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A Path Towards Citizenship: The Effects of Early College High Schools on Criminal Convictions and Voting

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Abstract

Early college high schools (ECHS) are small schools of choice which provide students with the opportunity to earn, at no financial cost to them, two years of transferable college credit or an associate's degree while simultaneously satisfying high school graduation requirements. This promising intervention is aimed at smoothing the transition from high school to college for under-represented minorities and students from economically disadvantaged backgrounds. There are about 80 ECHS in North Carolina, although the model is implemented in many other states as well.

While much is known from prior research about the impacts of the intervention on educational attainment, nothing is known about longer term outcomes such as employment, wages, criminal involvement, and voting behavior. The present study will briefly describe the data collection process, research methods, and preliminary findings on the effects of the intervention on voting and criminal conviction in North Carolina. We will also present results on whether impacts on long term civic outcomes are mediated by educational attainment. Quasi-experimental impacts have been validated against impacts generated from a randomized controlled trial of the same intervention in a subset of the sites during the same time period.

The team assembled personally-identified population level statewide administrative data on all NC high school students (including ECHS) and linked it to records housed at community colleges, universities, the Department of Public Safety (incarceration), and Board of Elections (voting). Together this effort comprises one of the more comprehensive administrative data collection efforts linking student level K-12, postsecondary, and longer-term outcomes.

Comments

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A Path Towards Citizenship: The Effects of Early College High Schools on Criminal Convictions and Voting

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THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Education Policy Initiative
at Carolina

Are U.S. Schools Focused on the Right Things?

"I was going to teach them the meaning of life ...
but it wasn't on the test."

Horace Mann

Source: Mathew Brady, 1849

“Education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men—the balance-wheel of the social machinery.” - 1848

Source: USPS, 1940

Well Known and Less Well Known

- We know a lot about
 - The effects of educational attainment on many outcomes
 - The effects of specific interventions on short run outcomes – test scores, engagement, completion
- We know a lot less about the effects of specific educational interventions on long run outcomes
 - Such as civic outcomes like voting and crime
- Why? Long run follow up happens in the long run and it is expensive!

The Intervention in This Study

- Early College High Schools (ECHS)
 - Small schools (~400 students) of choice on college campuses
 - Students choose to apply – not a default alternative for anyone
 - College preparatory curriculum, college courses
 - Goal – students graduate with two years of college credit or an Associates degree
 - Target population – first-generation college, groups underrepresented in higher education (black, Hispanic, economically disadvantaged)
- History
 - The ECHS initiative started in 2002 with Gates Foundation support
 - About 300 ECHS across 32 states
 - North Carolina was the first state to implement the intervention; 90? in the state – most of them on community college campuses

Theory of Action

ECHS Design Principles

1. College Ready

Articulated program of study leading to associates degree or 2 years of college credit; college readiness activities

2. Powerful Teaching and Learning

High-quality, rigorous and relevant instruction, student collaboration and discussion, formative and multiple assessments

3. Personalization

Academic and affective supports, supportive relationships

4. Leadership

Common vision, collective responsibility and decision-making

5. Professionalism

Ongoing professional development, collaboration among staff

6. Purposeful Design

Autonomous governance, location on college campus, small size, flexible use of time, integration with college

Intermediate Outcomes

- Absences
- Suspension
- Grade progression
- Staying on track with a college preparatory curriculum
- Applying to college

Ultimate Outcomes: Secondary, Postsecondary, Young Adult Outcomes

- End of course test scores
- Dropping out
- Graduating from high school within 5 years
- Accumulating college credit while in high school
- Postsecondary enrollment after graduation
- Freshman year GPA, college
- Enrolling in remedial / developmental education in postsecondary institutions
- Postsecondary degree completion
- Incarceration
- Registering to vote

Research Questions

- Do ECHS promote career and college readiness?
- Do ECHS produce positive civic outcomes?
 - Increase voting and decrease crime?
- Do effects vary by subgroup?
- Are the effects mediated through educational attainment?

Administrative Data Revolution

- “Data Tsunami” – Paul Decker
- Lots of digitized data for reporting, accountability, and program improvement/evaluation
- Pros
 - Complete coverage, less missing data, population level, sample size, accuracy, legitimacy
- Cons
 - Some constructs not measured or measured well, data must be cleaned to make it useful, privacy, access

Administrative Data Sample

- Population level, all Early Colleges and High Schools in NC
 - All students enrolled in grades **6-18**, tracked over time using a unique identifier
 - Data from NCDPI, UNC System, NCCCS, Dept. of Public Safety, NC Board of Elections
- Longitudinal
 - Multiple cohorts: 2005-2006 through 2010-2011
- Pre-treatment control variables
 - Demographic characteristics, educational classifications, absences, test scores, school mobility, age, Algebra 1 in middle school
- Outcomes
 - Course/grade progression, suspensions, absences, test scores, grades, graduation, college enroll/completion, crime, voting

Data Background

- Confidential education records, personally identified
 - FERPA – federal privacy laws
 - Had to create a statewide unique student ID from name and birthdate
- Merged with public sources
 - Incarceration records
 - Crime – downloaded a data file
 - Merged by name and birthdate
 - Voting records
 - Scraped from a website with a Python script
 - Could have downloaded a file with name and age, but name and birthdate matching is more accurate

Associate's Degree Completion

Percentage of 9th Grade Cohort Attaining Associate's Degree

UNC Bachelor's Degree

Percentage of 9th Grade Cohort Attaining Bachelor's Degree

Quasi-Experimental Method

- Propensity score techniques
 - 1:1 nearest neighbor matching with caliper
 - Each treatment student matched to their nearest neighbor (N ~ 24,000 Treat & Comparison)
 - Generalized boosted model (GBM) and IPT weighting
 - Non-parametric, data mining algorithm to flexibly fit the propensity score -- non-linear functional form with interactions
 - Uses propensity score to weight the entire statewide database (~110,000 per cohort; 4-6 cohorts used)

Panel A

Panel B

Figure 1. Predicted marginal effects of treatment and non-treatment on felonies, misdemeanors, voting, and registering to vote from GBM-weighted logit regression model. Treatment and control margins represent the predicted probability of each outcome occurring given an individual is assigned treatment or control status, respectively. Panel A displays predicted margins for crime outcomes, showing that ECHS students have significantly reduced likelihoods of committing felonies or misdemeanors compared to non-ECHS students. Panel B displays predicted margins for civic outcomes. ECHS students are significantly more likely to have ever voted, but are not significantly more likely to have registered to vote than non-ECHS students.

Effects on Civic Outcomes

Logit of ECHS treatment on felonies, misdemeanors, voting, and registration with generalized boosted model weighting

	(1) Ever felon	(2) Ever misdemeanor	(3) Ever voted	(4) Registered
ECHS	-0.513*** (0.114)	-0.498*** (0.0837)	0.106*** (0.0273)	0.0609* (0.0291)
Treatment margin	0.00635	0.0141	0.511	0.732
Control margin	0.0103	0.0225	0.486	0.721
Adjusted risk ratio	0.614	0.625	1.051	1.015
Number of observations	738684	738684	738975	738975

Note. Standard errors reported in parentheses, adjusted for clustering at the school-level. All models include controls for student demographics and background, middle school academics, and cohort year, omitted from output. Treatment and control margins represent predicted probabilities of each outcome occurring given an individual is assigned treatment or control status, respectively. The adjusted risk ratio, calculated as the ratio of the treatment margin to the control margin, represents the relative likelihood of each outcome occurring when individuals are assigned treatment rather than control status.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Sensitivity Analysis

$$\delta = RR_{EU}$$

$$\gamma = RR_{UD}$$

$$Bias = \frac{\delta\gamma}{\delta + \gamma - 1}$$

$$E\text{-value} = RR + \sqrt{RR(RR - 1)}, \text{ for } RR > 1$$

Explanation of E-Value

- Suppose a study finds an observed risk ratio of 1.33
- E-value = $1.33 + \sqrt{1.33 \times (1.33 - 1)} = 2$
- To reduce the observed risk ratio to 1
 - U would have to double the risk of the outcome among the exposed, and
 - U would have to be twice as prevalent among the exposed relative to the unexposed

Any Felony

For an estimated RR of .614

Any Misdemeanor

For an estimated RR of .625

Voting

For an estimated RR of 1.051

Registering

For an estimated RR of 1.015

Sensitivity Analysis (Felony)

Analysis of the effects of omitting the measured confounds adjusted for in the study

If omitted, these would produce upwardly biased estimates:

	Gamma	Delta
Family Poverty	1.48	1.28
Sch Mobility	1.54	1.17
Took Alg I in Middle	1.20	1.15

If omitted, these would produce downwardly biased estimates:

	Gamma	Delta
Male	5.59	0.81
Low Test Score	0.64	1.25
Disability	1.02	0.77
Black	1.95	0.99
High Absences	2.07	0.99

Next Steps

- Mediation analysis
 - Is the effect of the intervention on voting and crime mediated through educational attainment?
 - Early results: ECHS effect on crime is mostly direct; ECHS effect on voting is mostly indirect, through attainment
- Extend within-study replication to these outcomes to assess confounding

Can Quasi-Experimental Evaluations that Rely on State Longitudinal Data Systems Replicate Experimental Results: Findings from a Within-Study Comparison¹

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Abstract: This paper addresses whether researchers should expect to obtain unbiased effect estimates from quasi-experimental studies conducted with baseline covariates that are typically available in the longitudinal administrative state databases. Specifically, it reports findings from a within-study comparison study by combining student-level data from an ongoing longitudinal randomized control trial that evaluates early college high schools in North Carolina with rich administrative data from North Carolina that includes pre- and post-treatment information on students who did not participate in this intervention. We find that (i) it is possible to replicate experimental impacts estimates for six commonly used outcome measures in research examining high school reforms, including those that are one-time events and lack natural pretest measures; (ii) imposing locational restrictions on the comparison students —specifically choosing them among non-treatment students who came from the same feeder middle schools as the treatment students — does *not* decrease the QE bias (on the contrary, it yields to slightly *larger* bias for some outcomes); and (iii) the QE bias is not sensitive to the various propensity score based QE analytic methods including parametric and non-parametric estimation of propensity scores and propensity score matching and weighting.

Thank You!

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