The Small, Stand-Alone Early College: Impact on Postsecondary Outcomes

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Background/Context: This paper will present results from the longitudinal experimental study conducted on North Carolina's early college model described in the previous paper.

Purpose: The primary purpose of this paper is to present the impact of the early college model on outcomes related to postsecondary enrollment. The specific research questions driving this study include:
- What is the impact of the early college model on students' enrollment in postsecondary education?
- What is the impact on students' attainment of postsecondary credentials?

Setting: This paper draws from the same study conducted in early colleges across North Carolina. All early colleges included in the study were located on college campuses.

Population: The student sample analyzed for this paper includes a total of 1,652 students who applied to 12 different early colleges and enrolled in 9th grade in the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. These 12 schools enrolled a total of 18 cohorts of students, with five schools enrolling multiple cohorts. This represents the largest sample of students for whom we have data through six years after entering 9th grade; we hope to supplement this with an additional cohort of students (those who entered high school in the 2009-2010 school year) for the final presentation.

To participate in the study, schools had to have more applicants than available slots and had to agree to use a lottery to randomly assign students. Schools could set aside slots for students whom they wanted to accept, such as siblings. Any student who did not go through the lottery was excluded from the analysis. Because we use extant administrative data, we are able to include all students from the original lottery samples in our analyses. Table 1 presents the characteristics of the students in this sample. As seen, the treatment and comparison groups are statistically comparable on key demographic characteristics with one exception, the percentage of students previously retained. To increase precision, baseline characteristics are included in all analyses.

TABLE 1

Intervention: As noted in the description in the first paper, the early colleges in this study are small schools purposefully designed to be focus on college readiness for all students. They can be almost thought of as incorporating the components of a very strong (maybe even ideal) transition to college program. One of the main ways the early college model accomplishes this is by enrolling high school students into college classes in as early as ninth grade. By the time students are in their junior or senior years of high school, they are taking mostly college classes with other college students. The early college also provides explicit instruction in college readiness skills and provides extensive supports to students.

Research Design: This paper presents results from a longitudinal experimental study in which students who apply to attend the early college go through a lottery process. The study compares results for students who were randomly selected to attend with the results for students who were randomly selected not to attend.

Data Collection: The study focuses on two primary outcomes, enrollment in postsecondary education and attainment of a postsecondary credential.

Enrollment in postsecondary education. The unique design of the early college poses a challenge in identifying appropriate postsecondary outcomes and comparisons, given that early college students are enrolled in high school and college at the same time. Thus we sought to identify measures that would recognize the college experiences that occurred while in high school but also allow students in the control group the opportunity to catch up. The outcome we report in this paper is whether a student was ever enrolled in any type of postsecondary education (part-time or full-time). This enrollment could occur during high school or after high school. Therefore, our outcome is the percentage of students who had ever enrolled in postsecondary education at any point over the time period from 9th grade through the fall semester of the sixth year since the start of high school.

The primary source of this data is the National Student Clearinghouse (Clearinghouse). Our analyses assume that if a student is not present in the Clearinghouse data that he did not enroll in postsecondary education. Recognizing that the Clearinghouse data can pose challenges (Dynarski, Hemelt, & Hyman, 2015), we took various steps to try and ensure that the Clearinghouse data were as complete as possible, including submitting alternate spellings of students' names and submitting the complete list over multiple years to catch students who might change their release permissions.

Postsecondary degree attainment. One of the long-term goals of the early college is to increase the number of students who are receiving a postsecondary degree. Ideally, we would examine this for both two- and four-year institutions at a point in time that is at least 10 years after entering high school (four years of high school plus an additional six years to attain a Bachelor's degree). However, our current sample only goes through their sixth year after entrance into high school or through two years after what would be a student's graduation from high school if they graduated on time in four years. This would allow students two years to complete their two-year degree if they were choosing to do that. We report two sets of outcomes here. The first is attainment of any sort of postsecondary credential—including Associate's degree, technical credential, or bachelor's degree. The second set of outcomes show the outcomes for each of the specific categories of credential. It should be noted that attainment of a bachelor's degree is not necessarily an expected outcome of the program at this point as it would reflect an extremely accelerated timeline. The data for this outcome also comes from the Clearinghouse, which reports degrees attained. The Clearinghouse data were linked to data from the North Carolina Department of Public Instruction, which are housed at the North Carolina Education Research Data Center at Duke University.

The same as for the previous paper, we report separate impact estimates for four subgroups of students that are especially targeted by early colleges: underrepresented minority, low income, first generation college goers, and students who were underprepared for high school.

Analysis. The impacts of early colleges on these outcomes are estimated within an Intent-To-Treat (ITT) framework, in which a student's initial experimental status as a treatment or control student, rather than actual participation in an early college, serves as the basis for estimating impacts. Specifically, impact estimates are calculated using multivariate linear regression models that include site indicators (or site/lottery fixed effects), interaction of the treatment indicator with the site indicators, and baseline student characteristics including demographic characteristics such as gender, race/ethnicity, age, free/reduced price lunch status, whether a student was retained prior to 8th grade,

and 8th grade academic performance.[2] The coefficients on the site-by-treatment indicators yield site-specific impact estimates, which are then averaged weighting each by the number of students in each site, to yield an average impact estimate that represents the effect on the average student who applied to an early college in our sample. The impact for a subgroup of interest and the rest of the students who are not in that subgroup are calculating by estimating the impact model separately for that subgroup and the rest of the students. We also report whether the effect for a subgroup is statistically significantly different than that for the rest of the sample.

Results: By the beginning of the sixth year after entering 9th grade, 89 percent of the treatment group had ever enrolled in postsecondary education (including enrollment while in high school), compared to 74 percent of the control group, a statistically significant impact of 15 percentage points ($p \leq 0.05$). We also examine the impact of the ECHS model on ever enrolling in a two-year and/or four-year institution separately and find a large impact on enrolling in a two-year college (31 percentage points) and a positive but smaller and not significant impact on enrolling in a four-year college (4 percentage points). We hypothesize that this finding is driven by the fact that the majority of early colleges in this study are located on community college campuses. It is possible that the increased enrollment in two-year institutions could come at the expense of enrollment in four-year institutions; however, we also see a positive, although not statistically significant, impact on enrollment in four-year institutions.

TABLE 2

We also present impacts on postsecondary enrollment with yearly snapshots. Unlike the "ever enrolled" outcome described above, which is cumulative in nature, this measure is cross-sectional showing students' enrollment in a postsecondary institution only in the given grade. Figure 1 shows the enrollment patterns from grades 9 through the beginning of the sixth year after grade 9. As it shows, a large proportion of the impact of attending an early college is being driven by the experiences while in high school.

FIGURE 1

The bottom panel of Table 2 shows impacts on postsecondary attainment by the beginning of the sixth year after entering 9th grade. We find that 27.5 percent of the treatment group had attained an Associate's degree compared to 3.2 percent of the control group; the corresponding impact of 24.3 percentage points is statistically significant. Prevalence of obtaining a technical credential or a bachelor's degree in both the treatment and control groups are very small, which led to small and insignificant impact estimates.

Table 3 shows the impact estimates on the two primary outcomes (ever enrollment in postsecondary education and attainment of a postsecondary credential) for each of the four subgroups and their counterparts in the sample. All of the subgroup impacts are positive and statistically significant. While the impact on postsecondary enrollment is estimated to be larger for the two targeted subgroups including disadvantaged students (low income and first generation), the

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[2] Following Schochet (2008), these regressions do not include random school-effects since the level of analysis and level of random assignment are the same (student) and we will not seek to generalize the results outside our sample.

impact on postsecondary credential attainment seems to be significantly larger for less disadvantaged students.

TABLE 3

Conclusions: The early college is increasing students' access to postsecondary education, driven primarily by their experience in high school. The increase in enrollment is primarily in the area of two-year colleges because most of the early colleges are located on community college campuses. This increase in two-year enrollment is not happening at the expense of four-year enrollment, given that there is a slight increase in that arena as well. It is also substantially increasing their attainment of postsecondary credentials with an impact of 24.9 percentage points on the attainment of an associate's degree.

Table 1: Sample Characteristics, by Treatment Status

|	Whole Sample (N=1651)	Treatment Group (N=938)	Control Group (N=713)	T-C Difference		Effect Sizes
	Mean	Mean	Mean	Difference	P-Value	
Race & Ethnicity						
Black	26.7%	27.9%	25.0%	2.9%	0.21	0.09
Hispanic	8.1%	8.6%	7.3%	1.3%	0.35	0.11
White	60.6%	59.0%	62.7%	-3.7%	0.13	-0.09
Gender						
Male	40.9%	40.6%	41.3%	-0.7%	0.62	-0.02
Socioeconomic Background						
First Generation College	40.7%	40.8%	40.5%	0.4%	0.88	0.01
Free/Reduced Price Lunch Eligibility	50.5%	51.1%	49.7%	1.4%	0.55	0.04
Exceptionality						
Disabled/Impaired	2.9%	2.5%	3.5%	-1.0%	0.25	-0.20
Gifted	14.9%	14.0%	16.1%	-2.2%	0.29	-0.10
Retained	3.9%	3.0%	5.0%	-2.0%	0.03*	-0.33
8th Grade Achievement						
Math - Z score	0.00	-0.03	0.04	-0.07	0.21	-0.07
Reading - Z score	0.00	-0.02	0.03	-0.05	0.39	-0.05
Math - pass	80.4%	81.9%	78.3%	3.7%	0.07	0.14
Reading - pass	79.7%	79.4%	80.0%	-0.6%	0.77	-0.02

Notes:

[a] The proportions are weighted by students' probability of being selected into the ECHS.

[b] This is the core analytic sample used for many outcomes and excludes students who could not be found in the 9th grade administrative data and students missing demographic data. Only students in Pilot 1 through Cohort 2 are included.

*Statistically significant at p<.05

Table 2: Impact Estimates, Full Sample (N=1652)

	Adjusted Treatment Mean	Unadjusted Control Mean	Impact Estimate
% Ever enrolled in postsecondary education	89.1%	73.8%	15.3%*
% Ever enrolled in 2-year institution	87.7	56.3	31.4*
% Ever enrolled in 4-year institution	36.3	31.9	4.4
% Attainment of any postsecondary credential	29.2%	4.4%	24.9%*
% Attainment of Associate's degree	27.5	3.2	24.3*
% Attainment of technical credential	1.8	1.3	0.5
% Attainment of Bachelor's degree	0.8	0	0.8

*Statistically significant at p<.05

Figure 1: Percent Enrollment in Postsecondary Education by Year
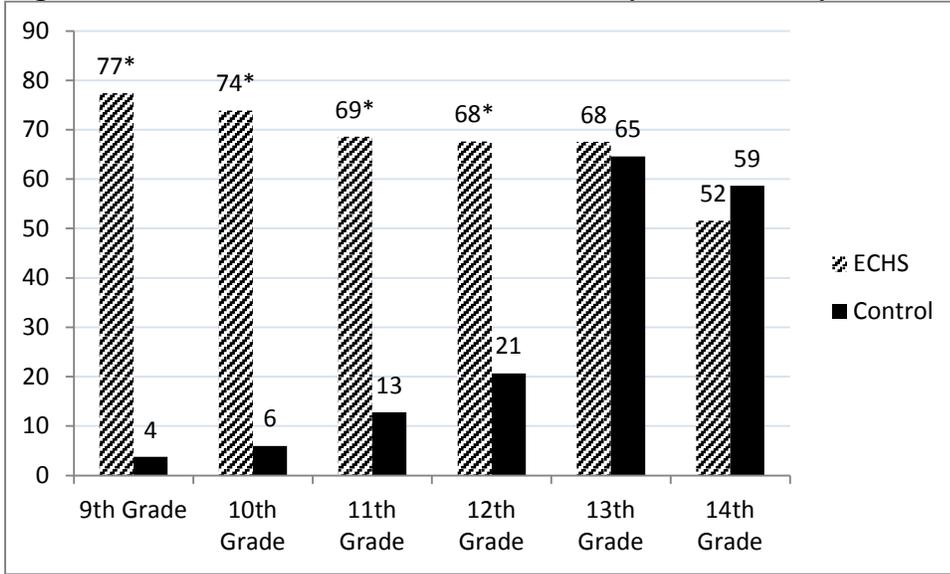
Note: The measure used to construct this graph is cross-sectional, not cumulative. The ECHS or Control bars for a given grade represent the percentage of students enrolled in postsecondary education in that grade.

*Statistically significant at p<0.05.

Table 3: Impact Estimates for Subgroups

	N	Adjusted Treatment Mean	Unadjusted Control Mean	Impact Estimate	Difference in Subgroup Impacts
Panel A: % Ever Enrolled in Postsecondary Education					
Underrepresented	568	86.1%	73.2%	12.9%*	-3.4%
Not Underrepresented	1061	90.4	74.1	16.3*	
First Generation	643	89.0	65.6	23.3*	12.3*
Not First Generation	950	90.3	79.2	11.1*	
FRPL Eligible	790	86.0	64.8	21.2*	11.8*
FRPL Ineligible	773	92.0	82.5	9.5*	
Not Prepared for 9th Grade	473	65.0	65.0	18.9*	5.5
Prepared for 9th Grade	1088	92.7	79.3	13.4*	
Panel B: % Received any postsecondary credential					
Underrepresented	568	17.6%	0.88%	16.7%*	-12.6%*
Not Underrepresented	1061	35.2	5.9	29.3*	
First Generation	643	21.9	2.8	19.1*	-10.0*
Not First Generation	950	34.8	5.6	29.1*	
FRPL Eligible	790	20.6	1.76	18.9*	-11.6*
FRPL Ineligible	773	37.3	6.75	30.5*	
Not Prepared for 9th Grade	473	10.3	1.41	8.9*	-23.3*
Prepared for 9th Grade	1088	37.8	5.6	32.3*	

*Statistically significant at p<.05.