

Abstract Title Page
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Title: From High School to the Future: Getting to College Readiness and College Graduation

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Abstract Body

Limit 4 pages single-spaced.

Problem / Background / Context:

Description of the problem addressed, prior research, and its intellectual context.

Over the past 20 years, gaps in students' educational aspirations have shrunk considerably (Roderick et al., 2008; Roderick, Nagaoka, & Coca, 2011; Kao & Tienda, 1998; Avery & Kane, 2004; Turner, 2007; Deil-Amen & Tevis, 2010). Similarly, racial and ethnic gaps in college enrollment have shrunk. The one area in which postsecondary racial gaps have not improved is in college completion (Turner, 2007). Given the complex and varied nature of the college application, enrollment, and graduation process, it is unsurprising that district and school policies have used a scattershot approach to evaluating college readiness, with rubrics containing items pertaining to non-cognitive skills, test scores, numbers of applications, FAFSA completion, college visits, and college knowledge. The problem with such an approach is not that these items are bad in and of themselves – indeed, all of these factors have valid research behind them – but rather there is no sense of the relative importance of these factors nor of the degree to which any of these factors ultimately affects degree completion.

Purpose / Objective / Research Question / Focus of Research:

Description of the focus of the research.

While this project was originally started to answer the question “What are the factors that make up college readiness?” our findings quickly pointed to the fact that this question is meaningless outside of the context of the question “ready for what?” That is, effects of postsecondary institutions on students' likelihood of degree attainment is so large that the idea of college readiness being assessed in high school (without the knowledge of what institution a student will attend), is essentially meaningless. As a result, the purpose of the project shifted away from a strict focus on high school determinants of degree completion, and towards an inquiry focused on measuring the effects that postsecondary institutions have on students' likelihood of degree completion. At the same time, our primary purpose as a research organization is to serve Chicago Public Schools, meaning that the main audience for this work is practitioners and administrators in secondary schools. Therefore, we have framed the analysis in terms of which factors, as viewed from a high school standpoint, can have the largest influence on degree attainment. We propose four possible policy options: Raise Grades (GPA), Raise test scores (ACT), improve the rates at which students enroll in ‘match’ colleges, improve college choice by looking at colleges' institutional four-year graduation rate.

Setting:

Description of the research location and partners involved, if applicable.

This study focuses exclusively on Chicago Public Schools (CPS) seniors. CPS is the third largest school system in the country, with 122 high schools, and approximately 400,000 students per year. Currently, approximately 45% of graduating seniors enroll in a four year college the fall after graduating. Ten colleges account for 50 percent of college enrollment for CPS graduates, and nine of these colleges are located in the Chicago metropolitan area. The five most popular colleges attended by CPS graduated are all Illinois public colleges. With the exception of the

state's flagship university, University of Illinois at Urbana-Champaign, all Illinois public colleges are considered Somewhat Selective in our rubric of college access, based on Barron's rating guide.

While a relatively small number of colleges can account for half of all CPS college enrollments, in a typical year, CPS students attend another 470 colleges and universities around the country. These colleges range from Very Selective to Non Selective and have graduation rates ranging from 20% to 95%.

Population / Participants / Subjects:

Description of the participants in the research: who, how many, key features, or characteristics.

For this study, we focus on the graduating high school cohorts of 2003 - 2005. Going this far back in time allows us to examine these cohorts' college four and six year graduation rates. Our analytic sample is comprised of 42,129 graduating seniors, 14,032 of whom enrolled in a four year college the fall after high school graduation. Among students who enrolled in college, the average ACT score was 20, and the average GPA was 2.77 and these students graduated at a rate of 23.8%.

Research Design:

Description of the research design.

This study focuses on identifying key predictors of college completion. Once these key levers are identified, we run large scale simulations to get a picture of which policy interventions, if successful, might have the biggest effect on increasing college graduation rates. For example, given the enormous focus currently placed on standardized test scores, what would be the effect of increasing all ACT scores by a single point on system wide college graduation rates? Alternatively, are there more returns to increasing student grades? Furthermore, recent research published by Roderick et. al. (2007), as well as Bowen and McPherson (2009), points to the importance of college match for college success. If all students went to a match college, how much would graduation rates increase? Or, is it possible that in Chicago, students are simply going to colleges that are worse than average in terms of institutional graduation rate? By measuring which levers can influence the biggest change, we can frame the policy debate around getting more students to attain their goal of completing a college degree. While certainly not a causal analysis, these simulations represent the largest possible impact that such interventions can have and hence provide a realistic set of expectations that administrators can use to set reasonable but ambitious goals. This simulations approach is recommended by Zellner (2009), and similar approaches have been used to examine potential effects on college outcomes of changing Affirmative Action policies (Espenshade & Chung, 2005; Archidiacono, 2005), college costs and family environments (Cameron & Heckman, 2001), and financial aid packages (Desjardins & McCall, 2010).

Data Collection and Analysis:

Description of the methods for collecting and analyzing data or use of existing databases.

This study uses administrative data from the Chicago Public Schools, archived by the Consortium on Chicago School Research at the University of Chicago. The current study uses data on students' backgrounds, neighborhood census data, test scores, and course grades, as well as school compositional data. As a part of the state accountability system, all students take the

ACT in the 11th grade. In order to identify whether graduates enroll in college in the fall after graduation, the kinds of colleges they attend, and their graduation rates, this study uses data from the National Student Clearinghouse (NSC). In 2004, NSC expanded its services to high school districts through its new program, Success Outcomes. CPS is the first major urban school district to participate in this program and produce reports on its graduates. Currently, NSC's enrollment verification program covers 92 percent of postsecondary enrollment in the United States.

Our analysis strategy for this project relies on building large scale Hierarchical Generalized Linear Models (HGLM) as well as a parallel specification using fixed effects. The HGLM allows us to model individual student characteristics at level 1 while also controlling for school effects at level 2. By controlling for factors at both levels we are able to develop a decent model for explaining variation in degree completion across students. Most importantly we are able to adjudicate between how well test scores and grades predict college graduation while simultaneously retaining our ability to examine high school level effects such as whether an A from one school means the same thing as an A from another. We then complicate this model by adding in college fixed effects in an attempt to measure the effect of colleges on students' likelihood of graduation. This second model informs two of our policy options. To model the effect of moving all students to a match college, we identify all students who have attended an 'undermatch college,' that is, students whose qualifications give them access to a more selective college than they attended. We then assign these students the fixed effect of a random match college¹. By looking at the difference in predicted probability of graduation for the sample after college reassignment, we are able to get a best case scenario prediction of the effect of getting all students to match.

To run our second college simulation, we calculate predicted probabilities of graduation controlling for but not including the college fixed effects. Essentially, this gives us the predicted probability that a student has of graduating from college at the end of high school, sans any later positive or negative effect their college has on that probability. Then, rather than grouping colleges by selectivity we group students according to their predicted probability (dividing those probabilities into 0.10 bands, e.g. 0.101 to 0.200). We then examine the college graduation rates for the students in each probability band the colleges that they attend, allowing us to compare the outcomes of similar students at different colleges. Given the variation we see in in these college graduation rates, we examine the effect of improving the graduation rate of all students who attend colleges whose graduation rates are below average for their group and see what the effect is across all groups.

Findings / Outcomes:

Description of the main findings or outcomes, with specific details.

In looking at the effects of student level characteristics that determine college graduation, academic factors are extremely important (See Table 1 for model output). Specifically, GPA and ACT are both equally strong predictors of enrolment in college. Looking further however, we find that for college graduation GPA's effect is much larger than ACT's and while ACT's effect has marginal decreases (the higher one's ACT, the less each additional point influences graduation) GPA has in increasing marginal effect. That being said, most CPS students graduate with such low qualifications that moderate improvements in qualifications are not yield relatively

¹ We only allow students to be assigned to a college where at least 20 students from our sample already attended. This allows us to have confidence that the fixed effect is reasonably robust.

small, but significant, changes in their likelihood of graduation. Among all graduates, the average GPA is 2.3 and the average ACT score is 18. Even among college-goers, these qualifications are still quite low, with averages, respectively, of 2.75 and 20. These are both lower than national averages.

The results from our college level simulations (Table 2) are even more surprising. Overall improving moving all students to a match college improves the degree attainment rate for CPS college-goers by 4 percentage points, approximately halving the gap between CPS and the nation. While this is impressive, these effects are not equally distributed across the population. Students with high qualifications upon exiting high school benefit disproportionately from this intervention. Part of this effect is tautological. Students who only have access to non-selective colleges are matching so long as they are in college, so no movement under this intervention is possible. However, the results of this analysis clearly point to the significant cost of high achieving students attending colleges below the level of selectivity to which they have access.

Our final simulation yields similar overall results with a different distribution of effects. The effect on the system-wide degree attainment effect would be the same using this intervention, but the effects are concentrated in the middle of the achievement spectrum. Given that this is where the majority of our students lie, there are clear implications for the work of teachers and counselors who are advising students where to attend school. Perhaps most clear in this analysis is the existence of schools which seem to actually harm students' likelihood of completing a degree. Furthermore, our analysis points to the fact that schools and districts do not need create complicated models of predicted probability of graduation in order to advise students. Across the achievement spectrum, the publicly reported four-year graduation rate of colleges is strongly correlated to CPS students' observed graduation rates. This implies that students should always try and choose the college with the highest reported four-year graduation rate to maximize their own likelihood of graduation.

Conclusions:

Description of conclusions, recommendations, and limitations, based on findings.

The conclusions for these findings are stark. While high schools, would be wise to focus on increasing GPA's, these improvements in student achievement are for naught if students make college choices that lead them to low performing colleges and universities. Similarly, it is clear that while some colleges are able to ensure that nearly all students who are accepted graduate, there are other schools where only 20% are able to graduate within six years, leading one to question: what must a student do to be adequately prepared for an institution where 80% do not succeed? Our findings strongly suggest that the wide variation in college graduation rates, even among similarly qualified students, make it impossible to set a single set college readiness benchmarks. It does appear possible, however, to create a demarcation of responsibility between high schools and colleges. On the one hand, high schools could be doing a great deal more to boost student achievement, especially related to grades, and providing structured supports around these students to ensure that they apply, and enroll in colleges that maximize students' chances of success. Colleges, on the other hand, play their own role in supporting students through graduation.

These findings challenge both high schools and colleges. For high schools, the importance of making hard work pay off lies in helping students make college choices that translate their high school preparation into the highest chance of earning a college degree. For colleges, the challenge in making hard work pay off is to provide the supports necessary for the high-achieving students they admit to continue to succeed on their campuses.

Appendices

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Appendix A. References

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Appendix B. Tables and Figures

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Table 1) Logistic regression of the effects of academic qualifications on four-year college attendees' probability of graduating in four years, including fixed effects of students' college.

	Coefficient	Standard Error
High School GPA	-.017	.315
GPA ²	.016	.054
ACT score	.014**	.047
ACT ²	-.005***	.001
GPA*ACT	.047***	.011
Female	.285***	.046
White	.423***	.073
Latino	.132	.070
Asian	.475***	.079
Concentrated Poverty	-.058***	.032
Social Status	.112	.315

Table 2) Predicted increase in graduation rate after simulating increases in students' college choices.

	Original Graduation Rate	No Students Undermatch ¹	No "below average" colleges ¹
All Students	26%	4.0	5.1
Very Selective Access 8%	63%	8.6	4.1
Selective Access 24%	33%	6.4	5.9
Somewhat Selective Access 41%	14%	2.0	5.2
Nonselective Access 24%	7%	0 ²	3.8

Note. ¹ Column represents the percentage points added to the predicted graduation rate under each simulation. ² By definition, all students with nonselective access are at least matching in their college choice by attending any four-year college, regardless of selectivity level.