Are the "Best and Brightest" Going into Finance? Skill Development and Career Choice of MIT Graduates

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*Harvard Business School, Harvard University, Boston, MA 02163. Email: pshu@hbs.edu. I have benefited from the helpful comments and suggestions of Daron Acemoglu, David Autor, JB Doyle, Shane Greenstein, Robin Greenwood, Gordon Hanson, Victoria Ivashina, Steven Kaplan, Lawrence Katz, Josh Lerner, John S. Reed, Antoinette Schoar, Erin Scott, Scott Stern, Jialan Wang, and conference and seminar participants at the Economics of Entrepreneurship and Innovation Conference at Queens University, Duke Strategy Conference, Fudan University, HBS, NBER Productivity, Innovation, and Entrepreneurship Program Meeting, National University of Singapore, MIT, Stanford, Society of Labor Economists Annual Meetings, UC Berkeley, and UCSD. I am grateful to Suzanne Berger, Maggy Bruzelius, Claude Canizares, Daniel Hastings, Elizabeth Hicks, Deborah Liverman, Brendon Puffer, Joseph Recchio, Ri Romano, Stuart Schmill, Lydia Snover, Ingrid Vargas, and especially Gregory Harris for help with data collection. Kristiana Laugen, Eamon O'Brien, Rohan Thavarajah, and Yue Wang provided excellent research assistance. This project was supported by the Kauffman Foundation and the Division of Research at Harvard Business School. All errors are my own.

Abstract

Using detailed data on recipients of bachelor's degrees from MIT between 2006 and 2012, I examine the selection of students into finance or science and engineering (S&E). I find that academic achievement in college is negatively correlated with a propensity to take a job in finance and positively correlated with a propensity to pursue a graduate degree or taking a job in S&E. This pattern is primarily driven by differences in skill development during college, not by differences in academic qualifications at college entry. In both high school and college, the two groups participate in different activities: students who ultimately choose finance are substantially more likely to be varsity-sports leaders in high school; they are also more likely to join fraternities and sororities, a decision typically made at college entry. Sizable differences in academic performance begin in freshman year and persist throughout college. The 2008 financial crisis, which substantially reduced the availability of entry-level positions in finance, prompted some students with relatively low college-entry qualifications to major in S&E instead of management or economics and/or to improve their academic performance. But there is no evidence that those with top qualifications changed their skill development in response to the crisis. Taken together, the results demonstrate that the preferences and skills of graduates who pursue finance are not comparable to those of graduates who choose a career in S&E.

1 Introduction

A nation's supply of scientists and engineers is critical to its innovation and growth (Atkinson, 1990; Baumol, 1990; Murphy et al., 1991; Jones, 1995; Romer, 2000). Recent policy reports, however, point to an alarming shortage of qualified workers in science and engineering (S&E) in the United States (Carnevale et al., 2011; President's Council of Advisors on Science and Technology, 2012; Salzman et al., 2013). Previous studies of the S&E workforce largely examine the decision to pursue a bachelor's degree in S&E (Freeman, 1975a,b; Ryoo and Rosen, 2004). But a substantial proportion of S&E degree-earners do not go on to work in S&E occupations (National Science Foundation, 2008; US Census Bureau, 2014), and little is known about their career choices.

High wages in some non-S&E sectors, notably finance, may make a career in those sectors more desirable than a career in S&E. Philippon and Reshef (2012) find that the wage gap between financiers and engineers, conditional on earning a post-graduate degree, grew from less than 5 percent to over 30 percent between 1980 and the early 2000s.[1] At elite universities like Massachusetts Institute of Technology (MIT), Harvard, Yale, and Princeton, finance was the most popular industry for graduating seniors before the 2008 financial crisis (Hastings et al., 2010; Rampell, 2011).[2] The chair of the Council of Economic Advisers, Christina Romer, cautioned in 2009 that "some of our brightest minds make small fortunes arranging the deals, rather than pursuing potentially more socially valuable careers in such fields as science, medicine, and education."

Much of the recent discussion of talent allocation has centered on whether wages in

[1]Several other studies also document the high relative wage in finance. Oyer (2008) and Goldin and Katz (2008) find that among Stanford MBA graduates and Harvard bachelor's graduates, financiers earn more than their peers. Kaplan and Rauh (2010) show that in 2004 the top 25 hedge-fund managers jointly earned more than all the CEOs of Standard & Poor's 500 companies combined. Bell and Van Reenen (2014) find that finance accounted for the majority of the increase in the top 1-percent earners' share of the UK wage bill since 1999. Bohm et al. (2015) show that the average wage in finance is higher than the average wage in the non-financial, non-farm private sector in Sweden, and that the gap has widened between 2000 and 2010.

[2]This finding excludes graduating seniors who entered graduate school immediately after college.

finance represent productivity or opportunities to seek rent.[3] Little empirical evidence exists, however, on the types of top college graduates who enter finance and on whether they possess the skills and training to be productive in S&E sectors. Understanding selection into finance versus S&E sectors has important implications, since the top of the skill distribution accounts for a disproportionately large amount of output in S&E.[4] A basic Roy (1951) model would predict that finance will not attract more productive scientists and engineers than S&E sectors if the correlation of skills in the two sectors is low or if the returns to skills are higher in S&E sectors than in finance. Using detailed data on recipients of bachelor's degrees at MIT between 2006 and 2012, this paper empirically examines the self selection of students into different careers based on their academic performance and participation in non-academic activities in high school and college.

As an elite sample of S&E talent, MIT graduates serve as a natural starting point for exploring whether finance and S&E sectors are competing for the best future scientists and engineers. Overall, 8.4 percent of MIT graduates in my sample entered finance; 73.4 percent of that group had majored in an S&E field.[5] I start by analyzing the correlation between academic performance and propensity to enter finance. Focusing on students who graduated prior to the financial crisis (i.e., the classes of 2006–2008),[6] I find that conditional on demographics, academic performance in high school—measured by an index score constructed by MIT's Admissions Office—does not predict the propensity to enter finance after graduation. However, an increase in cumulative grade-point average (GPA) in college is associated with a large and significant *decrease* in the probability of entering finance,

[3]Zingales (2015) summarizes this discussion and points out the inconsistency between academics' perceptions of the value of the financial sector and the public's perceptions. It also provides evidence on potential sources of inefficiencies in finance.

[4]For instance, star scientists are not only extremely productive, they also generate substantial and positive spillovers via influence on collaborators and doctoral students (Lotka, 1926; Azoulay et al., 2010; Waldinger, 2010).

[5]Almost all of the S&E majors who entered finance had majored in engineering, math, or physics. In contrast, science majors in fields other than math and physics—including biology, chemistry, earth sciences, and neuroscience—are extremely unlikely to go into finance.

[6]The propensity to enter finance decreased drastically in cohorts that graduated after 2008.

and the correlation remains strong and significant after controlling for academic performance in high school. Only 6.5 percent of those graduates with top-quartile GPAs went into finance after graduation; otherwise similar graduates from the bottom quartile were 2.5 times more likely to enter finance. In contrast, there is a large and positive correlation between GPA and propensity to pursue an S&E graduate degree or job.

Although academic achievement in college does not necessarily capture all of the skills valued in S&E sectors, it measures specialized human capital in a given field, which is important in S&E where knowledge production is highly cumulative (Jones, 2009; Furman and Stern, 2011).[7] I further show that, compared to similar graduates entering S&E sectors, graduates entering finance are significantly less likely to report that their analytical and critical-thinking skills improved between college entry and graduation. These findings suggest that the returns to academic and analytical skills are lower in finance than in S&E sectors.[8] As a result, relatively few of the graduates entering finance come from the top of the S&E skill distribution at MIT at college graduation.

Since finance may not prize academic and analytical skills as highly as S&E sectors, the prospect of a career in finance could discourage capable S&E students from acquiring more of these skills during college. Alternatively, some students might simply like spending time on non-academic activities, regardless of future career options. I provide two sets of evidence on how preferences and anticipated career incentives shape students' skill development in college. First, I show that differences in skill development appear very early. During high school, students who will ultimately enter finance are much more likely to take leadership positions in varsity sports and student clubs (i.e., community service, student government, or student publications). During college, the same students are significantly more likely to

[7]Consistent with this argument, Shu (2012) uses data on MIT bachelor's graduates between 1980 and 2005 to show that college GPA positively and significantly predicts future patenting.

[8]Both monetary and non-pecuniary incentives could drive the differences in returns to skills. It is possible that finance values academic and analytical skills highly but the most skilled S&E graduates have strong preferences for working in S&E. Previous work has found tastes to play an important role in PhD scientists' career choices (Stern, 2004; Roach and Sauermann, 2010; Agarwal and Ohyama, 2012).

join a fraternity or sorority, a decision typically made on arrival at MIT.[9] They also earn significantly lower grades each term, starting in freshman year, and take significantly fewer courses during their first two years. The two groups thus make different decisions very early about allocating their efforts between coursework and social activities, probably before most have formed clear career intentions.[10]

Second, I show that the 2008 financial crisis and subsequent Great Recession influenced students' skill development during college, but that its effect was concentrated among students with relatively low admission-index scores. Using the previous cohorts as the control group, I find that around 4 percent of the class of 2012, who were freshmen at the peak of the crisis, changed their intended major from management and economics to an S&E field;[11] these students had much lower academic-index scores than both the average management and economics major and the average S&E major. Some students in the bottom quartile of academic-index scores took more courses and earned better grades than did their counterparts in pre-crisis cohorts during the same phase of college, but the magnitudes of these changes are modest. Importantly, there is no evidence that students with top academic-index scores changed their majors or improved their academic performance after the onset of the crisis and recession. Taken together, both sets of evidence indicate that the appeal of finance has limited influence on the skill development of the students with top college-entry qualifications.

Like Goldin and Katz (2008) and Oyer (2008), this paper draws on both survey data and administrative data to examine the career choices of graduates at a top institution.[12] It differs

[9]Rush at MIT takes place in the fall of freshman year. See Lehn (2008) and Dominguez (2014) for a description of the process.

[10]Prior studies have found that, early in college, students have inaccurate beliefs about earnings in different sectors and professions and are uncertain about their own academic abilities (Betts, 1996; Zafar, 2011; Wiswall and Zafar, 2014; Stinebrickner and Stinebrickner, 2014; Kinsler and Pavan, 2015).

[11]A student's intended major is the first major declared at MIT. The vast majority of students first declare a major in the fall of sophomore year. Virtually all students who declare a first major in S&E graduate with an S&E major.

[12]Goldin and Katz (2008) find that the proportion of male Harvard College graduates working in finance tripled between the class of 1970 and the class of 1990. Oyer (2008) shows that obtaining a

from those studies by analyzing graduates' self-selection into different careers. Moreover, my sample is more relevant for understanding the labor supply of the S&E workforce. Recent studies have also examined college students' decisions to major in S&E fields (Kirkeboen et al., 2014; Stinebrickner and Stinebrickner, 2014; Arcidiacono et al., 2015) and S&E doctoral candidates' decisions to work in academia or in industry (Stern, 2004; Roach and Sauermann, 2010; Agarwal and Ohyama, 2012). This paper provides new evidence on how S&E majors make career choices in college.

The paper also contributes to the literature on the returns to skills in finance (Philippon and Reshef, 2012; Bohm et al., 2015; Celerier and Vallee, 2015). Using data from the United States, France, and Sweden, prior studies have shown that finance attracts more skilled workers than the rest of the economy.[13] My findings suggest that the relative returns to skills in finance for elite S&E graduates differ from those for the general population. Furthermore, by showing that, on average, graduates entering finance are less academically accomplished but more socially inclined, this paper also relates to the growing literature on the importance of social skills in the labor market (Kuhn and Weinberger, 2005; Borghans et al., 2008; Krueger and Schkade, 2008; Weinberger, 2014; Deming, 2015) and to the broad literature on job assignment of workers with multiple skills (Mandelbrot, 1962; Rosen, 1983; Heckman and Scheinkman, 1987; Gibbons et al., 2005; Firpo et al., 2011).

Finally, this paper complements a large literature on determinants of the choice of college major, which Altonji et al. (2012) summarize. Several recent studies use data on students' subjective expectations to show that choices of major are largely driven by unobserved preferences (Beffy et al., 2012; Wiswall and Zafar, 2014; Arcidiacono et al., 2014). I find

first post-MBA job in finance has a causal impact on Stanford MBA graduates' propensity to work in finance over the long term.

[13]These studies also examine changes in the returns to skills in finance over time. Philippon and Reshef (2012) document the growing skill intensity of workers in finance, and the increasing analytical complexity of work in finance. Celerier and Vallee (2015) find that the monetary returns to attendance at a higher-ranked engineering school have increased over time for French engineering graduates. In contrast, Bohm et al. (2015) find that returns to skills in finance have not improved or increased over time for Swedish workers.

that, conditional on academic interests, preferences also influence allocation of effort between coursework and other activities.

The paper is organized as follows. Section 2 describes the data. Section 3 examines selection into a career choice by academic performances in high school and college. Section 4 compares the high-school and college extracurricular activities of graduates who choose different career paths. Section 5 analyzes changes in students' skill development after the 2008 financial crisis. Section 6 summarizes the key findings and discusses their external validity, and Section 7 concludes.

2 Data

I collect data from various administrative offices at MIT about non-transfer students in the classes of 2006–2012, a total of 6,469 individuals.[14] A graduate's class year, as reported to the Alumni Association, is used to identify his or her cohort.[15] I observe such demographics as gender, birth year, ethnicity/nationality, and high-school location, and use financial aid received during senior year as a proxy for family income.

Skill measures and activities

I collect measures of each graduate's academic qualifications at college entry and academic achievement at graduation. For each applicant to MIT, the Admissions Office constructs an index score consisting of a weighted average of objective measures, including standardized test scores, high-school grades, and the difficulty of high-school courses. I standardize this admission index within each cohort so that the reported statistics are measured in standard deviations from the cohort mean. To measure academic achievement at college graduation, I

[14] These offices include the Registrar's Office, the Alumni Association, the Admissions Office, Career Services, and Student Financial Services. I exclude from my analysis 104 transfer students, whose skill development in college is only partially observable.

[15] The self-reported cohort is typically based on the year of college entry and is thus a better measurement of entry cohort; it differs from the year of degree conferment in rare instances when a student takes a leave and then returns to finish the degree.

use cumulative GPA, standardized within each cohort. I use the number of units passed and GPA earned during each term to measure a graduate's course load and academic performance over time.

To earn a bachelor's degree from MIT, a student must satisfy the requirements of the core curriculum and those of his or her department of choice. The core curriculum consists of courses in subjects ranging from science and engineering to humanities; freshmen and sophomores typically take core-curriculum courses and introductory courses in their fields of interest. By the end of sophomore year, students must declare a major. In the junior and senior years, they take specialized courses. I use a student's first declared major to capture his or her early academic interest. In the classes of 2006–2012, 90 percent of students declared a major in the first semester of sophomore year. I also observe each graduate's major(s) at graduation.[16]

I capture non-academic skills using participation in extracurricular activities during high school and college. For graduates in the classes of 2010–2012, I obtain information on participation in and leadership of extracurricular activities in high school.[17] For the classes of 2006 and 2008, I collect student responses to Senior Surveys describing participation in extracurricular activities during college.[18] I subdivide these activities into three sets: sports, performing arts (music, theater, and dance), and clubs (community service, student government, and student publications). I also observe membership in fraternities and sororities. Table A.1 in the Data Appendix provides an overview of the skill measures and activities.

Career choices

I use graduates' initial career choices to determine their sector after graduation; this information comes from the Graduating Student Surveys administered to students in the

[16]Around 18 percent graduated with double majors.

[17]The data came from the Admissions Office; data are not available on earlier cohorts.

[18]Senior Surveys are administered every other year.

spring of senior year.[19] I then assign each graduate to one of three categories: S&E, Finance, and Other.[20] S&E encompasses graduate study in science or engineering and employment in an S&E industry. Finance signifies employment in finance. The remaining graduates enter a non-S&E graduate program or a non-S&E industry other than finance (e.g., consulting, law, and architecture) or pursue an activity other than employment or graduate school (e.g., a fellowship, travel, the military, and volunteer work).

Some graduates may pursue their initial choices only briefly before changing careers (e.g., earning a master's degree in S&E and then entering finance). To investigate how often such transitions occur, I use graduates' profiles on LinkedIn to identify their sectors as of August 2014; the Data Appendix explains the methodology. Table A.2 shows that, among graduates who started out in S&E and for whom I observe subsequent outcomes in August 2014, 92.3 percent were still in S&E. Only 2.4 percent had switched to finance.[21]

2.1 Descriptive statistics

Table 1 reports the descriptive statistics. Of the 6,469 graduates in the full sample, I observe the initial career choices of 3,769 graduates. These graduates are more likely to be female and Caucasian or Asian American than the average student body. The oversampling of certain gender or ethnicity could bias my results if the returns to skills in finance and S&E differ substantially by these characteristics. I investigate this possibility in my empirical analysis.

Of graduates with non-missing initial career choices, 8.4 percent took a first job in finance, 64.3 percent pursued graduate degrees or jobs in S&E, and 27.3 percent pursued other paths. Because S&E and other non-finance careers jointly encompass graduates who enter

[19] MIT grants degrees in February, June, and September. Graduating Student Surveys are sent only to June graduates, who represent the vast majority.

[20] Assignment of an employer to an industry is performed manually via online search. In cases of missing information on an employer, I use the industry self-reported in the survey.

[21] The use of August 2014 outcomes does not capture graduates who started in S&E, worked in finance briefly, and then returned to S&E. One can argue that these graduates should be categorized as in S&E since they worked in finance only briefly. They are likely to be very few in number.

varied industries and graduate programs, their numbers are much larger than the number of graduates who choose finance. Table A.3 in the Data Appendix, using a more detailed classification of career destinations, shows that finance is the most popular industry among graduates entering the labor market; it attracts 25 percent more graduates than the most popular S&E industry, computer and information technology.

Compared to graduates with initial career outcomes in S&E, those with initial career outcomes in finance are on average less likely to be female or Caucasian American and more likely to be Asian American. Those with initial career outcomes in finance also receive less financial aid on average. Nearly all graduates with initial career outcomes in S&E are S&E majors (98 percent). In contrast, financiers are much more likely to have majored in management or economics (45 percent). Still, the fraction of financiers with a major in science and engineering is substantial (73 percent), as most of MIT graduates major in science and engineering (around 90 percent). Around 19 percent of financiers double major in management or economics and S&E.

Figure 1 plots the distribution of majors at graduation by first declared major. Around 84 percent of students who declared first majors in management or economics graduated with a major in those fields; 27 percent pursued a second major in S&E. Nearly 97 percent of students who declared first majors in S&E graduated with a major in those fields; a small number double-majored in management/economics and S&E. Only 1.5 percent of students who initially majored in S&E switched entirely to management and economics. These numbers suggest that interest in S&E majors coalesces by the third semester and persists.

Figure 2 shows the proportion of graduates in each major who pursue careers in finance.[22] Graduates with majors in either management or economics exhibit the highest probability of working in finance. Interestingly, the propensity of graduating S&E majors to pursue

[22] For each major, I calculate the average of two proportions: the proportion of graduates whose first job is in finance and the proportion still working in finance in August 2014. The proportions are calculated respectively within the sample of students whose initial and subsequent (August 2014) career choices are available.

careers in finance ranges widely, from 24.4 percent for math majors to 2 percent for chemistry majors. Overall, nearly 8.5 percent of engineering, mathematics, and physics majors become financiers; only 1.4 percent of other S&E majors (i.e., life sciences, chemistry, and earth sciences) do so. Jointly, engineering, mathematics, and physics majors account for nearly 98 percent of S&E graduates who enter finance.

Figure 3 plots the proportion of graduates in each cohort who pursue each of the three initial career choices (finance, S&E, and other) for all majors and for engineering, mathematics, and physics majors. The overall proportion of graduates entering finance decreased noticeably after 2008, as did the proportion of graduates who pursued fields other than finance and S&E. These decreases are mirrored by increases in the proportion entering science and engineering. These trends suggest that the 2008 financial crisis and subsequent Great Recession influenced graduates' probability of entering finance. But because these aggregate shocks to the economy could have different effects on the relative attractiveness of finance, S&E, and other sectors for different graduates, further analysis is needed to pinpoint the extent to which the marginal financiers—those who did not enter finance after the financial crisis—entered S&E instead of other non-S&E sectors. Examining the impact of the financial crisis on initial career choices is beyond the scope of this paper.

3 Academic Performance and Propensity to Enter Finance

This section examines the correlation between academic performance and propensity to enter finance. I use the admission-index score to measure academic performance in high school and cumulative GPA at college graduation to measure academic achievement in college. Figure 4 plots the proportions of graduates entering finance and S&E by admission-index and GPA quartile dummies. Panel A in Figure 4 shows that students between the 25th and 50th percentiles of admission index are the most likely to enter finance, but the differences across admission-index quartiles are small; there is a positive correlation between admission-index score and propensity to enter S&E. In contrast, Panel B shows different patterns for academic performance in college. Students in the higher percentiles of GPA are less likely to enter finance and the magnitudes of the differences are large: in the lowest quartile, 15 percent of students enter finance; in the highest quartile, the proportion of students entering finance is less than half that of students from the bottom quartile. Furthermore, the propensity to enter S&E is much higher among graduates in the top GPA quartile than among those in the top admission-index quartile.

Figure 5 demonstrates that, within each admission-index quartile, students who pursue finance have lower average GPAs than students who enter S&E. The pattern applies to all students and specifically to those who major in engineering, math, and physics. The magnitude of the difference ranges from 0.25 to 0.4 standard deviations for all students and from 0.28 to 0.32 standard deviations for engineering, math, and physics majors. This pattern suggests that some students who end up in finance perform less well academically than others with similar levels of estimated academic ability at college entry. I use regressions to confirm that these results are statistically significant and robust to controlling for students' majors and characteristics.

3.1 Regression Specifications

I estimate regressions of the following form:

$$Pr\left(Outcome\right) = \alpha + \beta f\left(AI_i\right) + \delta \chi_i + \gamma D_i^{Cohort} + \epsilon_i, \tag{3.1}$$

$$Pr\left(Outcome\right) = \alpha + \beta f\left(GPA_i\right) + \theta D_i^{Major} + \sigma AI_i + \delta \chi_i + \gamma D_i^{Cohort} + \epsilon_i, \tag{3.2}$$

where the dependent variable is whether a graduate enters finance (or S&E), χ_i is the set of demographic controls for gender, age, ethnicity, high-school region, and financial aid; D_i^{Major} is the full set of major dummies; and D_i^{Cohort} is the full set of cohort dummies. For $f\left(AI_i\right)$ and $f\left(GPA_i\right)$, I consider one set of specifications with linear form and one set of specifications with quartile dummies.

The coefficient of interest in both Equations (3.1) and (3.2) is β, which shows the correlation between academic performance and initial career choice conditional on demographics and cohort fixed effects. For GPA, I also include major fixed effects, since different majors may have different distributions of grades. I estimate Equation (3.2) with and without controlling for admission index.

3.2 Regression Results

Table 2 presents the OLS estimates of Equation (3.1) with robust standard errors. Controlling only for cohort fixed effects, there is a small and positive correlation between admission index and propensity to enter finance, which is statistically significant at the 10-percent level (column (1)). But the coefficient estimate becomes negative and insignificant once I include controls for demographics in column (2). Column (3) shows that, compared to students with admission-index scores in the bottom quartile, students in the other quartiles do not differ markedly or significantly in their propensity to enter finance. In columns (4) to (6), the dependent variable is whether a graduate enters S&E sectors. Conditional on demographics and cohort, a one-standard-deviation increase in admission index is associated with a 6.3 percentage-point increase in the probability of entering S&E, equivalent to a 10.6 percent increase from the baseline probability of 59.6 percent. Whereas finance is comparably likely to hire students from all quartiles, S&E sectors are more likely to attract students with admission-index scores in the top two quartiles than in the bottom quartiles.

Table 3 reports the OLS estimates of Equation (3.2) with robust standard errors clustered by cohort and major.[23] The estimates in the first two columns indicate that graduates with higher GPAs are significantly less likely to enter finance regardless of whether I control for admission index. Conditional on admission index, demographics, major and cohort fixed effects, a one-standard-deviation increase in GPA is associated with a 4.1 percentage-point decrease in the proportion of graduates entering finance, equivalent to a 36.3 percent decrease

[23] For students with double majors, each combination of majors is a separate cluster.

from the baseline probability of 11.3 percent. Only 6.5 percent of graduates in the highest GPA quartile pursued finance, a much lower proportion than the analogous 10.6-percent probability for the top admission-index quartile. Column (3) shows that 2.5 times as many of the top graduates would have become financiers had they shared the propensity to enter finance of counterparts in the bottom quartile. Columns (5) to (7) show that graduates with higher GPAs are significantly more likely to enter S&E sectors, and the coefficient estimates for GPA are stronger than those for admission index. In columns (4) and (8), I restrict the analysis to graduates with engineering, math, and physics majors and obtain similar coefficient estimates. Table A.4 in the Data Appendix shows that the coefficient estimates are nearly identical using OLS, Probit, and Logit. It also shows that there are no meaningful differences between selections into quantitative and non-quantitative jobs in finance.[24]

3.3 Extensions

I provide two extensions to the main analysis. The first extension explores heterogeneity across demographics by interacting academic performance with gender or ethnicity. Table 4 reports the results and yields three observations. First, male and female students differ significantly in their selection into finance. Among male students, both admission index and college GPA negatively and significantly predict the probability of entering finance; the coefficient estimate for GPA is more negative and significant. Compared to male students, female students exhibit less negative correlations between the measures of academic performance and propensity to enter finance, and the F-tests do not reject the null hypotheses that these correlations are zero. Since my sample of graduates with non-missing initial career choices includes more female students than does the MIT student body as a whole (Table 1), it is possible that my results underestimate overall negative selection into finance at MIT by college academic performance. Second, the coefficient estimates for academic performance

[24] I construct an indicator variable that specifies whether a job in finance is likely to be quantitative; the indicator equals 1 if the employer is a hedge fund or the job entails trading or quantitative analysis. The most common job among non-quantitative positions in finance is investment-banking analyst.

do not differ significantly between Caucasian American and Asian American students, but there is some evidence that the correlation between GPA and propensity to enter finance is less negative for underrepresented minority students (i.e., Hispanic American, African American, and Other American students). Finally, selection into S&E sectors does not differ significantly by gender or ethnicity.

The second extension uses responses to Senior Surveys to construct alternative skill measures of academic performance. First, an indicator variable on interactions with faculty equals 1 if a student reports that two or more faculty members know him or her well enough to provide a recommendation for a job or graduate program. Second, a set of indicator variables measures self-reported improvement during college in an array of skills in critical thinking and scientific reasoning. Table 5 reports the conditional means of these measures for graduates who make different career choices. I estimate the conditional means by regressing each skill measure on dummies for initial career choice (S&E is the omitted group), admission-index-quartile dummies, controls for demographics, and cohort fixed effects. The results reinforce my main findings: graduates entering S&E are twice as likely as those entering finance to know faculty members well; they are also more likely to report improved analytical and critical thinking skills. Among engineering, math, and physics majors, the four skills that exhibit the largest and most significant differences are (1) formulating and creating original ideas and solutions; (2) understanding the process of science and experimentation; (3) gaining in-depth knowledge of a field; and (4) thinking analytically and logically.

4 Differences in Skill Development in High School and College

This section investigates the underlying reasons why students of similarly estimated academic ability at college entry differ in academic accomplishment during college. Both preferences for activities and anticipated career incentives could influence how students allocate time between coursework and other activities. The Theory Appendix provides a two-period, two-skill Roy model of endogenous skill development that shows how both factors affect time allocation during college. To empirically distinguish between the relative importance of unobserved preferences and incentives, I examine when differences in skill development begin to occur. The identifying assumption is that, in high school and the first year of college, students tend to make decisions based on preferences because their career interests are still hazy. Prior studies have found that, early in college, students have imperfect information about their academic abilities and about earnings in the labor market (Betts, 1996; Zafar, 2011; Wiswall and Zafar, 2014; Stinebrickner and Stinebrickner, 2014; Kinsler and Pavan, 2015). I have shown that most students decide on their majors in the third semester (Figure 1); in this section I focus on the allocation of effort between coursework and non-academic activities.

4.1 Extracurricular activities in high school and college

Table 6 reports the conditional means of graduates' rates of participation in activities in high school and college, using the same specifications as Table 5. Panel A shows that graduates who enter finance are more likely than similar graduates who enter S&E to have participated in or taken leadership positions in varsity sports and clubs in high school. These differences appear much larger and more significant for leadership roles than for mere participation. The 18.7 percentage-point estimated difference in the probability of being a varsity-sports captain is economically large, given that only 26 percent of graduates entering S&E were varsity-sports captains. Similarly, the difference in the probability of club leadership is 20.3 percentage points, suggesting that future financiers are 40.6 percent more likely to have been club leaders than future scientists and engineers. In contrast, graduates who enter S&E are more likely to have participated in or taken leading roles in performing arts (music or theater). These results suggest that college graduates who make different career choices had strong preferences for different activities even in high school. The results also hold if I restrict the sample to engineering, math, and physics majors.

Panel B presents the results for participation in college extracurricular activities. Again, graduates who enter finance are more likely to participate in competitive sports and less likely to participate in performing arts, but the differences are smaller and not statistically significant. Participation in clubs also exhibits a statistically insignificant difference. The lack of significant differences is unsurprising, since participation in extracurricular activities is much less commonplace in college than in high school.

Notably, graduates entering finance and S&E differ substantially in their participation in fraternities and sororities. Future financiers are 18 percentage points or 50 percent more likely to belong to a fraternity or sorority. This pattern suggests that future financiers are likely to have spent more time and energy than future scientists and engineers on social activities in college. Importantly, the rush schedule at MIT indicates that this is a decision made at college entry.

4.2 Academic performance over time in college

To determine when differences in academic performance begin to appear, I estimate the conditional means of graduates' course load and grades by semester using the following specification:

$$Y_{it} = \alpha + \beta_t D_i^{Outcome} + \delta \chi_i + \theta f(AI_i) + \mu D_i^{Major} + \gamma D_i^{Cohort} \times D_i^t + \epsilon_{it}, \qquad (4.1)$$

where the dependent variable is graduate i's GPA or number of course units in semester t ($t \in [1, 8]$); $D_i^{Outcome}$, χ_i, $f(AI_i)$, D_i^{Major} and D_i^{Cohort} are defined as in Equations (3.1) and (3.2); and D_i^t is the set of semester dummies. To obtain a balanced panel, I restrict the sample of analysis to those who earned a bachelor's degree in exactly eight semesters.[25]

Figure 6 plots the coefficient estimates of β_t and 95 percent confidence intervals by semester, with robust standard errors clustered at the individual level. Panel A shows the

[25] Doing so eliminates around 13.5 percent of graduates. Reasons for not graduating in eight semesters include early graduation, taking a gap year, and returning to finish a degree after a hiatus.

results for all graduates; panel B shows the results for engineering, math, and physics majors. The two sets of graphs exhibit similar patterns. Controlling for characteristics and academic qualifications at college entry, graduates entering finance earned significantly worse grades every semester.[26] The term-wise GPAs are not normalized within a cohort; the standard deviation is around 0.55 for all students. The coefficient estimates in Panel A thus range from 20 percent to 42 percent of the standard deviation, comparable to the magnitudes of the differences in Figure 5. In addition to receiving lower grades, future financiers also take significantly fewer courses. The magnitudes of the coefficient estimates are small: the estimates average to 2.3 units per term in the first two years for all students, or about 20 percent of a regular full-semester course load (12 units). Nevertheless, the patterns are consistent with GPA results; both show that graduates who choose finance perform worse academically than graduates with comparable characteristics and college-entry qualifications who choose S&E, and that these differences appear during freshman year.

Two other patterns in Figure 6 are interesting. First, differences in grades and course load do not grow in the second and third years. Thus, it is unlikely the case that unexpected poor academic performance in the freshman year systematically prompts students who will enter finance to expend even less academic effort in their second and third years. Second, differences in GPA between future financiers and future scientists and engineers become more negative during senior year, which suggests that differences in time allocation between coursework and other activities intensify once students have chosen their future careers.

5 The Impact on Skill Development of the Financial Crisis and Great Recession

To complement the analysis in Section 4, in this section I study the impact of the 2008 financial crisis, when Lehman Brothers filed for Chapter 11 bankruptcy protection, Merrill

[26] Grades are unavailable for the first semester, when students are graded either Pass or No Record.

Lynch was acquired under duress by Bank of America, and the U.S. Treasury and Federal Reserve Bank issued a $700 billion emergency bailout. The U.S. economy entered a recession, and the unemployment rate increased from 5.8 percent in 2008 to 9.3 percent in 2009. Figure 3 has already shown that the crisis had a striking impact on MIT graduates' propensity to enter finance: the 2009–2012 cohorts were 45 percent less likely to choose finance than the 2006–2008 cohorts, a decrease from 11.3 percent to 6.3 percent. In addition to reducing the availability of entry-level positions in finance, the crisis and events like the Occupy Wall Street protests may also have increased the perceived riskiness of a career in finance and decreased its perceived social value. Furthermore, as the unemployment rate rose, worsening job-market prospects may have encouraged undergraduates—regardless of their interest in finance—to consider graduate school rather than joining the workforce upon graduation (Bedard and Herman, 2008). These aggregate shocks thus provide an opportunity to identify whether students' skill-development choices are sensitive to sudden changes in anticipated future career incentives. Since the analysis in this section does not involve initial career choices, I use the full sample of non-transfer students.[27]

5.1 Impact on major choice

To examine the impact on students' choices of major, I estimate the following regressions:

$$Pr(Major_i = S) = \alpha_S + \beta_S D_i^{Cohort} + \delta_S \chi_i + \theta_S f\left(AI_i\right) + \epsilon_{S,i} \tag{5.1}$$

where the dependent variable is an indicator variable that captures either first declared major or major at graduation; D_i^{Cohort}, χ_i, and $f\left(AI_i\right)$ are cohort dummies, demographic controls, and quartile dummies for admission index, all defined earlier. The class of 2008, who graduated right before the peak of the financial crisis, is the omitted group. The identifying assumption is that students who graduated after 2008 would have exhibited patterns of

[27]Restricting the analysis to the sub-sample of graduates with non-missing initial career choices yields largely similar results.

majors similar to that of the class of 2008 if not for the influence of the crisis and recession. Because the classes of 2009 and 2010 had already declared majors by late 2008, the impact of economic crisis on their choice of majors is likely to be limited.

Figure 7 plots the coefficient estimates of β_S and 95 percent confidence intervals by cohort. In Figure 7, consistent with Figure 1, the pattern of first declared majors closely resembles that of majors at graduation. As expected, no statistically significant differences are evident between the 2008 cohort and those who graduated by 2010 (who had declared first majors before the financial crisis); nor does the class of 2011, who were sophomores in late 2008, exhibit statistically significant changes in choice of major. The class of 2012, however, was significantly less likely to major in management/economics and significantly more likely to major in S&E. The magnitude of the decrease in propensity to major in management/economics, relative to the class of 2008, is around 4.2 percentage points, comparable to the corresponding magnitude of the increase in propensity to major in S&E (3.7 percentage points). This shift is apparent as early as fall 2009, when most of the 2012 cohort first declared majors. Table A.5 in the Data Appendix shows that the results in Figure 7 hold after controlling for participation and leadership in high-school extracurricular activities; this finding indicates that the results are not driven by changes in MIT's admission policies.

The 3.7 percentage-point increase in propensity to major in S&E is small compared to the baseline probability of doing so (around 88 percent in 2008); it could have large implications, however, if it consists of students with top college-entry qualifications. To examine the qualifications of students at the margin between management/economics and S&E majors, I use an empirical test similar to that of Gruber et al. (1999) and Chandra and Staiger (2007):

$$Y_i = \alpha + \delta S_j + \epsilon_i \tag{5.2}$$

where the dependent variable is the normalized admission index and S_j is the share of management/economics majors in cohort j. The regression is estimated only within the sample of management/economics majors. Intuitively, δ measures how much the average admission index of management/economics majors changes when they are more numerous. A negative δ implies that students who remain management/economics majors are more highly qualified than students who switch to another major. Similarly, estimating the equation within the sample of S&E majors—where S_j is the share of S&E majors in cohort j—shows how each additional S&E major compares to the average S&E major.

In Table 7, Column (1) shows that marginal management/economics majors have much worse admission-index scores than the average management/economics major; the estimated difference is almost half of the standard deviation. Column (2) shows that, although there are fewer management/economics majors in the 2012 cohort, their average admission index is much higher than that of management/economics majors in previous cohorts.The coefficient estimates in both columns are statistically significant. Another approach is to compare the raw numbers of the classes of 2008 and 2012. Around 12 percent of the class of 2008 majored in management/economics; their mean admission index is 0.06. Around 8 percent of the class of 2012 majored in management/economics; their mean admission index is 0.26. A back-of-the-envelope calculation shows that those who would have majored in management/economics if they had belonged to the 2008 cohort instead of the 2012 cohort have a mean admission index of -0.34. Columns (3) and (4) show that marginal S&E majors are also less qualified than the average S&E major; the differences are not statistically significant because the changes in the proportion of S&E majors are relatively small.

5.2 Impact on academic performance

To study changes in students' academic performance, I estimate the following specification at the person*semester level:

$$Y_{it} = \alpha + \beta Post\_Fall2008_{it} + \delta\left(Controls_i\right) + \gamma D_i^t + \epsilon_{it}, \tag{5.3}$$

where Y_{it} is GPA or course units in semester t ($t \in [1, 4]$) and D_i^t is the set of semester dummies. The set of controls includes quartile dummies for admission index and demographics (χ_i), and dummies for first declared major and high-school activities. I restrict the sample of analysis to the 2010–2012 cohorts and the first four semesters, since different cohorts take similar general and introductory courses in the first two years. Post-Fall 2008 is an indicator variable that equals 1 for the spring 2009 semester and later.[28] Thus, β compares students' academic performance in semester t before and after the peak of the financial crisis. The identifying assumption is that, in the absence of the financial crisis and recession, students in the 2011 and 2012 cohorts would have exhibited course loads and grades similar to those of their counterparts in the 2010 cohort. To examine the differential impact across different admission-index quartiles, I estimate the regressions separately for students with top-quartile admission indexes, students between the 75th and 25th percentiles, and those in the bottom quartile.

Table 8 reports the coefficient estimates for β for different samples and different levels of controls. I find no evidence that students in the top quartile changed their academic performance in response to the economic shocks. There is evidence with marginal statistical significance that students between the 75th and 25th percentiles improved their grades, but the magnitude is small (around 7.6 percent of the standard deviation in the specification with the full set of controls). In contrast, students in the bottom admission-index quartile earned significantly better grades and took more courses than did similar students before the crisis. The results are robust to including different levels of controls, but the magnitudes are not large: improvement in GPA among students in the bottom quartile is around 20 percent of the standard deviation; the increase in the average course load is around 0.80 units, equivalent to only 6 percent of a course (12 units). As a falsification test, I estimate similar specifications on the 2006–2008 cohorts assuming that the shocks had occurred in

[28] For the class of 2010, the variable is 0 across all four semesters; for the class of 2011, the variable is 0 in the first three semesters and 1 in the fourth semester; for the class of 2012, the variable is 0 in the first semester and 1 in the next three semesters.

fall 2004. None of the estimates are large or statistically significant.

6 Discussion and External Validity

In summary, I find that graduates who enter finance are more or less evenly distributed in terms of estimated academic ability at college entry, but earn significantly lower grades in college than comparable students who enter S&E sectors. Thus at graduation, finance attracts relatively few of the most academically accomplished S&E majors at MIT, and the vast majority of those students pursue graduate degrees or jobs in S&E. Furthermore, students who choose different career paths at graduation spent their time and effort differently in both high school and college. In high school, students who will ultimately pursue careers in finance are more likely to be varsity team captains and club leaders; the same students are more likely to join fraternities and sororities at college entry. In contrast, students who later pursue careers in science and engineering take significantly more courses and earn significantly better grades starting in the first year. I find no evidence that the skill development of students with the best college-entry qualifications was responsive to the sudden changes in career incentives provoked by the financial crisis and Great Recession.

These findings are consistent with two explanations. First, finance may prize specialized S&E human capital and analytical skills less than S&E sectors do, and may call for other skills, such as social skills, more than S&E sectors do.[29] In this scenario, finance does not attract the "best and brightest" future scientists and engineers from MIT, but it hires those who will be most suited to working in finance. Second, employers in finance may seek the best S&E students, but find that these students have strong preferences to pursue careers in S&E. This possibility would be consistent with Stern (2004)'s finding that postdoctoral biologists seeking jobs are willing to forgo better compensation for opportunities to perform independent research.

[29]Like this paper, Marmaros and Sacerdote (2002) find that membership in a fraternity/sorority is associated with a significant increase in Dartmouth students' likelihood of taking jobs in finance.

Importantly, students make different skill-development choices at college entry. For the skill demand in finance to drive these differences, most students would have to know at college entry both what career they will pursue and how to optimize their skill development accordingly; such certainty and clarity are unlikely. Prior studies have found peer effects on time use in college (Stinebrickner and Stinebrickner, 2006) and on career choice (Marmaros and Sacerdote, 2002). Thus, participation in Greek societies may have a causal impact on academic effort and propensity to enter finance. This explanation reinforces the influence of personal preferences on skill development in college.

Focusing on a single institution allows for detailed analyses using a wide range of skill measures observed at both college entry and graduation. It is important to emphasize, though, that this sample consists of a highly talented group of students. The following issues may affect the external validity of my results and how they generalize to other top universities:

1. Demand for academic/analytical skills in finance may be different for MIT graduates than for other top college students.

Since MIT is a top S&E school, the financial firms that recruit there are likely to be those that value S&E skills most. Other financial firms might demand less advanced S&E skills and thus attract fewer top S&E students from other colleges.

2. The most highly qualified MIT graduates may have different preferences for working in S&E than similarly talented students from other colleges.

The most academically and analytically skilled MIT graduates may have strong preferences for S&E careers even though they could land high-paying jobs in finance. Equally qualified S&E students at other institutions may not share such preferences. It is difficult to test this hypothesis directly, since it requires data on comparable S&E students at other institutions. I collect suggestive evidence by tracking the career paths of winners of the William Lowell Putnam Mathematical Competition, an annual competition for North American college students.[30] Using online searches, I identify the career choices of 79 winners who graduated between 1990 and 2012. Of the 16 winners from MIT, one currently works in finance and 14 are in various S&E sectors, including academia. Of the 63 winners from other universities, five are currently in finance and 54 are in S&E. Thus the two groups are similar in their propensity to choose finance. This exercise is far from conclusive, but it shows that, among the most talented math students, the career propensities of MIT graduates are similar to those of graduates of other institutions.[31]

3. The composition of the MIT student body may differ from those of other top colleges.

MIT students may differ from students elsewhere in academic interests and preferences for coursework versus social activities. It is reasonable to assume that an average MIT student is more S&E-oriented and more analytically minded than an average student at a top institution less oriented toward S&E: students who are uninterested in S&E and/or who strongly prefer social activities to coursework may not apply to or be accepted at MIT. These students would not be at the margin between a career in finance and a career in S&E and are thus less relevant for the purpose of this study.

4. The responsiveness of skill development to anticipated future career incentives may be different for MIT students than for students elsewhere.

Two recent papers, Arcidiacono et al. (2014) and Wiswall and Zafar (2014), examine choices of major among undergraduate students at Duke University and New York University respectively; similar to this paper, both find preferences to be a key determinant. Wiswall and Zafar (2014) also show that students with higher SAT math scores have stronger tastes for majoring in non-humanities/arts subjects. This result is consistent with my finding that students with higher academic-index scores were less responsive to the financial crisis and recession in terms of major choice and academic effort.

[30] The names and affiliations of the winners—the five students with the highest scores each year—are available on the website of the Mathematical Association of America.

[31] Recall that, at MIT, math is the S&E major with the highest percentage of graduates who pursue careers in finance.

7 Conclusion

This paper uses data on recipients of bachelor's degrees at MIT between 2006 and 2012 to study the types of college students who self select into finance and S&E respectively. I present three key findings. First, at graduation, finance is much less likely than S&E-related sectors, including S&E graduate programs, to attract the most academically accomplished S&E students, though the two groups exhibited fairly comparable academic qualifications at college entry. Second, graduates entering finance and those entering S&E spent their time differently in both high school and college. In college, future financiers were more involved in social activities, a decision made at college entry; they also performed worse academically starting in freshman year. Third, students who changed majors and modified their academic efforts in response to the financial crisis and recession exhibited relatively low college-entry qualifications; there is no evidence that the most highly qualified students did so.

The likely explanation for divergence in skill development is that students uncertain of their future career paths at college entry tend to pursue the skills and activities they prefer; later, they make a career choice conditional on their skills and preferences. It is possible, however, that some students who ultimately enter finance already intend to do so at college entry and develop their skills accordingly. Both scenarios suggest that finance and S&E attract students with strong preferences for different skill-development paths and that those preferences are largely already formed at college entry. Furthermore, unobserved preferences correlate with characteristics observed before college entry, such as participation in extracurricular activities in high school. Thus, a key implication of this paper is that admission policies could influence the distribution of career choices at college graduation. Determining the optimal talent allocation is beyond the scope of this paper; my findings suggest, however, that universities' ability to influence top students' career choices is limited, and that any interventions should be made early to give students time to adjust their skill development.

Changes in the distribution of career choices after 2008 suggest that some MIT graduates waver at the margin between taking a job in finance and opting for science and engineering. Though this paper shows that these graduates tend not to be MIT's most skilled science and engineering students, they occupy the top of the skill distribution nationally. It will be valuable for future work to analyze whether they would have been more productive and innovative in science and engineering than in finance.

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Table 1. Mean Statistics of MIT Classes of 2006–2012

Sample	S&E	Finance	All Career Choices	Full Sample
N	2,423	316	3,769	6,469
Proportion of all career choices	64.3%	8.4%	100%	–
Demographics				
Female	48.8%	37.0%	50.0%	46.0%
Age at graduation	22.2	22.2	22.2	22.2
Caucasian American	42.1%	33.9%	39.7%	37.3%
Asian American	27.0%	37.3%	28.6%	27.4%
Hispanic American	9.7%	6.0%	9.7%	11.0%
African American	4.7%	2.8%	5.1%	6.2%
Other American	8.5%	9.8%	8.8%	9.4%
International student	8.0%	10.1%	8.1%	8.7%
High-school region: Northeast	33.1%	35.8%	33.3%	32.3%
High-school region: Midwest	14.1%	13.3%	13.3%	12.6%
High-school region: South	24.9%	25.9%	25.2%	25.7%
High-school region: West	18.4%	14.2%	18.8%	19.2%
High-school region: International	9.5%	10.8%	9.4%	10.2%
Financial aid received in senior year	$17,108	$15,116	$16,797	$16,431
Academic field				
Majored in S&E	98.1%	73.4%	91.1%	89.2%
Majored in Management/Economics	3.4%	44.9%	10.8%	11.4%
Double majored in S&E & Mgmt/Econ	2.3%	18.7%	4.6%	4.5%

Table 2. Career Choice by Admission Index, Classes of 2006–2008

Dependent Variable	Initial Career Choice: Finance			Initial Career Choice: S&E		
	(1)	(2)	(3)	(4)	(5)	(6)
Admission Index	0.013*	-0.006		0.043***	0.063***	
	(0.007)	(0.008)		(0.013)	(0.015)	
AI quartile						
Top quartile			-0.031			0.124***
			(0.024)			(0.038)
Third quartile			-0.001			0.098***
			(0.024)			(0.037)
Second quartile			0.017			0.016
			(0.023)			(0.037)
Demographics		Y	Y		Y	Y
N	1,548	1,548	1,548	1548	1548	1548
R^2	0.00	0.02	0.03	0.01	0.03	0.02

Notes: Person-level observations. Coefficients reported are from OLS regressions. Robust standard errors are shown in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. In columns (1)–(3), the dependent variable is whether the graduate enters finance after graduation. In columns (4)–(6), the dependent variable is whether the graduate pursues an S&E graduate degree or job after graduation. The sample consists of graduates from the 2006-2008 cohorts with non-missing initial career choices. AI quartiles are calculated by cohort within the sample. Demographic controls include a dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000). All regressions include dummies for year of graduation.

Table 3. Career Choice by GPA, Classes of 2006–2008

Dependent Variable	Initial Career Choice: Finance				Initial Career Choice: S&E			
Sample	All Majors			Engr/Math/Phy	All Majors			Engr/Math/Phy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cumulative GPA	-0.037***	-0.041***		-0.044***	0.088***	0.082***		0.091***
	(0.010)	(0.010)		(0.012)	(0.013)	(0.014)		(0.013)
GPA quartile								
Top quartile			-0.094***				0.206***	
			(0.023)				(0.034)	
Third quartile			-0.049**				0.085***	
			(0.023)				(0.027)	
Second quartile			-0.042**				0.082**	
			(0.018)				(0.039)	
Admission Index		0.010	0.010	-0.002		0.018	0.017	0.012
		(0.010)	(0.010)	(0.010)		(0.017)	(0.016)	(0.022)
N	1,548	1,548	1,548	1,146	1,548	1,548	1,548	1,146
R^2	0.18	0.19	0.19	0.09	0.18	0.18	0.18	0.07

Notes: Person-level observations. Coefficients reported are from OLS regressions. Robust standard errors clustered by cohort and majors are shown in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. In columns (1)–(4), the dependent variable is whether the graduate enters finance after graduation. In columns (5)–(8), the dependent variable is whether the graduate pursues an S&E graduate degree or job after graduation. In columns (1)–(3) and (5)–(7), the sample consists of graduates from the 2006-2008 cohorts with non-missing initial career choices; GPA quartiles are calculated by cohort within the sample. In columns (4) and (8), the sample consists of graduates from the 2006-2008 cohorts with majors in engineering, mathematics, or physics and non-missing initial career choices. All regressions include a dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000), dummies for majors at graduation, and dummies for year of graduation.

Table 4. Heterogeneous Selection by Gender and Ethnicity, Classes of 2006–2008

Dependent Variable	Initial Career Choice: Finance				Initial Career Choice: S&E			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Career Choice by Admission Index							
Admission Index	-0.021*	-0.002	-0.004	-0.008	0.048**	0.053***	0.039**	0.049***
	(0.012)	(0.011)	(0.008)	(0.011)	(0.020)	(0.018)	(0.016)	(0.018)
AI * Char.	0.035**	-0.002	0.009	0.015	-0.008	-0.022	0.030	-0.012
	(0.014)	(0.015)	(0.024)	(0.015)	(0.025)	(0.027)	(0.034)	(0.028)
Characteristic	Female	Caucasian Am.	Asian Am.	URM	Female	Caucasian Am.	Asian Am.	URM
	Panel B: Career Choice by GPA							
Cumulative GPA	-0.058***	-0.040***	-0.036***	-0.050***	0.077***	0.096***	0.075***	0.074***
	(0.013)	(0.011)	(0.010)	(0.013)	(0.017)	(0.015)	(0.015)	(0.016)
GPA * Char.	0.039**	-0.002	-0.019	0.039*	0.012	-0.034	0.025	0.031
	(0.018)	(0.017)	(0.025)	(0.022)	(0.025)	(0.022)	(0.027)	(0.028)
Characteristic	Female	Caucasian Am.	Asian Am.	URM	Female	Caucasian Am.	Asian Am.	URM

Notes: Person-level observations. The sample consists of graduates from the 2006–2008 cohorts with non-missing initial career choices. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. In columns (1)–(4), the dependent variable is whether the graduate enters finance after graduation. In columns (5)–(8), the dependent variable is whether the graduate pursues an S&E graduate degree or job after graduation. Panel A reports the OLS estimates of Equation (3.1) for normalized admission index and its interaction term with robust standard errors. The controls include demographics and cohort dummies. Panel B reports the OLS estimates of Equation (3.2) for normalized cumulative GPA and its interaction term with robust standard errors clustered by cohort and major. The controls include normalized admission index, demographics, dummies for major at graduation, and cohort dummies. "URM" stands for "Underrepresented Minorities", which consists of Hispanic American, African American, and Other American. Demographic controls include dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), and dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000).

Table 5. Self-Reported Skill Improvement in College, Classes of 2006–2008

Statistics	Mean (Fin.)	Mean (S&E)	Est. Diff. (Fin.−S&E)	
Sample	All	All	All	Engr/Math/Phy
Variable	(1)	(2)	(3)	(4)
Know faculty member well	24.1%	57.2%	-0.271***	-0.262***
			(0.060)	(0.065)
Self-reported improvement in ability to:				
Think analytically and logically	86.7%	91.0%	-0.084*	-0.094*
			(0.046)	(0.056)
Formulate and create original ideas and solutions	67.6%	77.6%	-0.108	-0.175**
			(0.069)	(0.079)
Gain in-depth knowledge of a field	77.3%	91.2%	-0.104*	-0.147**
			(0.059)	(0.065)
Plan and execute complex projects	72.4%	85.6%	-0.163***	-0.105
			(0.061)	(0.069)
Synthesize and integrate ideas and information	70.7%	80.6%	-0.118*	-0.120
			(0.067)	(0.075)
Use quantitative tools	80.3%	80.6%	-0.049	-0.016
			(0.055)	(0.067)
Understand the process of science and experimentation	63.2%	84.1%	-0.176***	-0.168**
			(0.065)	(0.078)

Notes: Person-level observations. Column (1) reports the mean of each variable for graduates entering finance after graduation. Column (2) reports the mean of each variable for graduates entering S&E after graduation. Columns (3)–(4) report the differences in the conditional means controlling for quartile dummies for normalized admission index, dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000), and dummies for year of graduation. Robust standard errors are in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 6. Extracurricular Activities in High School and College

Statistics	Mean (Fin.)	Mean (S&E)	Est. Diff. (Fin.−S&E)	
Sample	All	All	All	Engr/Math/Physics
Variable	(1)	(2)	(3)	(4)
	Panel A: High-School Activities, Classes of 2010–2012			
Varsity sports	60.2%	51.5%	0.090**	0.070
			(0.046)	(0.051)
Leadership in varsity sports	43.5%	25.8%	0.187***	0.185***
			(0.045)	(0.050)
Performing arts	59.3%	70.6%	-0.102**	-0.096*
			(0.048)	(0.054)
Leadership in performing arts	19.4%	29.1%	-0.088**	-0.079*
			(0.041)	(0.046)
Clubs	98.1%	95.5%	0.029*	0.041***
			(0.015)	(0.014)
Leadership in clubs	71.3%	49.9%	0.203***	0.168***
			(0.046)	(0.053)
	Panel B: College Activities, Classes of 2006–2008			
Intercollegiate sports	37.6%	28.8%	0.081	0.120*
			(0.055)	(0.069)
Performing arts	15.3%	22.1%	-0.059	-0.017
			(0.045)	(0.058)
Clubs	45.9%	52.5%	-0.058	-0.103
			(0.060)	(0.072)
Fraternity or sorority	57.6%	36.2%	0.180***	0.177***
			(0.054)	(0.063)

Notes: Person-level observations. Column (1) reports the mean of each variable for graduates entering finance after graduation. Column (2) reports the mean of each variable for graduates entering S&E after graduation. Columns (3)–(4) report the differences in the conditional means controlling for quartile dummies for normalized admission index, dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and \$25,000, greater than \$25,000), and dummies for year of graduation. Robust standard errors are in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 7. Marginal and Average College Qualifications, Majors in Management/Economics and S&E

Sample	Management/Economics		S&E	
Dep. Var. = Admission Index	(1)	(2)	(3)	(4)
Δ(Marginal - Average)	-0.446*		-0.678	
	(0.234)		(0.918)	
D^{2012}		0.228**		-0.023
		(0.109)		(0.038)
N	735	735	5,769	5,769

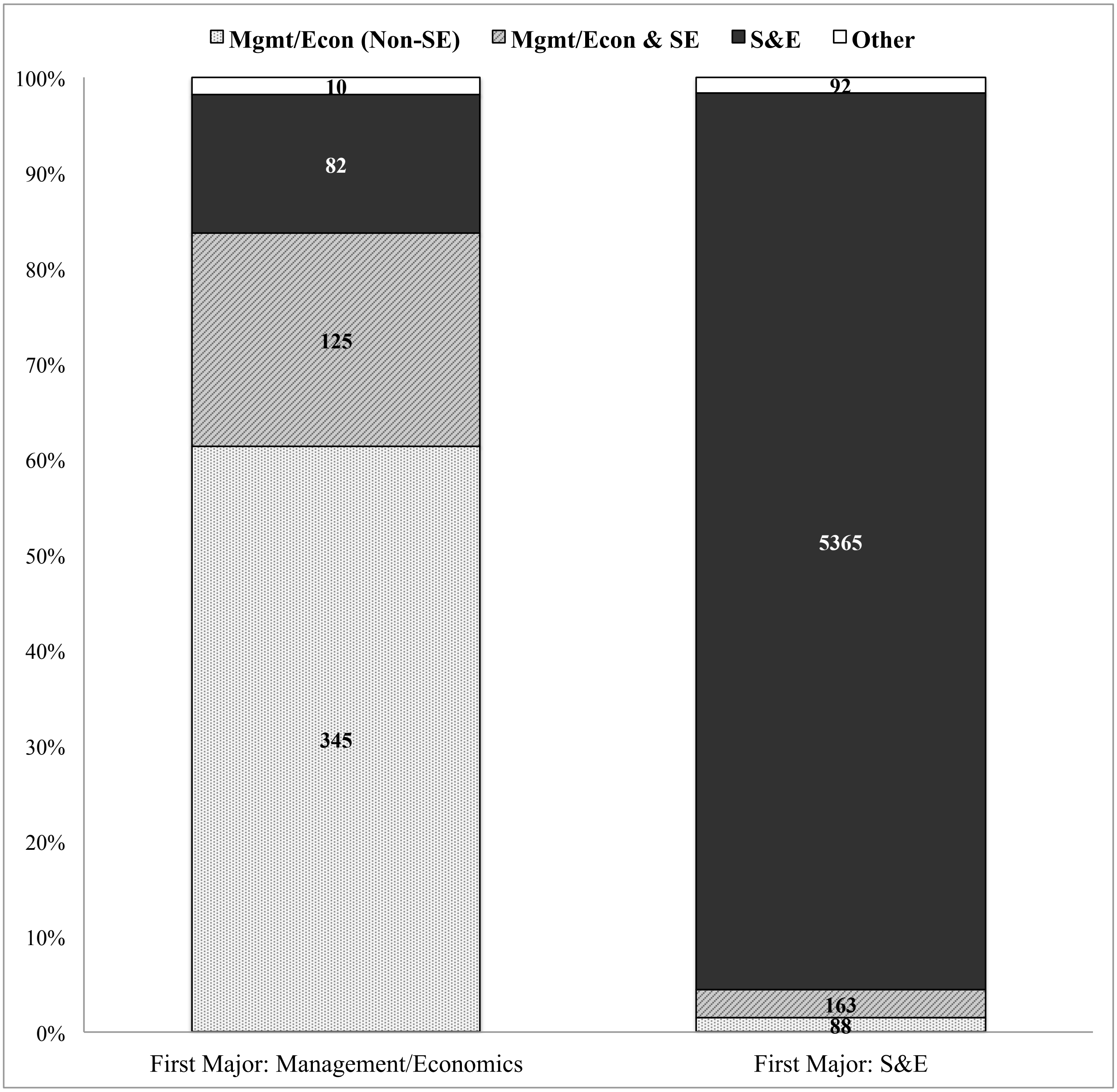
Notes: Person-level observation. All estimates are from ordinary-least-squares (OLS) with robust standard errors. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. The dependent variable is admission index normalized within the cohort. The sample for columns (1) –(2) consists of graduates from the 2006–2012 cohorts with a major in management or economics. The sample for columns (3)–(4) consists of graduates from the 2006–2012 cohorts with a major in S&E. D^{2012}: indicator variable for the 2012 cohort.

Table 8. Estimated Change in Academic Performance after Fall 2008

Sample by AI Quartile	I. Classes of 2010–2012 All (1)	Top (2)	75%–25% (3)	Bottom (4)	II. Classes of 2006–2008 (Falsification Test) All (5)	Top (6)	75%–25% (7)	Bottom (8)
	Panel A. Dependent Variable = GPA							
Controls:								
Demographics and semester dummies	0.062***	0.019	0.054**	0.127***	0.018	0.027	0.034	-0.028
	(0.016)	(0.026)	(0.025)	(0.034)	(0.017)	(0.027)	(0.024)	(0.036)
+ Dummies for first declared major	0.056***	0.021	0.042*	0.119***	0.017	0.023	0.030	-0.034
	(0.016)	(0.026)	(0.025)	(0.034)	(0.016)	(0.027)	(0.024)	(0.036)
+ High-school activities	0.056***	0.022	0.042*	0.113***				
	(0.016)	(0.026)	(0.025)	(0.034)				
	Panel B. Dependent Variable = Units							
Controls:								
Demographics and semester dummies	0.184	-0.488	0.272	0.818*	0.046	-0.324	0.345	-0.302
	(0.247)	(0.540)	(0.350)	(0.467)	(0.276)	(0.584)	(0.399)	(0.515)
+ Dummies for first declared major	0.170	-0.465	0.241	0.861*	0.005	-0.384	0.267	-0.286
	(0.248)	(0.532)	(0.352)	(0.471)	(0.272)	(0.573)	(0.395)	(0.511)
+ High-school activities	0.181	-0.419	0.246	0.807*				
	(0.249)	(0.532)	(0.353)	(0.470)				

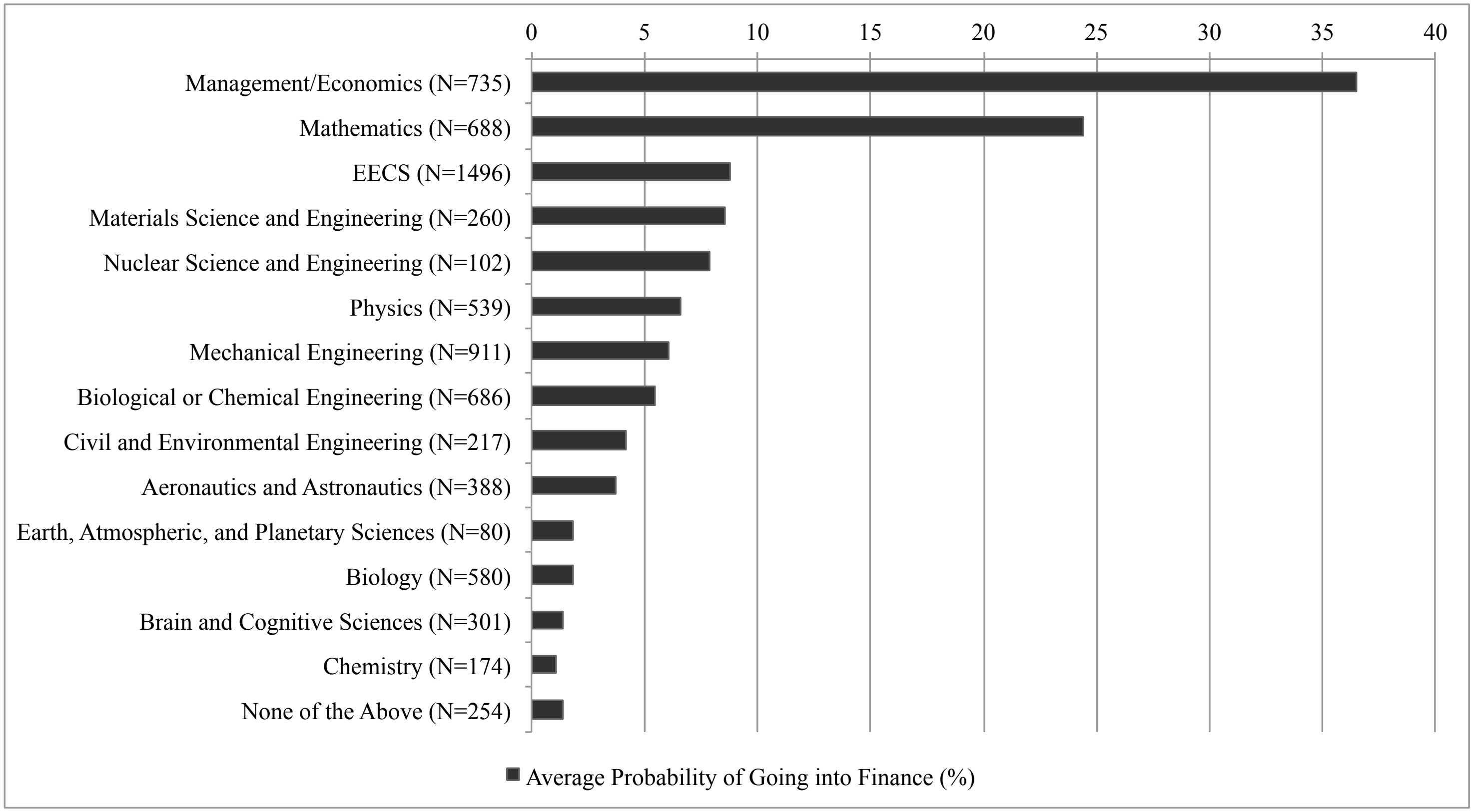
Notes: Person*semester-level observations. All estimates are from ordinary-least-squares (OLS) with robust standard errors clustered by person. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. In column (1), the sample consists of graduates from the 2010–2012 cohorts with valid responses on high-school activities (97.7 percent of the 2010–2012 cohorts). In columns (2)–(4), the sample includes the subgroup of a given admission-index quartile. In columns (1)–(4), each cell reports the coefficient estimates of Equation (5.3) for the indicator variable on whether the semester follows fall 2008. In column (5), the sample consists of graduates from the 2006–2008 cohorts. In columns (6)–(8), the sample consists of the subgroup of a given admission-index quartile. In columns (5)–(8), each cell reports the coefficient estimates of Equation (5.3) for the indicator variable on whether the semester follows fall 2004. Demographic controls include dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than$25,000). High-school activities include indicator variables for participation in varsity sports, performing arts (music/theater/dance), and clubs (community service, student government, student publications) and indicator variables for leadership in these activities. Columns (1) and (5) also include the quartile dummies for admission index.

Figure 1. Distribution of Majors at Graduation, by First Declared Major



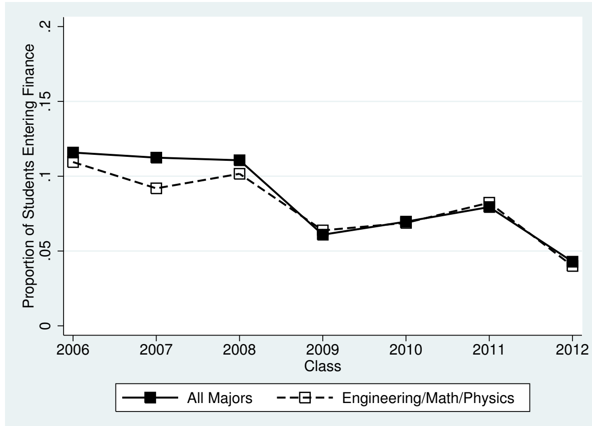
Notes: Person-level observation. This figure plots, by first declared major, the distribution of majors at graduation. *Mgmt/Econ (Non-SE)* consists of graduates with a major in management or economics who do not also major in S&E. *Mgmt/Econ & SE* consists of graduates with a double major in management/economics and S&E. *S&E* consists of graduates with a major in science and/or engineering who do not also major in management or economics. *Other* consists of graduates who do not major in science & engineering or management/economics.

Figure 2. Proportion of Graduates Entering Finance, by Major at Graduation

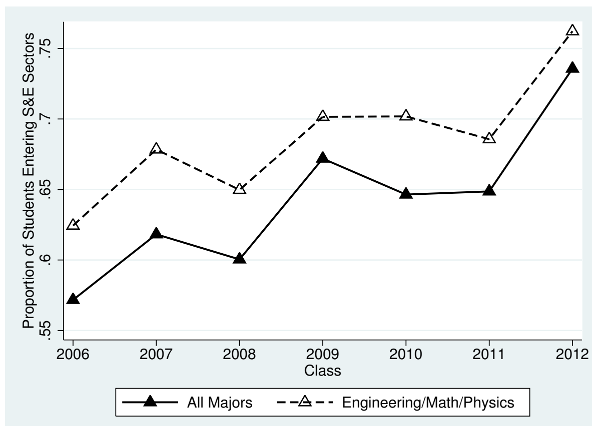


Notes: Person-level observation. This figure plots the proportion of students in each major who pursue finance. The total count for each major appears in parentheses. For each major, the average probability of entering finance is calculated as 100 times the mean of the proportion of graduates entering finance and the proportion working in finance in August 2014.

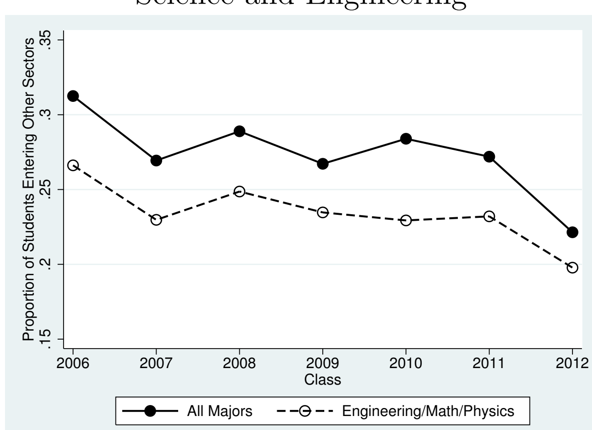
Figure 3. Distribution of Initial Career Choices, by Cohort



Finance



Science and Engineering

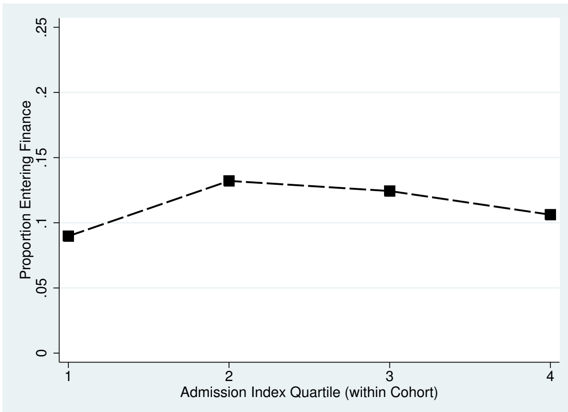


Other

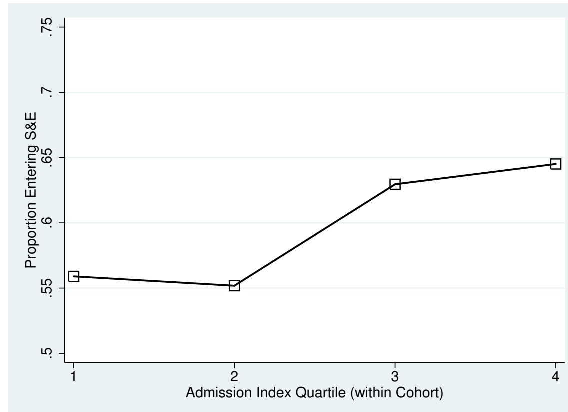
Notes: Person-level observation. This figure shows the proportions of graduates who make various initial career outcomes, by cohort.

Figure 4. Career Choices by Academic Achievement, Classes of 2006–2008

Panel A: Academic Performance in High School

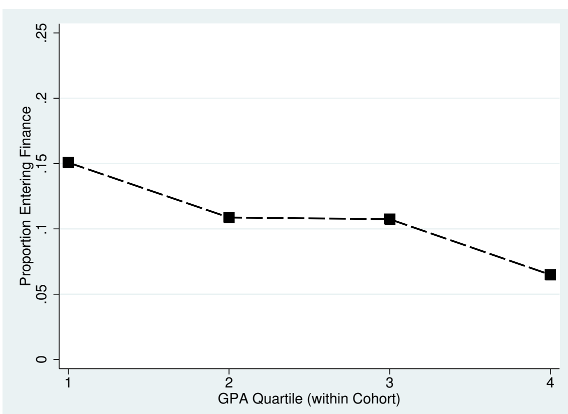


Proportion of Graduates Entering Finance

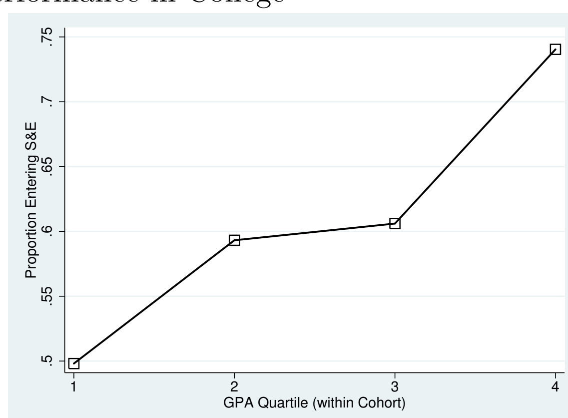


Proportion of Graduates Entering S&E

Panel B: Academic Performance in College



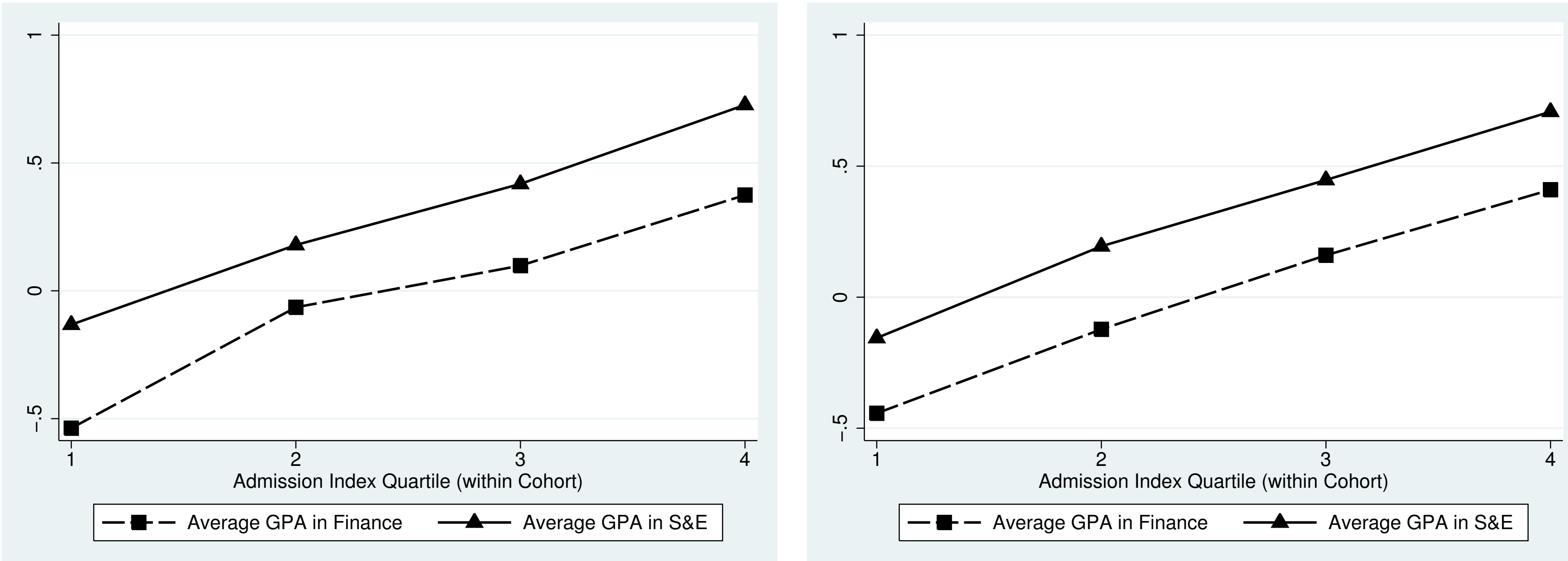
Proportion of Graduates Entering Finance



Proportion of Graduates Entering S&E

Notes: Person-level observation. This figure plots the distribution of career choices by Admission Index quartile in Panel A and by GPA quartile in Panel B. The quartiles are calculated within the sample of graduates with non-missing initial career choices and by cohort.

Figure 5. Academic Performances in High School and College, Classes of 2006–2008



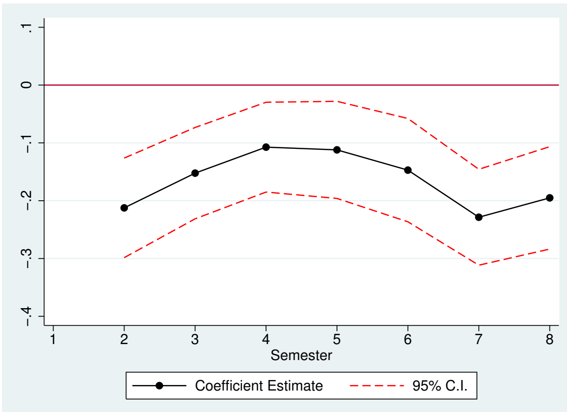
All Students

Engineering/Math/Physics Majors

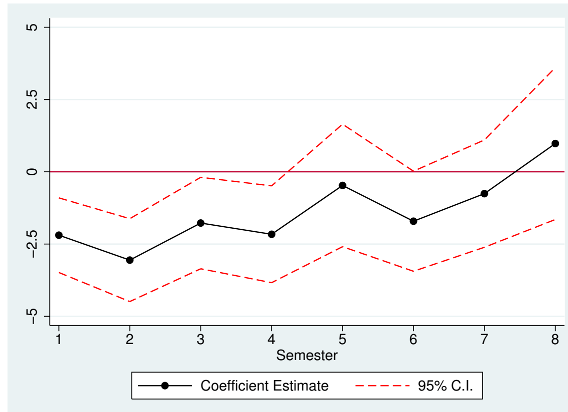
Notes: Person-level observation. This figure plots mean GPA by Admission Index quartile. The sample on the left consists of graduates in the classes of 2006–2008 with non-missing initial career choices. The sample on the right consists of graduates in the classes of 2006–2008 with majors in engineering, math, or physics and non-missing initial career choices. In both samples, admission-index quartiles are calculated within the sample of graduates with non-missing initial career choices and by cohort. GPA is measured in standard deviations from the population mean within each class.

FIGURE 6. Differences in Academic Performance over Time, Classes of 2006–2008

Panel A: All Majors

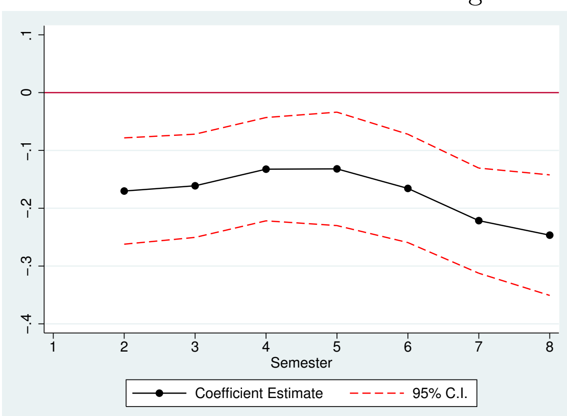


GPA

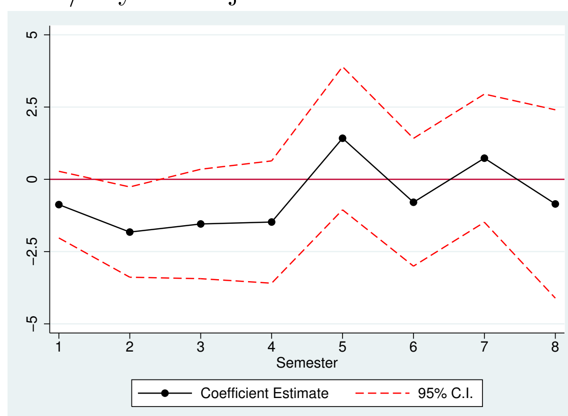


Units

Panel B: Engineering/Math/Physics Majors



GPA

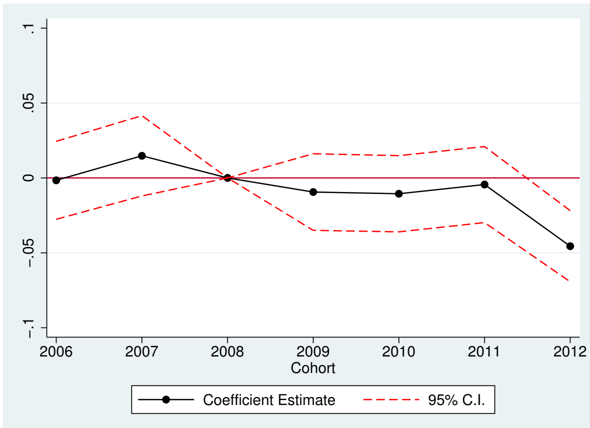


Units

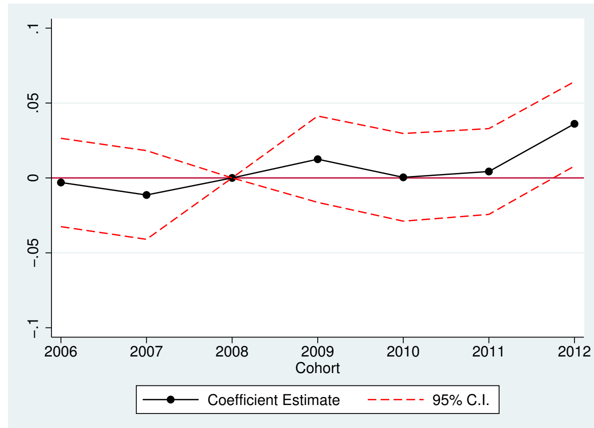
Notes: Person*semester-level observation. This figure plots, by semester, the OLS coefficient estimates and 95 percent confidence intervals from Equation (4.1). Standard errors are robust and clustered by person. For Panel A, the sample consists of graduates from the 2006-2008 cohorts with non-missing initial career choices. For Panel B, the sample consists of graduates from the 2006-2008 cohorts with majors in engineering, mathematics, or physics and non-missing initial career choices. The coefficients plotted are the dummy for entering finance interacted with semester dummies. GPA is not normalized. All regressions include dummy for entering other sectors, dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000), quartile dummies for normalized admission index, dummies for major at graduation, and dummies for year of graduation interacted with semester dummies.

FIGURE 7. Estimated Likelihood of Major, by Cohort

Panel A: First Declared Major

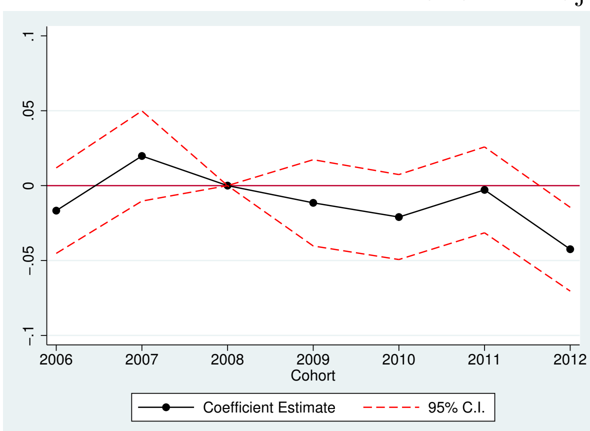


Management/Economics

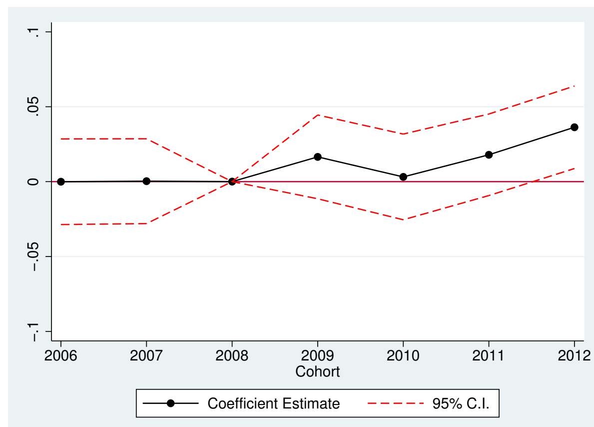


S&E

Panel B: Major at Graduation



Management/Economics



S&E

Notes: Person-level observation. This figure plots, by cohort, the OLS coefficient estimates and 95 percent confidence intervals from Equation (5.1) with robust standard errors. The sample consists of all non-transfer students in the 2006–2012 cohorts. In Panel A, the dependent variable is whether the first declared major is management/economics or S&E. In Panel B, the dependent variable is whether the student graduated with a major in management/economics or in S&E. All regressions include dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and \$25,000, greater than \$25,000), and quartile dummies for normalized admission index.

Data Appendix

1 Construction of current career outcomes

To collect public profiles on LinkedIn, I searched graduates by first and last names and then used major and year of graduation from MIT to identify the correct profiles. In rare instances when this information was not sufficient, I used the individual's profile on MIT Alumni Association's web directory to match location and employer. I excluded profiles with fewer than 50 connections since they are likely to be inactive.

I used the "current industry" reported in the profile's headline to assign individuals to sectors. I assigned the following industries to the Science & Engineering sector: computer & network security; computer games; computer hardware; computer networking; computer software; consumer electronics; e-learning; information technology & services; internet; online media; technology & services; wireless; biotechnology; cosmetics; health care; health, wellness & fitness; hospital & health care; medical devices; medical practice; mental health care; pharmaceuticals; veterinary; airlines/aviation; automotive; aviation & aerospace; chemicals; civil engineering; construction; consumer goods; defense & space; design; electrical/electronic manufacturing; energy; environment; environmental services; food & beverages; food production; industrial automation; logistics & supply chain; maritime; mechanical or industrial engineering; metals; mining & metals; nanotechnology; oil & energy; renewables & environment; semiconductors; space; sporting goods; telecommunications; textiles; transportation/trucking/railroad; utilities; higher education; military; research.

I assigned the following industries to Finance: banking; capital markets; financial services;

insurance; investment banking; investment management; private equity; venture capital, and private equity.

The following industries were categorized as Other: apparel & fashion; architecture & planning; arts & crafts; building materials; civic & social organization; consumer services; education management; entertainment; fashion; gambling & casinos; government administration; government relations; hospitality; human resources; international affairs; international trade & development; law practice; legal services; leisure travel & tourism; luxury goods & jewelry; management consulting; market research; marketing & advertising; media production; motion pictures & film; museums & institutions; music; non-profit organization management; performing arts; philanthropy; planning; political organization; primary/secondary education; program development; public policy; public safety; publishing; real estate; restaurants; retail; sports; staffing & recruiting; supermarkets; think tanks; tourism; writing & editing.

2 Additional tables and figures

Table A.1. List of Skill Measures

Variables	Cohort Availability	Response Rate
Academic qualifications		
Normalized admission-index score	2006–2012	100%
Normalized cumulative college GPA	2006–2012	100%
First major declared in college	2006–2012	100%
Major(s) at graduation	2006–2012	100%
Course load and GPA by term	2006–2012	100%
Extracurricular activities		
High school extracurricular participation	2010–2012	97.7%
College extracurricular participation	2006, 2008	60.3%

Notes: College extracurricular participation includes participation in fraternities and sororities.

Table A.2. Transition between Initial and Current Career Outcome

Initial Career Outcome	Current Career Outcome	Number of Graduates
S&E	S&E	1098
S&E	Finance	28
S&E	Other	64
Finance	S&E	49
Finance	Finance	117
Finance	Other	15
Other	S&E	291
Other	Finance	42
Other	Other	189

Notes: The sample consists of the 1,893 graduates whose initial and August 2014 career choices are observed.

Table A.3. Detailed Classification of Career Destinations

Destination	N	Average Starting Salary
S&E graduate programs	1,613	–
Computer/IT industry	252	$81,378
Other S&E industries	558	$58,497
Finance industry	316	$77,511
Consulting industry	233	$68,439
Other non-S&E industries	156	$58,536
Non-S&E graduate programs	217	–
Outcomes Other than Graduate School or Job	424	–

Notes: The category "Other S&E industries" includes energy, life sciences/medical devices, and hardware manufacturing. Starting salary is in real 2012 dollars and does not include bonuses.

Table A.4. Career Choice by Academic Performance, Classes of 2006–2008: Robustness

Initial Career Choice:	Finance (All) (1)	Finance (Quantitative) (2)	Finance (Non-Quantitative) (3)
N	175	48	127
Proportion	11.3%	3.1%	8.2%
	Panel A: Coefficient Estimates for Admission Index		
OLS	-0.006	0.001	-0.007
	(0.008)	(0.005)	(0.007)
Probit	-0.005	0.003	-0.007
	(0.009)	(0.006)	(0.007)
Logit	-0.006	0.002	-0.007
	(0.009)	(0.006)	(0.007)
	Panel B: Coefficient Estimates for GPA		
OLS	-0.041***	-0.017***	-0.024***
	(0.010)	(0.006)	(0.008)
Probit	-0.041***	-0.017***	-0.025***
	(0.009)	(0.005)	(0.008)
Logit	-0.039***	-0.018***	-0.024***
	(0.009)	(0.005)	(0.008)

Notes: Person-level observations. The sample consists of graduates from the 2006–2008 cohorts with non-missing initial career choices. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. In column (1), the dependent variable is whether the graduate enters finance after graduation. In column (2), the dependent variable is whether the graduate pursues a quantitative job in finance (e.g., trading or quantitative analysis). In column (3), the dependent variable is whether the graduate pursues a non-quantitative job in finance (e.g., investment banking). Panel A reports the OLS, Probit, and Logit estimates of Equation (3.1) for normalized admission index with robust standard errors. The controls include demographics and cohort dummies. Panel B reports the OLS, Probit, and Logit estimates of Equation (3.2) for normalized cumulative GPA with robust standard errors clustered by cohort and major. The controls include normalized admission index, demographics, dummies for major at graduation, and cohort dummies. Demographic controls include dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), and dummies for financial aid received in senior year in 2012 dollars (between 0 and \$25,000, greater than \$25,000).

Table A.5. Estimated Likelihood of First Declared Major, Classes of 2010–2012

Dep. Var.: First Major in	Mgmt/Econ		S&E		Engr/Math/Phy		Other Science	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
D^{2011}	0.005	0.003	0.004	0.006	0.029	0.027	-0.025	-0.022
	(0.013)	(0.013)	(0.015)	(0.015)	(0.020)	(0.020)	(0.016)	(0.017)
D^{2012}	-0.040***	-0.040***	0.041***	0.040***	0.041*	0.038*	0.000	0.002
	(0.012)	(0.012)	(0.015)	(0.015)	(0.021)	(0.021)	(0.018)	(0.018)
High-School Activities		Y		Y		Y		Y
N	2,658	2,658	2,658	2,658	2,658	2,658	2,658	2,658

Notes: Person-level observation. All estimates are from OLS with robust standard errors. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. The sample consists of graduates from the 2010–2012 cohorts with valid responses on high-school activities (97.7 percent of the 2010–2012 cohorts). In columns (1)–(2), the dependent variable is an indicator variable for declaring a first major in management or economics. In columns (3)–(4), the dependent variable is an indicator variable for declaring a first major in S&E. In columns (5)–(6), the dependent variable is an indicator variable for declaring a first major in engineering, mathematics, or physics. In columns (7)–(8), the dependent variable is an indicator variable for declaring a first major in biology, chemistry, neuroscience, and earth sciences. D^{2011}*:* indicator variable for the 2011 cohort. D^{2012}*:* indicator variable for the 2012 cohort. High-school activities include indicator variables for participation in varsity sports, performing arts (music/theater/dance), and clubs (community service, student government, student publications) and for leadership in these activities. All regressions include quartile dummies for admission index, dummy for being female, dummies for age (equals 22, greater than 22), dummies for ethnicity (international, Caucasian American, Asian American, Hispanic American, and African American), dummies for high-school region (northeast, midwest, south, and west), dummies for financial aid received in senior year in 2012 dollars (between 0 and $25,000, greater than $25,000).

Theory Appendix

I begin with a static Roy model of how college graduates choose an employment sector based on their skills at the time of graduation and the returns to skills in different sectors. I then turn to a dynamic model that describes how students choose to spend time and develop skills during college as a function of the career incentives they expect.

1 One-period model

For the static model of career choice at college graduation, I assume that two sectors hire college graduates, science and engineering (SE) and finance (F). Students are endowed with analytical/academic skill s_i^A and social skill s_i^S. Suppose the utility of working in each sector is:

$$\begin{aligned} U_{i,SE} &= \mu_{SE} + r_{SE}^A s_i^A, \\ U_{i,F} &= \mu_F + r_F^A s_i^A + r_F^S s_i^S \end{aligned}$$

where $r_j^A > 0$ denotes the returns to analytical skill in sector j, inclusive of non-pecuniary returns from doing analytical tasks, and $r_F^S > 0$ denotes the returns to social skill in finance. Alternatively, one can think of s_i^S as preferences for social activities and r_F^S as the level of social activities in F. Note that allowing for social skill to affect utility in SE would not affect the implications of the model as long as the returns are lower than in F.

Let $\triangle\mu = \mu_F - \mu_{SE}$ and $z_i = \triangle r^A s_i^A + r_F^S s_i^S \sim N(0, \sigma_z^2)$ where $\triangle r^A = r_F^A - r_{SE}^A$. A student will choose to work in finance if and only if $U_{i,F} - U_{i,SE} = \triangle\mu + z_i > 0$. Following the standard assumption of a Roy model, let analytical and social skill endowments be normally distributed, i.e., $\begin{pmatrix} s_i^A \\ s_i^S \end{pmatrix} \sim N \begin{pmatrix} 0 & 1 & \rho \\ 0 & \rho & 1 \end{pmatrix}$.[1] We can then derive the explicit condition under which graduates entering finance will have high analytical ability relative to those entering S&E.

Proposition 1. *$E\left(s_i^A \mid F\right) - E\left(s_i^A \mid SE\right) > 0$ if and only if $\triangle r^A + r_F^S \rho > 0$.*

Proof.

$$\begin{aligned} & E\left(s_i^A \mid F\right) - E\left(s_i^A \mid SE\right) \\ =& E\left(s_i^A \mid z_i \geq -\triangle\mu\right) - E\left(s_i^A \mid z_i < -\triangle\mu\right) \\ =& \frac{\rho_{zA}}{\sigma_z}\left(\lambda\left(\frac{\triangle\mu}{\sigma_z}\right) + \lambda\left(-\frac{\triangle\mu}{\sigma_z}\right)\right) \end{aligned}$$

where $\lambda(.)$ is the inverse mills ratio $(\frac{\phi(.)}{\Phi(.)})$. And

$$\begin{aligned} \rho_{zA} &= corr\left(s_i^A, \triangle r^A s_i^A + r_F^S s_i^S\right) \\ &= \frac{\triangle r^A + r_F^S \rho}{\sigma_z}. \end{aligned}$$

Thus $E\left(s_i^A \mid F\right) - E\left(s_i^A \mid SE\right) > 0$ if and only if $\triangle r^A + r_F^S \rho > 0$. Similarly, $E\left(s_i^S \mid F\right) - E\left(s_i^S \mid SE\right) > 0$ if and only if $\triangle r^A \rho + r_F^S > 0$. □

Proposition 1 shows that the overall distribution of analytical skill across sectors will depend on the returns to both analytical and social skills in each sector and on the correlation between analytical skill and social skill within the population of students. Empirically, the

[1]The assumption that both skills have the standard normal distributions is without the loss of generality, since the returns to skills can be rescaled.

correlation between the two skills among the MIT graduates in my data is close to zero.[2] Thus, finance would hire graduates with higher average analytical skill if the return to analytical skill is higher in finance.

2 Two-period model

Thus far I have assumed that students' skills at college graduation are exogenous; in practice, however, students develop skills while in college as a function of their abilities at college entry, their preferences, and the returns to skills in the labor market that they expect to encounter upon graduation. College students must allocate their limited time across academic, social, and extracurricular activities, and different time allocations promote development of different skills. If finance offers lower returns to analytical skills and higher returns to social skills, the career incentives it offers may discourage students from developing more analytical skills in college.

To capture endogenous skill development, suppose that there are now two periods. At the beginning of the first period (college entry), individual i is endowed with (s_i^A, s_i^S). In the first period, individuals have a fixed amount of time, normalized to 1, to allocate between coursework and social activities. Both coursework and social activities generate utility in the present period. Coursework also improves analytical skills, but social activities do not improve any skills.[3] In the second period, individuals choose their sector of employment based on their skills at the end of the first period and the utility functions specified in Section 1. Let t_i denote the time that individual i spends on coursework, $v\left(s_i^A, s_i^S, t_i\right)$ be the utility in the first period, and $\tilde{s}_i^A = f\left(s_i^A, s_i^S, t_i\right)$ be the level of analytical skill at the

[2]The correlation between normalized cumulative GPA and being in a Greek society is -0.04; the correlation between normalized admission index and being in a Greek society is -0.02.

[3]This setup is similar to the model in McCann et al. (2015), which studies matching in the labor market when individuals have heterogeneous cognitive and communication skills. In their model, workers can improve their cognitive skill through education, but communication skill is assumed to be fixed. Stinebrickner and Stinebrickner (2008) provide causal evidence that time spent studying improves academic performance in college. Krueger and Schkade (2008) and Saffer (2008) show that social interactions can generate direct and positive utilities.

end of the first period.

Assume that individuals are forward-looking and have perfect information about payoffs in the second period. They thus choose t_i to maximize

$$U\left(s_i^A, s_i^S, t_i\right) = v\left(s_i^A,\ s_i^S,\ t_i\right) + \beta_i max\left\{U_{i,SE}, U_{i,F}\right\}$$

where β_i is the discount factor,$U_{i,SE} = \mu_{SE} + r_{SE}^A \tilde{s}_i^A$, and $U_{i,F} = \mu_F + r_F^A \tilde{s}_i^A + r_F^S s_i^S$.

For illustrative purposes, I make a few simplifying assumptions to obtain an explicit solution. First, let $v\left(s_i^A,\ s_i^S,\ t_i\right) = (1-t_i)\, s_i^S + t_i s_i^A$ be the utility in the first period; let $f\left(s_i^A,\ s_i^S,\ t_i\right) = (1+t_i)\, s_i^A$ be the development function of analytical skill. The marginal returns to social activities and coursework are thus increasing in the student's social and analytical skill endowments respectively. In other words, I assume that students with higher analytical skill endowment are more effective at studying and enjoy it more, and that students with higher social endowment enjoy social activities more. Since I am interested in the scenario where the returns to analytical skills are lower and the returns to social skills are higher in F, let $r_{SE}^A = r_F^S = r > 0$, $r_F^A = 0$, and $\mu_{SE} = \mu_F$.

Thus, a student's choice of how to allocate time during college will depend on his or her endowment of social and analytical skills as of college entry, expected future returns to developing analytical skills by studying, and the degree to which he or she values current utility over future utility. Due to the linearity of the utility functions, the equilibrium involves complete specialization. The solution is derived by comparing the utilities of the four possible paths:

	$t_i = 1,\ SE$	$t_i = 0,\ SE$	$t_i = 1,\ F$	$t_i = 0,\ F$
$U\left(s_i^A, s_i^S, t_i\right)$	$(1+2\beta r)\, s_i^A$	$s_i^S + \beta r s_i^A$	$s_i^A + \beta r s_i^S$	$(1+\beta r)\, s_i^S$

It thus follows that students would spend all their time on coursework and enter SE if and only if $s_i^A \geq \left(\frac{1+\beta r}{1+2\beta r}\right) s_i^S$. The incentive compatibility constraints are satisfied since $\frac{1+\beta r}{1+2\beta r} > \frac{1}{2}$ and $\frac{1+\beta r}{1+2\beta r} > \frac{1}{1+\beta r}$. For $s_i^A < \left(\frac{1+\beta r}{1+2\beta r}\right) s_i^S$, the students would spend all their time on social activities and enter F.

This reasoning shows that students' decisions to spend time studying depend on the degree to which they enjoy and gain skills from doing coursework (captured by s_i^A), their preferences for non-course work (captured by s_i^S), and their responsiveness to future career incentives (captured by $\beta_i r$). Thus students with high analytical skill will only allocate their time to social activities if they have strong preferences for social activities (high s_i^S) and/or low responsiveness to future career incentives (low $\beta_i r$).

It is important to note that, among students who spend all of their time on social activities and enter F, some would still spend all of their time on social activities even in the absence of F. To see this, suppose that SE is the only sector in the labor market. Such students would still spend all of their time on social activities if their preferences for social activities were large enough or their responsiveness to future career incentives were low enough, such that $s_i^A < \left(\frac{1}{1+\beta_i r}\right) s_i^S$.

Due to imperfect information, college students typically do not make the full set of education and labor-market decisions at the beginning of college; instead such decisions are sequential (Altonji et al., 2012). If individuals solve the two-period problem sequentially (i.e., $\beta_i = 0$), in the first period they choose the time allocation that maximizes $v\left(s_i^A,\, s_i^S,\, t_i\right)$, and in the second period they choose the sector with the highest payoff conditional on their skill development. Specialization is still complete: students with $s_i^A \geq s_i^S$ would spend all their time on coursework and enter SE, while students with $s_i^A < s_i^S$ would spend all their time on social activities and enter F. Note that in this case the set of students who would study only in the absence of finance is empty, because they are entirely unresponsive to future career incentives.

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