A Study of College-Student Mismatch

Dillon & Smith (2013) recently released an in-depth analysis of a national data sample to explore the concept of college-student mismatch. They make the following points, among others, in their analysis:

1. “First, using our definition of academic mismatch between students and colleges, we find substantively important amounts of both undermatching and overmatching…” [p.30]  “In practice, substantial gaps between a student’s ability percentile and her college’s quality percentile are quite common…high ability students at low quality colleges, account for 12.5% of the sample, while…low ability students at high quality colleges, account for 12.9%…” [p.13]

2. “Second, this mismatch largely results from choices made by students and their families, not by college admissions offices. The vast majority of students who end up mismatched either did not apply to any well-matched schools or were accepted to at least one well-matched school but attended a mismatched school instead.” [p.30]

3. “Third, we find some evidence that financial constraints lead some students to undermatch, as students from the wealthiest families undermatch less often…” [p.30]

4. “Fourth, information matters, though not in the way we expected it to. We thought more informed students would have a lower probability of both types of mismatch. Instead we found that our proxies for information lower the probability of undermatching but raise the probability of overmatching. We interpret this as evidence that informed students and their families believe that the benefits of college quality more than compensate for any possible costs of overmatch.” [p.30]

5. “Fifth, we find that students with a well-matched public college within 50 miles are less likely to mismatch in either direction. In-state tuition policies often make attending a home state college much less expensive than other options; and a nearby college allows living at home or, at least, lower travel costs to visit…” [pp.30-31]

“...A more obvious interpretation follows our finding that having a public four-year that is a good match within 50 miles (and within the state) leads to almost a five percentage point decrease in the probability of undermatching. This suggests that a desire to live nearby, whether to save money by living at home or to stay near family and high school friends plays a key role in driving undermatching... having a matched private within 50 miles reduces the probability of undermatching as well, by nearly five percentage points. Students make tradeoffs between tuition, travel and room and board costs, and quality at the margin in reasonable ways. Less easy to interpret is the strong positive effect of having a well-matched private college within 50 miles on the probability of overmatching, which it increases by 0.106. Taken together, our findings on the substantively important role of distance in college application and enrollment generally parallel those in the broader literature...” [p.23]

6. “...Students in the northeast have a 16 percentage point higher probability of overmatching and an 11 percentage point lower probability of undermatching than students in the Midwest. Perhaps more surprisingly, students in the south and west also have lower probabilities of undermatching than those in the Midwest. We suspect that some of the regional differences in our estimates spring from regional differences in the relative importance of state and private colleges. In contrast, we find little effect of living in a rural area, though we might expect one if colleges devote less recruiting effort to rural high school...” [p.21]

7. “...Taken together, the positive effects of parental education along with measures of information about college on the probability of overmatch suggest that more informed students (and their families) prefer to overmatch. That is, they view the benefits of attending a higher quality college as outweighing any possible costs of mismatch. Manski and Wise (1983) also find that students prefer colleges where the average SAT score is slightly higher than their own...” [p. 22]

“Those with the least educated parents and those with the most educated parents have the highest conditional probabilities of overmatching...” [p.20]

8. “...The opposite pattern holds for undermatching, with students with the most and least educated parents having substantially lower probabilities of undermatching. These patterns suggest a combination of disadvantage-based affirmative action at the lower end of the parental education distribution and the pursuit of college quality at the
upper end...” [p.21]

9. [When the analysis includes those who begin at 2-year colleges, this] “...increases the sample size substantially from 2,125 to 3,805. Second, both black and Hispanic students are now more likely to be overmatched for their college, not less, and less likely to be undermatched, a pattern consistent with affirmative action. Third, students from families in the top half of the wealth distribution are now more likely to be overmatched than students from less wealthy families as well as less likely to be undermatched. Fourth, the probability of overmatching is now (roughly) monotone in parental education, but quite non-linear, with all of the action at the margin between high school completion and some college... Fifth, 4-year in-state tuition at public colleges now has a (much) stronger negative effect on undermatching than on overmatching. Higher 2-year state tuition, which we include in this model for the first time, decreases overmatching and increases undermatching... Finally, the percentage of the student’s high school class going on to a 2-year college switches from imprecisely decreasing undermatching to strongly increasing it and decreasing overmatch...” [p.24]

10. “...The variables measuring income and education at the census tract level both positively affect overmatching and negatively affect undermatching,... Given the wealth of variables we condition on at the student level, the importance of the census tract level education variable surprised us...Among the variables drawn from the high school survey, the fraction of teachers with an advanced degree has no clear effect (and a zero point estimate for overmatching). This finding comports with a large literature – e.g. Rivkin, Hanushek and Kain (2005) – that finds that teacher advanced degrees have little effect on student outcomes...” [p.22]

11. [In our multivariate analysis,] “...We estimate separate probit models of undermatching and overmatching conditioning on demographics, multiple measures of ability, family background variables including parental education and family wealth, contextual variables related to the census region or tract in which the student finished high school, variables related to the state university system and variables related to the student’s high school... We find a lower probability of undermatching for male students, but little difference in overmatching. Race-based affirmative action programs should increase the probability of overmatch for minority students, conditional on their measured ability. We do not find evidence of this effect for either blacks or Hispanics. In contrast, students in the “other” category, mostly Asians, have a substantially higher probability (0.08) of overmatching and a correspondingly lower probability (-0.11) of undermatching... Ability has a mechanical effect on the probability of mismatch. Very able students will have few schools for which they are overmatched and many schools for which they are undermatched...” [p.18]

12. “The final set of covariates summarizes state higher education policy. Average four year in-state tuition at public colleges (entered in log form to allow for a non-linear relationship) decreases the probability of both overmatching and undermatching, though the latter effect does not attain statistical significance...” [p.22-23]

13. “We employ three alternative measures of mismatch...Our primary measure of mismatch combines the student ability and college quality measures just described. We calculate the college’s quality percentile across all four-year institutions in the United States included in the IPEDS, weighted by student body size. When considering both 2-year and 4-year college starters we calculate student ability percentiles across all 2- and 4-year starters in the NLSY97 sample and calculate weighted college quality percentiles using all 2-year and 4-year colleges in IPEDS and the 6-factor college quality measure...” [p.13]

This analysis will have relevance for researchers and policy makers because knowledge development about college mismatch poses a tricky analytical task that could guide decisions at multiple levels of responsibility (the institution, the state, and the nation). Note that this paper does not explore the merits or consequences of mismatch. Nonetheless, analysts and administrators could apply this kind of information to help understand the college enrollment decisions of students who matriculate at their institution (or an alternative institution or segment for that matter).

Eleanor Wiske Dillon (Dept. of Economics, Arizona State University) and Jeffrey Andrew Smith (Dept. of Economics, University of Michigan) detail their analysis in a 51-page working paper (“The Determinants of Mismatch between Students and Colleges”) released through the National Bureau of Economic Research (Working Paper 19286). The paper should be accessible to readers with a background in data analysis and higher education. It includes a helpful discussion of the mismatch concept as well as extensive appendices and references.

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