The effect of private high school education on the college trajectory

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HIGHLIGHTS

- We estimate the effect of private secondary schooling on the college trajectory.
- A private secondary education increases the probability of enrollment and completion.
- The effect of private secondary schooling on college enrollment diminishes over time.
- Private schooling is getting students to college sooner and graduating earlier.
- We find evidence of negative selection.

ABSTRACT

We use the National Education Longitudinal Study (NELS) to estimate the effect of private secondary schooling on the average college trajectory of a student in the United States, examining college enrollment and degree attainment across the private and public sectors. We provide the first estimates of the effect of private schooling on college degree attainment using the most recent NELS survey. To account for potential non-random selection we exploit the variation in the grade spans of the students' middle schools. Results indicate that private schooling has a significant, positive effect on college enrollment and degree attainment. The effect on college enrollment diminishes with time, suggesting that private schools influence degree attainment by getting students to college sooner.

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1. Introduction

The effect of attending a private high school is still a controversial issue in the economics literature. Some findings suggest that attending a Catholic high school (which comprises most of the private sector in the United States) substantially raises the probability of high school graduation and/or college attendance (Evans and Schwab, 1995, Sander and Krautmann, 1995, Neal, 1997, Altonji et al., 2005 (AET)). Contrastingly, Figlio and Stone (1999) show the effect of Catholic schooling on test scores is driven only by minority students, while Cardak and Vecci (2013) find that the confidence interval of the effect of Catholic schooling on various educational outcomes can be negative. Inferences about the impact of private schools on educational attainment are difficult because of potential non-random selection. Families of students in private schools choose to pay when a free public alternative is available. These differences can confound the effect of attending a private high school with student (and/or family) attributes.

Previous research on the effect of private high school enrollment on educational attainment has used a variety of instruments to address non-random selection (Evans and Schwab, 1995; Neal, 1997; Sander and Krautmann, 1995; Hoxby, 1994).[2] However, there is substantial evidence that these instruments do not meet the exclusion restrictions (AET, 2005; Cohen-Zada, 2009). In this paper, we provide the first estimates of the effect of private schooling on college completion using a novel identification approach. Following Booker et al. (2011) we restrict our sample only to students who were enrolled in a private middle school in 8th grade and exploit the variation in school grade span as an instrument for selection. While this approach strengthens the internal validity of our estimates, it comes at the cost of external validity as it is

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[2] More recently, the historical density of the Catholic population (Cohen-Zada, 2009) and the use of the number of private schools (Booker et al., 2011) have proven more successful.

Table 1
Effect of private high school education on educational outcomes (*marginal effects*).

	Enrollment 1994	Enrollment 2000	BA degree 2000	Some degree 2000
Private high school choice				
Through 12th grade (=1 if MS offers grades 9–12)	0.260[***] [0.061]	0.263[***] [0.061]	0.259[***] [0.060]	0.258[***] [0.061]
Private high school attendance				
Univariate probit	0.034[**] [0.017]	0.020 [0.012]	0.040 [0.027]	0.029 [0.026]
Bivariate probit	0.096[*] [0.057]	0.064[**] [0.026]	0.151[*] [0.085]	0.097 [0.110]
Rho				
Bivariate probit	−0.268 [0.213]	−0.349[**] [0.114]	−0.263 [0.194]	−0.165 [0.254]

$N = 1166$

Note: standard errors clustered at the high school level. Controls include census region, race, catholic religion, gender, parental and student college preferences, urban, no. of siblings, and standardized test scores composite of reading and math in 8th grade. See Table A.1 for description.

[*] 10% significance level.
[**] 5% significance level.
[***] 1% significance level.

plausible to assume that there is selection in the choice to attend a private middle school. Our findings indicate that private schooling increases the probability of a bachelor's (BA) degree by motivating students to stay on a regular academic track, getting them enrolled in a college sooner.

2. Data and empirical approach

We use the National Education Longitudinal Study (NELS) administered by the National Center for Education Statistics (NCES). The NELS is a questionnaire based longitudinal study; the base year is 1988, and follow ups were conducted in 1990, 1992, 1994, and 2000. We use the 1994 and 2000 waves to obtain data on college attendance and completion. The sample is restricted on the following criteria: (i) include only students enrolled in a private middle school in 8th grade at baseline; (ii) students who transferred between sectors during high school are excluded[3]; and (iii) following Neal (1997) we consider only those students who were enrolled at a school located within an MSA in both 1988 and throughout high school with the goal of examining differences in educational outcomes among students with uniform access to both school types.[4] There is a further reduction in sample size due to attrition, resulting in a final sample of 1166 students (summary statistics in Table A.2).[5]

Consider the following empirical model of school choice and educational outcomes:

$$g_i^{*,k} = X_i\beta + I_{c,i}\theta + \varepsilon_{g,i} \tag{1}$$

$$c_i^* = Z_i\alpha + \varepsilon_{c,i}. \tag{2}$$

For student i, $g_i^{*,k}$ and c_i^* are the latent values of educational outcome $k \in$ {enrollment-1994, enrollment-2000, BA-degree-2000} and of attending a private high school respectively; X_i contains a set of student and family characteristics (see Table A.1 for details); and $Z_i = \{X_i \cup z_i\}$ where $z_i = 1$ if a student's middle school spans grade 12, and zero otherwise. We observe $I_{g,i} = 1$ if $g_i^{*,k} > 0$ and $I_{g,i} = 0$ if $g_i^{*,k} < 0$, and $I_{c,i} = 1$ if $c_i^* > 0$ and $I_{c,i} = 0$ if $c_i^* < 0$.

[3] We use the 1990 and 1992 waves to determine middle and high school types and to exclude students who switch between sectors in high school.

[4] It would be preferable to restrict the sample based on the place of residence, but this information is not offered in the public-use NELS.

[5] Three observations missing high-school identifier.

Assume that both $\varepsilon_{g,i}$ and $\varepsilon_{c,i}$ are distributed bivariate normal with mean zero given X_i and Z_i, unit variance, and correlation coefficient $\rho \neq 0$. The naïve probit estimates are based on the assumption that conditional on X_i and the subsample of private middle school students, $\rho = 0$.

3. Econometric results and discussion

In the top panel of Table 1 we show that a longer grade span is a good predictor of private high school choice. In the middle panel, the univariate probit results on college enrollment indicate that attending a private high school significantly increases the probability of enrollment in a post-secondary institution, but the effect diminishes over time. The bivariate probit estimates are consistent with this trend but indicate a much larger magnitude, while remaining close to the point estimates in the literature (Kim, 2012). Private high school attendance influences the college trajectory beyond enrollment as it also has a weakly significant and positive effect on the probability of obtaining a BA degree. The mechanism driving the increase in college attainment seems to be getting students to enroll sooner as the effect of private schooling on enrollment is one third smaller in 2000 relative to 1994. Students who do not complete high school by 1992 and want to pursue a college degree may not have completed a BA by 2000; however, the enrollment results suggest that students who are not on the regular academic track eventually catch up. Interestingly, when examining the effect on attainment of any post-secondary degree (2- or 4-year college), private schooling becomes insignificant. Students who obtain an associate degree have on average the lowest test scores in middle school among students who eventually enroll in a post-secondary institution or obtain a degree (see Table A.3). Intuitively, high school type is unlikely to make a difference for highly motivated students with relatively lower ability.

Consistent with Booker et al. (2011) and Neal (1997), we find evidence of negative selection; for all outcomes, the point estimate of the effect of private schooling is larger in the bivariate probit. Further, the estimated cross-equation correlation coefficient (ρ) takes a negative value. Even when ρ is only statistically significant in the enrollment-2000 equation, it seems to be inappropriate to fail to reject non-random selection even after restricting the sample to only students who attended a private middle school. Booker et al. (2011) postulate that parents of students at the margin of dropping out are more likely to choose charter schools (private schools in our case) to minimize the likelihood of quitting which parents associate with attending a public high school. Our results are