	82.92	30.27
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: 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**	0.890***	0.080	0.407**
	(0.117)	(0.303)	(0.060)	(0.178)
Number of siblings	-0.004	0.016	-0.022	-0.115***
	(0.038)	(0.091)	(0.016)	(0.042)
Female	-0.852***	-0.303	-0.479***	-1.231***
	(0.134)	(0.296)	(0.070)	(0.163)
Black	0.326	-6.463***	-0.864***	-0.637**
	(0.209)	(0.515)	(0.087)	(0.279)
Hispanic	0.218	-3.766***	-0.383***	-0.721**
	(0.248)	(0.456)	(0.119)	(0.310)
Mother high school graduate	-0.521*	-0.070	-0.066	-0.219
	(0.309)	(0.581)	(0.101)	(0.254)
Mother some college or more	-0.532	-0.062	0.067	0.038
	(0.354)	(0.577)	(0.134)	(0.259)
Father high school graduate	-0.218	-0.821	-0.037	-0.461**
	(0.208)	(0.539)	(0.087)	(0.206)
Father some college or more	-0.271	-2.092***	-0.136	-0.624**
	(0.244)	(0.595)	(0.093)	(0.238)
2nd family income quartile	0.349	0.544	-0.018	0.305
	(0.226)	(0.586)	(0.079)	(0.214)
3rd family income quartile	0.195	0.508	-0.028	0.184
	(0.265)	(0.483)	(0.097)	(0.296)
4th (high) family income quartile	-0.132	0.141	0.013	0.294
	(0.262)	(0.591)	(0.117)	(0.282)
At least one bio. parent absent	0.291*	2.222***	0.080	0.378*
	(0.170)	(0.417)	(0.081)	(0.195)
2nd AFQT score quartile	-0.077	-0.407	0.010	0.149
	(0.321)	(0.355)	(0.128)	(0.267)
3rd AFQT score quartile	-0.531**	-1.967***	-0.176*	-0.191
	(0.233)	(0.505)	(0.103)	(0.304)
4th (high) AFQT score quartile	-0.762***	-3.398***	-0.432***	-0.890***
	(0.259)	(0.582)	(0.113)	(0.289)
Urban residence	0.113	0.583*	0.027	0.475**
	(0.158)	(0.342)	(0.085)	(0.211)
Constant	1.687	11.458***	1.045*	2.980**
	(1.359)	(2.197)	(0.530)	(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 3: The effect of 2-year college tuition on risky behavior at age 17, by likelihood of 2-year college attendance

	Sex partners in past year		**Days smoked in past month**	
	(1)	(2)	(1)	(2)
2-year college tuition ($1000's)	0.064	0.526**	-0.288	1.969***
	(0.102)	(0.216)	(0.383)	(0.434)
P-value associated with test of Ho: (1)=(2)	0.0647		0.0003	
Mean of dependent variable	0.98	1.42	5.66	6.76
	Days 5+ drinks in past month		**Days marijuana in past month**	
	(1)	(2)	(1)	(2)
2-year college tuition ($1000's)	-0.046	0.247***	0.030	0.792***
	(0.088)	(0.068)	(0.254)	(0.226)
P-value associated with test of Ho: (1)=(2)	0.0035		0.0272	
Mean of dependent variable	0.86	0.96	1.73	1.85

*** 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. Right-hand side variables not shown include all covariates listed in Table 2. Group (1) contains all individuals for whom the propensity score associated with attending 2-year college is below or at the median (2457 observations). Group (2) contains all observations for whom the same propensity score is above the median (2456 observations).

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)	-2.158*	-5.680**	-1.034	-7.733**
	(1.225)	(2.116)	(2.601)	(3.284)
Number of siblings	-0.516	-1.514*	-1.499**	-2.613**
	(0.744)	(0.856)	(0.652)	(1.096)
Female	1.672	11.785***	0.451	9.069***
	(1.490)	(1.762)	(2.993)	(3.029)
Black	3.992**	2.360	5.878	15.545**
	(1.904)	(3.925)	(4.550)	(6.009)
Hispanic	1.992	4.027	1.936	2.976
	(2.198)	(5.325)	(4.729)	(5.872)
Mother high school graduate	2.768	6.839	4.901	10.906*
	(2.389)	(4.477)	(4.773)	(6.326)
Mother some college or more	3.510	7.871*	4.977	22.927***
	(2.689)	(4.481)	(5.333)	(6.814)
Father high school graduate	5.057**	4.101	6.427*	-8.578
	(2.047)	(3.857)	(3.581)	(6.215)
Father some college or more	7.589***	5.534	9.982**	1.595
	(2.415)	(5.135)	(4.181)	(8.126)
2nd family income quartile	6.574**	-8.831*	5.331	-13.935*
	(2.665)	(4.373)	(4.871)	(7.435)
3rd family income quartile	8.051***	-13.177***	3.896	-16.007*
	(2.223)	(4.751)	(5.085)	(9.213)
4th (high) family income quartile	5.690**	-3.436	7.954	-9.087
	(2.387)	(3.622)	(5.077)	(7.610)
At least one bio. parent absent	-3.659***	-3.414	-9.847***	-10.246
	(1.344)	(3.318)	(2.568)	(6.186)
2nd AFQT score quartile	2.174	13.357***	-1.659	18.410***
	(1.900)	(4.790)	(4.359)	(6.440)
3rd AFQT score quartile	4.370**	14.760***	0.169	22.985***
	(2.074)	(3.889)	(3.999)	(7.481)
4th (high) AFQT score quartile	8.676***	19.417***	13.027***	30.812***
	(1.709)	(5.496)	(4.266)	(6.073)
Urban residence	-2.207	6.481**	-3.358	6.886*
	(1.742)	(3.016)	(2.874)	(4.076)
Constant	66.996***	48.692**	49.645**	11.989
	(9.398)	(20.575)	(18.435)	(30.729)
Year dummies	yes	yes	yes	yes
Region dummies	yes	yes	yes	yes
Additional state characteristics	yes	yes	yes	yes
Observations	1294	582	1255	559
R-squared	0.108	0.182	0.083	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 2. 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.