Determinants of Mismatch Between Student Ability and College Quality

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For many people a college education is one of the most significant investment decisions they will make, both in terms of the costs of going to college and of the potential returns to that investment. We consider how students and their families make the decision of which, if any, college they will attend. While most college-bound students attend a school whose quality is fairly proportional to the student's ability, there are many relatively weak students at competitive schools and even more high-ability students at relatively low quality schools.

A poor match between student and school characteristics can have a number of negative consequences for the student. Workers receive an extra wage premium for attending a high quality college, so a student who attends a school for which she is over-qualified may be foregoing some of her potential returns to attending college. Students who are over- or under-qualified for their school may be less likely to graduate and more likely to transfer or take extra time to complete their degree.

Previous research has demonstrated that many factors besides ability influence a student's choice of college. Griffith and Rothstein (2007) find that students are more likely to apply to a selective college if they live near one, have highly-educated parents, or live in a zip code with high average income. Brand and Xie (2007), and others in the sociology literature, have stressed that the college decision is heavily influenced by social and economic background.

We move beyond the existing literature in looking explicitly at the causes of both forms of mismatch, with particular attention to information and financial constraints. We consider over-qualification and under-qualification separately since it seems likely that they are different phenomena. We expect that some students are better informed about the types of colleges they might attend, the effects of attending different qualities of college, and perhaps about their own abilities relative to other college students. This type of information constraint could affect mismatch in either direction. Students may also be more or less able to pay for the more expensive colleges. These financial constraints should be more important in predicting over-qualification. We use data from the 1997

National Longitudinal Study of Youth. Most of the participants in this survey graduated high school between 1998 and 2002, so we can study the decisions of a very recent cohort of college attendees.

Our measure of college quality is the first principal factor across mean SAT score, percent of applicants rejected, freshman retention rate, average faculty salary, and faculty-student ratio. This measure combines peer and institution characteristics. Our measure of student ability is their score percentile on the Armed Forces Vocational Aptitude Battery (ASVAB). Table 1 gives the joint distribution a student's ability quartile among college-goers and the quality of the school she attends. Students are concentrated along the left to right diagonal, which indicates a good match, but there is also a substantial proportion of mismatched students. Many previous discussions of mismatch have been framed by a discussion of affirmative action, and have therefore focused on apparently under-qualified students, but we find that strong students at weak schools are at least as common a problem.

We define a student as over- or under-qualified for their school if their ASVAB percentile is more than 20 points above or below, respectively, the college quality percentile of the school they attend. This cutoff assigns about a quarter of our sample to each mismatch category. Table 2 describes student characteristics by match quality, as compared to all students who attend a 4-year college.

To capture the possibility that a student is financially constrained we include their household's income quintile, among all U.S. households, and the in-state tuition at the flagship public university in the state where they lived in their last year of high school. In-state tuition is lower, on average, for students who end up over-qualified for the school they attend. This is consistent with the idea that students may stay in state to take advantage of lower tuition rather than paying more for the highest quality school they can get into.

Our measures of information constraints fall into two categories. Mother's education, share of adults in the student's census district that have college degrees, and quality of the student's state flagship capture the student's access to information and role models for college attendance. The number of college applications that the student submitted, along with the average and standard deviation of the quality of the schools to

which they applied, give more direct information about how the student conducted their college search. Students who end up under-qualified for their colleges are more likely to have grown up in highly educated districts and in states with strong flagship universities. This pattern is consistent with the idea that cultural standards can influence college choices regardless of individual ability. Students who end up over-qualified for their schools applied, on average, to fewer schools, but also to a wider range of school qualities.

These preliminary results suggest that both financial and information constraints play a role in determining mismatch. However, we do not yet know the importance of these two factors or the correlations between the two. In our next steps we will calculate a more formal propensity to be over- or under-qualified using appropriate probit regressions, isolating the influences of these two constraints.

References

Arulampalam, Wiji, Robin A. Naylor and Jeremy P. Smith. 2005. "Effects of in-class variation and student rank on the probability of withdrawal: cross-section and time-series analysis for UK university students." *Economics of Education Review*, 24.

Black, Dan and Jeffrey Smith. 2004. "How Robust is the Evidence on the Effects of College Quality? Evidence from Matching." *Journal of Econometrics*. 121(1).

Brand, Jennie E. and Yu Xie. 2007. "Who Benefits Most from College? Evidence for Negative Selection in Heterogeneous Economic Returns to Higher Education." California Center for Population Research Working Paper Series 033-07.

Bound, John, Michael Lovenheim, and Sarah E. Turner. 2007. "Understanding the Decrease in College Completion Rates and the Increased Time to the Baccalaureate Degree." PSC Research Report No. 07-626.

Griffith, Amanda and Donna Rothstein. 2007. "Can't Get Here from There: The Decision to Apply to a Selective Institution." Cornell CHERI WP 100.

Light, Audrey and Wayne Strayer. 2000. "Determinants of College Completion: School Quality or Student Ability?" *The Journal of Human Resources*, 35(2).

Table 1: Joint Distribution of Student Ability and College Quality

Ability Quartile	College Quality Quartile			
	1	2	3	4
1	9.52%	8.93%	3.92%	2.48%
2	6.47%	7.25%	6.55%	4.71%
3	4.20%	5.92%	8.02%	6.80%
4	2.97%	4.51%	6.29%	11.46%

Table 2: Student Characteristics by Match Category

	College Attendees	Under qualified	Well matched	Over qualified
Observations	3,476	523	913	436
Age when starting college	18.4	18.6	18.6	18.5
% Male	45.4%	35.0%	44.9%	56.4%
% Black	22.0%	24.9%	21.2%	10.3%
% Hispanic	14.0%	12.8%	10.7%	8.3%
Ability percentile	45.9	26.4	46.5	68.1
Financial Constraints				
Household income quintile	3.2	3.2	3.3	3.3
Instate tuition at state flagship	$4,430	$4,576	$4,507	$4,386
Information Constraints				
Mother's years of education	13.8	13.9	14.3	14.4
Number of colleges applied to	2.4	2.9	2.4	2.2
Mean quality of colleges applied to	49.5	62.6	49.1	35.5
Std dev of quality of colleges applied to	18.7	17.1	17.6	24.2
Quality of state flagship	74.9	78.1	74.6	69.1
% in census district with BA	20.6	22.2	21.3	19.4