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Chapter Author: Philip J. Cook, Robert H. Frank

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The Growing Concentration of Top Students at Elite Schools

Philip J. Cook and Robert H. Frank

Colleges and universities compete to matriculate the most able students. But while there are literally hundreds of schools pursuing each year's crop of top high school seniors, the competition is by no means even. Top students are attracted to the schools with the best reputations, the most prestige, and the greatest past success in matriculating good students. Schools further down in the academic hierarchy continue to attract a limited number of top students because of compensating advantages such as location, low tuition, or family tradition. But a remarkably high and growing proportion of top students end up in a small number of elite schools.

Qualitatively, the current interuniversity allocation of students resembles the intraschool tracking systems employed within many of the nation's elementary schools. The social desirability of sorting by ability has been hotly debated in the elementary school case but has received much less serious attention in the university context. Indeed, closer examination of the tracking issue at the university level seems especially timely in light of the evidence we present here. This evidence suggests that the concentration of top students in elite schools may have increased substantially from the 1970s to the 1980s.

Philip J. Cook is professor of economics and public policy at Duke University, where he holds a joint appointment in the department of economics and the Sanford Institute of Public Policy. Robert H. Frank is the Goldwin Smith Professor of Economics, Ethics, and Public Policy at Cornell University, where he holds a joint appointment in the department of economics and the Johnson Graduate School of Management.

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And there is other evidence suggesting that this recent increase is a continuation of a process that began in the immediate post–World War II period.¹

In addition to whatever policy concerns are raised by these results, they may also be of interest as an illustration of a competitive process known in the economics literature as a “tournament.” The interesting features of this process are that it yields only a few winners from among many contestants and that the relative standing of the contestants, much more than their absolute quality, determines their prize. We suggest that the competition for top students can be viewed as a tournament, one characterized by a dynamic process with positive feedback. In recruiting good students, success breeds success, and the result has been a high degree of concentration. Among the possible explanations for why concentration has grown during recent years, we will discuss more intense marketing by elite schools, increasing wealth and reduced family size, lower long-distance telephone rates and real air travel costs, and a shift in the recruiting practices by elite employers.

The next section provides background information on the value of a degree from an elite institution and the consequences of having a large proportion of top students at one of these institutions. Section 4.2 presents some statistics on the current distribution of top students. Section 4.3 then discusses changes in the environment of higher education that appear to have influenced the equilibrium distribution of students among schools; this section also describes a positive feedback process whereby small shifts in the environment may produce relatively large shifts in the distribution of students. Sections 4.4 and 4.5 provide evidence on the trend in concentration and the apparent consequences of this trend for recruiting by employers.

4.1 Background

There is no mystery about which colleges and universities constitute the elite in American higher education. As noted by Kingston and Lewis (1990, xx), “prestige is a somewhat amorphous asset. Yet, for all the shadings of eliteness, there is remarkable continuity and consistency—among raters and over time—in the rankings of undergraduate schools.” There is a group of perhaps three dozen schools that are at the top of the rankings (with only minor variations) every year in college guides and news magazines and that are overwhelmingly successful in attracting top students. The students who do matriculate at these schools and graduate are on the “high status track” (Kingston and Lewis 1990); they tend to earn more than others and to have a much greater chance of achieving high rank in government or business.

A recent survey by *Fortune* documents the extent to which graduates of elite schools hold the top positions in the business world (Caminiti 1990). *Fortune*

1. For example, author and commentator Charles Murray has pointed out to us that the annual reports of the Harvard Dean of Admissions document a vast improvement in SAT scores between 1952 and 1960.

obtained responses from nearly 1,500 current and former chief executive officers of Fortune 500 and Service 500 companies. Almost all (93 percent) had graduated from college, and the seven schools that led the list were Yale, Princeton, Harvard, Northwestern, Cornell, Columbia, and Stanford—all elite private universities. These seven schools claim 166 CEO respondents, or over 10 percent of the total, as undergraduate alumni. The author notes that “the dominance of the Ivy League is, if anything, increasing: Whereas 14% of the former CEOs surveyed hold Ivy League undergraduate degrees, nearly 19% of the current CEOs do” (p. 121).

Of course, relatively few alumni from any school, elite or otherwise, become CEOs of Fortune 500 companies. But taken as a whole, graduates of elite schools are more successful in the labor market than are graduates of other colleges and universities. This is no surprise, given that elite schools select students because of many personal qualities that happen also to predict success on the job.

It is a matter of dispute whether elite schools have greater value added than other schools in terms of subsequent earnings and career accomplishment. One summary of the social science research on this subject states that “although graduates of higher-quality institutions do have demonstrably more successful careers, their greater success largely reflects greater intellectual and personal endowments and advantaged family backgrounds” (Kingston and Smart 1990, 148).² But even if a degree from an elite school served only to alert employers to the presence of these attributes, it would be a valuable asset indeed.

The best evidence on the value of an elite degree comes from an unusually rich data set, the National Longitudinal Survey of the High School Class of 1972, which followed this cohort through 1986. James et al. (1988) report their analysis of a subsample consisting of 1,241 males who had graduated from college and who worked for an employer in 1985. Earnings in that year were regressed on vectors of individual and family characteristics, institutional characteristics, and higher educational experience. The authors’ primary conclusion is that “while institutional characteristics do not explain a large proportion of the variance in earnings, other aspects of the higher educational experience such as choice of major, number of math credits taken, GPA and postgraduate degree matter a great deal” (p. 21). Nonetheless, the overall selectivity of the school (as measured by average SAT scores of the freshman class) did have a considerable effect—each additional 100 points of combined SAT scores increased earnings by about 4 percent. And alumni of private eastern schools earned a few percent more than others even after controlling for this measure of selectivity.³ According to James et al., if these

2. For similar conclusions, see Astin (1968) and Griffin and Alexander (1978).

3. James et al. control for whether or not a subject has an advanced degree as if the decision were exogenous. A more complete analysis would model that decision as a function of the characteristics of the undergraduate institution and family characteristics. Kingston and Smart (1990) studied a large sample of college graduates who were interviewed in 1971 as freshmen and again

proportional differences in salary persist throughout the career, they are more than sufficient to justify the higher tuition at elite schools.

Why is a degree from an elite private school of greater value than a degree from a less selective institution? One explanation, mentioned briefly above, is that it serves as a signal of quality that can be observed at low cost by employers, customers, and other potential transactors. On this view, the reputation of the school generates tangible benefits for graduates, independent of their own abilities and knowledge. While the social value of such signaling mechanisms is positive, it tends to be less than its total private value to the individuals who obtain elite degrees. After all, those who fail to obtain such degrees bear the stigma of a negative labor market signal, a cost that is external from the perspective of elite-degree seekers. The result is that, on signaling grounds, top students face too large an incentive to expend resources in pursuit of elite degrees.⁴ (For a discussion, see Arrow 1973.)

A second explanation for the value of an elite degree is suggested by the economic literature on tournaments. This literature has focused on cases where employers deliberately link compensation to rank-order performance measures as a means of eliciting greater effort from their workers.⁵ There may be a similar, albeit unintended, consequence of the intense competition among top students for admission to elite universities. For example, such competition undoubtedly induces many top students to devote more time to their schoolwork. Elite schools also emphasize that they are looking for well-rounded students, which may cause some students to join organizations or go out for athletic teams and spend less time experimenting with drugs or playing video games.

But the consequences of tournament incentive schemes are by no means uniformly positive. Often such schemes result in contestants engaging in a variety of “arms races” that contribute little or nothing to output. For example, much private expense is incurred, with little resulting increment in social value, when high school seniors take Stanley Kaplan courses in order to boost their scores on the Scholastic Aptitude Test.

in 1980. They found that, other things equal, the alumni of “prestige” schools were more likely to go on to an advanced degree. Questions of possible endogeneity of certain characteristics, and of generally unobserved heterogeneity, create substantial specification uncertainty for this type of study. For example, it is possible that personal characteristics that are generally unobservable by labor economists may be taken into account in the admissions decisions of elite schools. If such characteristics play an important role in salary determination, the observed earnings premiums of elite-school graduates may tend to overstate the additional value added by elite schools.

4. By all accounts, the Japanese system is much more extreme than the American system in this respect. The contest for admission to a prestigious university is fierce and expensive for students and their parents alike. Yet the quality of education offered even at top-ranked Tokyo University is quite poor. “Actually the entrance examinations themselves perform one of the university’s most significant functions, for they, more than a student’s work while at the university, help sort Japanese out for their lifetime careers” (Reischauer 1988, 195). Many businesses invite only candidates from the more prestigious universities to take their employment examinations.

5. See, for example, Lazear and Rosen (1981).

There are still further possible effects of the interuniversity tracking of students. For example, top students may receive a better education at elite schools for a variety of reasons, including the following:

1. An outstanding student body helps the university recruit outstanding faculty, since faculty members tend to prefer teaching bright students.

2. The curriculum and the standards for student performance in the classroom will be influenced by the quality of the student body, so that a highly selective school will be more likely to challenge bright students.

3. Students learn from each other outside the classroom, and the quality of such interaction at a highly selective school will tend to be more educational than at other schools.

4. The alumni of a school form a network of mutual assistance, and the value of this network tends to increase with the success of its members. If we take as given that this network results in a disproportionate number of graduates of elite universities being allocated to the most important industry and government jobs, then having additional top students in the network is of social as well as private value.

Consideration of these mechanisms suggests that educational tracking is productive, at least for those students who are tracked into the top schools. But there is another side of the tracking coin—namely, that it deprives students at nonelite schools of whatever personal or organizational benefits derive from additional contact with top students. For example, it diminishes the value of the honors curriculum that many large state universities offer to their best students. And when outstanding faculty members are drawn to an elite school by the effects of tracking, students in the nonelite schools no longer receive the benefit of their services. A related cost of tracking is that it diminishes the opportunities for “late bloomers”—those whose true high academic potential becomes apparent only after beginning college—to interact with other students and faculty of high ability.

The increasing concentration of top students in elite schools thus involves a trade-off: greater value added in the elite schools comes at the expense of diminished value added in some nonelite schools. Given the nature of the externalities involved, there is no assurance that the private decisions of individual students will resolve this trade-off in a socially optimal way. Suppose, for example, that the social product of having more elite students in any given university exhibits sharply diminishing returns. If our goal is to maximize net output from the educational system as a whole, such a technology might favor a relatively even distribution of top students across universities. Yet the private incentives that encourage top students to concentrate in a small number of elite universities would operate with the same force under that technology as under any other technology.⁶

6. The extensive literature on two-sided matching (see, for example, Roth and Sotomayor 1990) is primarily concerned with the ability of particular mechanisms to produce stable allocations when individual preferences are not affected by the assignment of other participants. (See

The allocation of students across universities has implications not only for efficiency but also for equity. Some commentators worry, for example, that family income plays too large a role in the process by which students are distributed among schools. The average family income of students attending elite colleges and universities is far higher than the average family income of students at nonelite schools. Several studies (including Hearn 1990; Spies 1990) report that family income is an important predictor of who applies to and attends an elite school, even after controlling for high school grades, standardized test scores, parents' education, and other personal characteristics. This difference persists even though postwar admissions policies at elite private schools have become largely meritocratic. The equity concern is that students in the top quintile of the income distribution are able to take advantage of the high returns to an investment in an elite education, while middle-class students of equal ability are relegated to an education with significantly lower value. Kingston and Lewis (1990) object that this pattern has the effect of perpetuating class differences, although they note that only a small percentage of the students from *any* socioeconomic status category, including the top group, attend elite schools.

The net impact of these opposing normative concerns is far from clear. A more complete account of the issues would require an analysis of the technology of higher education, and of the extent to which students with the most to offer their college peers can be identified on the basis of high school records. Such an analysis is well beyond the scope of our effort here. But the distribution of top students surely affects both the productivity of the educated work force and the extent to which ability determines economic success. For these reasons alone, it is an issue well worth studying.

4.2 Current Concentration

To what extent are students with the greatest scholastic aptitude and promise currently concentrated at the elite schools? In this section, we offer several statistics suggesting that a large percentage of students who are qualified for admission to one of the elite schools actually matriculate at those schools. We then offer some suggestions about the process that produces this result.

One way to identify college-bound seniors with the greatest promise is to utilize the lists of winners of national merit-based prizes. We obtained data on the Westinghouse Science Talent Search and the Presidential Scholars Program.⁷ The Westinghouse Science Talent Search, initiated in 1942, is a program that identifies high school seniors talented in science, mathematics, and

Gale and Shapley [1962] for an early application to college admissions.) Our concern is with the more difficult case where externalities are important.

7. We also contacted the National Merit Scholarship corporation but were unable to obtain data from them on the trend in college choice by National Merit Scholars.

engineering. Each year 40 finalists are selected on the basis of applicants' reports on an independent research project, their high school records, and standardized test scores. Among other benefits, the finalists receive a five-day, all-expense-paid trip to Washington, D.C.; a chance to receive a Westinghouse scholarship; and a letter of recommendation in support of their college applications. Using data provided by the Science Service, we were able to calculate the number who matriculated at each college during the three decades since 1960. The top seven schools on this list were all elite private universities; fully half (50.4 percent) of the finalists matriculated at one of these schools (table 4.1). The most popular choice for finalists during this period was Harvard, where one-fifth of all finalists matriculated.

The Presidential Scholars Program was established in 1964 "to recognize and honor our nation's most distinguished graduating high school seniors."⁸ Under current procedures, 2 winners are selected from each state and up to 15 winners chosen at large on the basis of standardized test scores, high school transcripts, essays, and other materials. The White House Commission on Presidential Scholars provided us with data on college choices by winners for the period 1987–89. As in the case of the Westinghouse finalists, the top seven choices accounted for half (49.7 percent) of the total (table 4.2). Harvard alone matriculated 18 percent of the Presidential Scholars, and the top five universities are the same as for the Talent Search winners.

We also sought information on college choices by the much larger group of high school seniors who have not necessarily won one of these prizes but have credentials sufficient to gain admission to one of the most selective schools. One method for identifying members of this group (albeit with a large number of errors of both types) is the Scholastic Aptitude Test. SATs are taken by all but a few students who intend to apply to a selective college. Unfortunately, the College Board cannot provide data on college choice of high school seniors taking the test. However, we were able to approximate this distribution by using the tabulations of freshmen scores provided in *Peterson's Guide to Four-Year Colleges*. This guide reports the fraction of each freshman class that scored above 500, 600, and 700 on each of the SAT tests (verbal and math). The most selective of these six categories, which best identifies the top students, is defined by a score above 700 on the SATV. In 1989 only 9,510 (less than 1 percent) of the 1.1 million seniors who took the SAT scored this high. Of this group, we estimate that 4,075 (42.8 percent) matriculated at 1 of the 33 colleges and universities designated as "most competitive" by *Barron's*.⁹ Since these schools matriculated only 2.4 percent of the seniors taking the SAT in that year, this result demonstrates an extraordinary degree of concen-

8. Quote from the White House Commission on Presidential Scholars, The 1990 United States Presidential Scholars Program fact sheet.

9. We used the list from the 1980 edition of *Barron's*. Colleges were rated by several factors to determine the competition for admission, including entrance exam scores and high school grades of the freshman class, as well the proportion of applicants to whom the college offered acceptance.

Table 4.1 Entering Freshmen: Westinghouse Science Talent Search Finalists, 1960–89

College	Number of Finalists	Percentage of Total	Cumulative
Harvard	229	19.8%	19.8%
MIT	103	8.9	28.7
Princeton	72	6.2	35.0
Stanford	58	5.0	40.0
Yale	50	4.3	44.3
Cal Tech	38	3.3	47.6
Cornell	32	2.8	50.4
All others	573	49.6	100.0
Total	1,155	100.0	

Source: Calculated from unpublished data provided by Science Service.

Table 4.2 Entering Freshmen: Presidential Scholars, 1987–89

College	Number of Scholars	Percentage of Total	Cumulative
Harvard	54	18.2%	18.2%
Princeton	28	9.5	27.7
Stanford	26	8.8	36.5
Yale	12	4.1	40.6
MIT	11	3.7	44.3
Duke	9	3.0	47.3
Michigan	7	2.4	49.7
All others	149	50.3	100.0
Total	296	100.0	

Source: Calculated from unpublished data provided by the White House Commission on Presidential Scholars.

tration.¹⁰ If anything, this measure tends to be an understatement because some of the seniors with a high SATV were not qualified for admission to an elite school. If it were possible to exclude them from our tabulation, the resulting measure of concentration would be still higher. The top four universities (Harvard, Princeton, Stanford, and Yale) had a combined freshman class equal to only 0.5 percent of all those who took the SAT but included 17.5 percent of all those scoring above 700 on the SATV.

The statistics on top students suggest that college-bound seniors who are qualified for admission to the most selective colleges and universities are likely to attend one of these schools. Since elite universities are not cheap, it appears that a large portion of the relevant market agrees that the product offered by these schools is of relatively high quality.

10. The same list of schools matriculated 61 percent of the Presidential Scholars for the period 1987–89 and 60 percent of the Westinghouse Talent Search winners for the period 1960–89.

4.3 Quality and College Choice

In this section, we argue that there is an interaction between perceived quality and the distribution of top students and that this interaction produces a positive feedback effect that tends to magnify or reinforce initial differences in perceived quality.

A recent review (Conrad and Blackburn 1985) found that while quality is “analogous to pornography in its elusiveness” (p. 284), the evidence suggests that perceived quality in higher education is closely related to student achievement. According to one survey of top high school students and their mothers, students tended to judge college quality primarily on the basis of the achievements of the student body, while mothers tended to place greater emphasis on the admissions rates of alumni to graduate and professional schools (Litten and Hall 1989).¹¹ In practice, of course, the two measures are highly correlated. In a related finding based on college choices of high school seniors, Fuller, Manski, and Wise (1982) report that applicants tend to prefer colleges that matriculate students whose SAT scores exceed their own.¹²

These findings imply the existence of a positive feedback process. If applicants judge a school’s quality partly by the accomplishments of its students (both in high school and after graduation from college), then an upgrade in student quality improves the reputation of the college and demand for its services, thereby making it easier for the college to improve the quality of its other resources as well (McPherson and Winston 1988). Thus, an initial improvement in reputation for whatever reason will generate improvements in the quality of the student body, which in turn leads to a further improvement in reputation.¹³ As Brian Arthur (1990) observes, an industry in which such positive feedback processes are important may evolve in certain distinctive ways, including “lock-in” through historical events and no guarantee of shared markets. These possibilities seem to be at least partly realized in the market for prestige in undergraduate education.¹⁴

To illustrate the workings of the feedback process, consider a simple model with two types of students, “ordinary” and “top.” Top students are always

11. See Krukowski (1985) for evidence that students’ definition of quality shifted during the early 1980s to focus more on the postgraduate success of the student body.

12. The authors found that for a student with given ability, the utility of an alternative first increases fairly linearly with its “performance standard” but eventually turns down. Based on which college they choose, students appeared indifferent between schools with the same SAT and those that are 300 points higher, given that they had applied and been admitted to both. The optimum appears to be 100 points higher than the score of the student. The authors employed data from the National Longitudinal Survey of High School Seniors, Class of ’72.

13. Commenting on the University of Pennsylvania’s campaign to broaden its market and improve its image during the early 1980s, Provost Thomas Ehrlich noted: “The wonderful thing is that the more successful you are, the more successful you are. The more you hear Penn is the institution of choice, the more you want to come” (Walton 1986).

14. One piece of evidence concerning the importance of history is the geographical mismatch between elite colleges and students. The fact that most of the elite colleges are located in the Northeast reflects the geographic distribution of college students in the 18th century.

admitted to and attend elite schools if they apply. In figure 4.1, D_1 represents top students' initial demand curve for slots in elite schools, shown as upward sloping to represent the fact that elite schools become more attractive to top students when there are more such students enrolled in the elite schools. The initial equilibrium occurs at E_1 , where the proportion of top students seeking admission to elite schools is exactly in balance with the proportion of top students enrolled in these schools.

Now imagine an upward shift in the demand for elite schools by top students (the result, say, of increased recruiting by elite schools). At S_1 (the original proportion of top students in elite schools), there will now be a proportion $N_2 > S_1$ of top students who desire positions in top schools. Note that at the new equilibrium, E_2 , the increase in the proportion of top students enrolled in elite schools ($S_2 - S_1$) is larger than the original upward shift in the demand schedule ($N_2 - N_1$). This difference represents the feedback, or multiplier, effect discussed earlier.¹⁵

4.4 Trends in Concentration

While the reputational ranking of colleges and universities is very similar now to what it was several decades ago, there is evidence that the importance of reputation in the competition for top students has increased in recent years. We discuss this evidence in this section.

For two of the measures of concentration presented above, we have sufficient data to determine whether there has been any shift over the last several decades. For the Westinghouse Science Talent Search finalists, we present a decade-by-decade comparison in table 4.3. While there was only a small rise in concentration between the 1960s and 1970s, the 1980s showed a substantial increase: 59 percent of 1980s finalists chose one of the top seven schools, compared with 48 percent in the 1970s.¹⁶

Between 1979 and 1989 there was an increase from 32 to 43 percent of students scoring over 700 on their SATV who chose one of the "most competitive" colleges on the *Barron's* list (table 4.4), even though the number of matriculants at these schools increased only slightly during this period.¹⁷ The counts in this table tell the story in more detail. First, the number of students taking the SAT was approximately the same in the two years, but the number who scored above 700 on the SATV dropped from 12,879 to 9,510. Second, the number of these high scorers who matriculated at one of the elite schools remained roughly constant (4,166 in 1979 compared with 4,075 in 1989). Thus the elite schools captured a larger percentage of a smaller pool in 1989, which accounts for the increase in the concentration statistics. Another way

15. The equilibria shown in figure 4.1 are stable because the demand curves are less steep than 45 degrees. If they were steeper, no interior equilibria would be observed.

16. This difference is statistically significant at the 1 percent level.

17. The list of schools was the same for 1979 and 1989 and was taken from the 1980 *Barron's*.

Number of top students seeking admission to elite schools (as a % of elite school capacity)

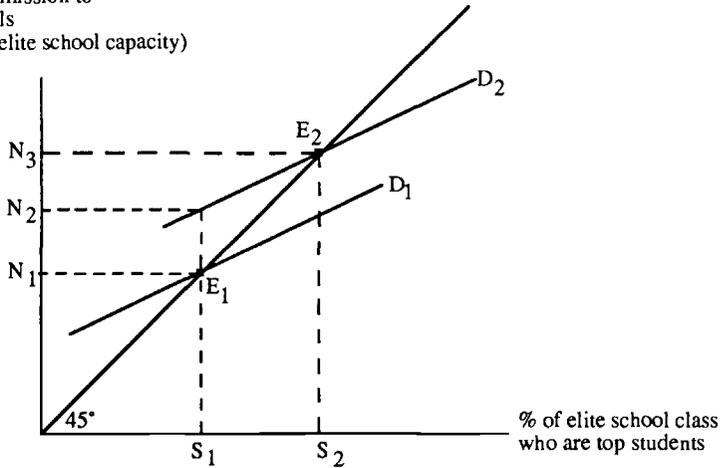


Fig. 4.1 The multiplier model

Table 4.3 Entering Freshmen: Westinghouse Science Talent Search Finalists, by Decade

College	1960s	1970s	1980s
Harvard	17.7%	18.9%	21.6%
Top three*	32.8	33.5	38.6
Top seven**	46.5	48.1	58.9
Number of finalists	396	370	389

Source: Calculated from unpublished data provided by the Science Service.

*Harvard, MIT, Princeton.

**Harvard, MIT, Princeton, Stanford, and Cal Tech were among the top seven during each of the three decades. The other two were Columbia and Chicago (1960s), or Yale and Cornell (1970s and 1980s).

of seeing this is that in 1979, the elite schools drew one-sixth of their combined class from the top 1.3 percent of the SATV distribution, whereas in 1989 they drew almost the same fraction of their combined class from the top 0.9 percent of the SATV distribution. The most plausible explanation for this increase in concentration was that the top students were more likely to seek admission to one to the elite schools in 1989 than they were a decade earlier.¹⁸ This explanation is supported by other data, presented below.

18. It is interesting to note the corresponding trends for those scoring above 700 on the SATM (mathematics). This category, which included fully 30,539 students in 1979, was not nearly as exclusive as having an SATV score that high in 1979, and it became still more common in 1989,

Table 4.4 Entering Freshmen Nationwide, 1979 and 1989

Category	Number of Freshmen		
	Total	At Most Competitive Schools*	Percentage
<i>1979</i>			
SATV of 700–800	12,879	4,166	32.4%
All SATV scores	991,405	25,004	2.5
<i>1989</i>			
SATV of 700–800	9,510	4,075	42.8
All SATV scores	1,088,796	25,796	2.4

Sources: Number of freshmen in 1989 (College Board 1990); number of freshmen in 1979 (College Board 1980); distribution of freshmen by SAT for 1989 (Peterson's Guide 1990); distribution of freshmen by SAT for 1979 (Peterson's Annual Guide 1981); nationwide distribution of SAT scores (College Board 1979, 1989).

*"Most competitive schools" are those listed in that category by *Barron's* in 1980. Bowdoin and Dartmouth were omitted due to missing data. The distribution of SAT scores for Harvard freshmen was assumed to be the same as in 1989. For Mount Holyoke, the distribution of SAT scores for 1989 freshmen was taken from 1986.

There is also evidence that the trend toward increased concentration of top students in at least some leading universities began well before the 1980s. For example, the median combined SAT score for entering freshmen at Harvard, which stood at 1191 in 1952, had already risen to 1388 by 1965. In absolute terms, the Harvard total has actually shown no further significant increases during the last two decades. For freshmen males who entered in fall 1990, it stood at an even 1400. But because average SAT scores fell throughout the same period, these figures imply a continuing improvement in the relative quality of Harvard's freshmen.

The increase in concentration of top students at Harvard and other elite schools does not appear to be the result of a change in relative prices of private and public education. On the contrary, because the price of attending an elite private school has been increasing in relative terms over the last two decades (Schenet 1988; Clotfelter 1990), the observed increase in concentration must have resulted from an increase in demand for elite universities.

Clotfelter (1990) argues that such a demand shift has resulted in part from the substantial increase in the income and wealth of households in the top fifth

when the number was 52 percent higher at 46,435. The number of these students who matriculated at one of the elite schools increased by 34 percent during the decade, from 8,548 to 11,446. These results do not tell us much about the preferences of top students, since many of these high SATM scorers were not qualified for admission to the elite schools. The number of students scoring above 700 on the SATM exceeded the number of slots in the elite schools' combined freshman class in 1979 and greatly exceeded it in 1989.

of the income distribution, which supply a disproportionate share of the students for the elite schools (Schapiro, O'Malley, and Litten 1990). He notes that between 1977 and 1987 the average income of households in the top quintile increased in real terms by 12.5 percent. Stock and real estate values increased sharply during this period, and there were two cuts in the top rate of the federal income tax. We add that this period was also notable for the reduction in the average number of siblings of college students, making a high-cost education more affordable. For example, according to results from the American Freshman Survey, the number of freshmen at private universities whose parents had five or more dependents fell from 45 percent in 1979 to 28 percent in 1987.

But affordability is not the whole explanation. A recent study by Richard Spies (1990) finds a large increase in recent years in the probability that a student with given characteristics, including family income, would apply to an elite private school.¹⁹ He conducted two surveys of high school seniors with high PSAT scores, one in 1976 and the second in 1987. Based on their responses, he reports estimates of the probability of application to at least one of a group of 33 elite colleges and universities (all of them selective, private, and expensive). His ordinary least squares (OLS) regression results control for a variety of factors, including family income. Using these results to compare the two years, we estimate the probability of application for a student with the following characteristics: white Protestant male only child, financially dependent on his parents, resident of the Middle Atlantic states, public high school graduate in the top 10 percent of his class, father with college degree, applicant for financial aid, family income is \$40,000 in 1987 dollars.²⁰ Holding all of these factors fixed, the probability of application depends as follows on the SAT score and the year²¹:

	SAT Score		
	1200	1300	1400
1976	.25	.36	.50
1987	.41	.56	.72

19. In 1987, about 56 percent of those who applied to an elite private school matriculated at such a school. See table 4 of Schapiro, O'Malley, and Litten (1990).

20. The consumer price index doubled between 1976 and 1987, so the nominal value for the earlier year was \$20,000.

21. It should be emphasized that the data are for application rather than matriculation. It is possible that there was a downward shift in the likelihood that a student who applied and was accepted to at least one of these schools actually matriculated at one of them. There is evidence, however, that it is relatively uncommon for a student who is accepted at an elite school to decline in favor of a lesser-ranked institution. For example, a 1987 survey (Schapiro, O'Malley, and Litten 1990, 22) indicated that 71 percent of the students admitted to at least one COFHE school (a group of elite private institutions very similar to *Barron's* "most competitive" list) matriculated at one of these schools.

Although most institutions on *Barron's* list of most competitive universities are private, a significant number of public schools also have strong academic reputations. We have made some preliminary attempts to check whether demand has also shifted toward relatively more prestigious public institutions. Tables 4.5 and 4.6 provide data on the SAT scores of entering freshmen at the eight campuses of the University of California. All the UC campuses charge the same tuition but differ with respect to prestige and reputation. The campus with the strongest reputation of the eight is Berkeley, and the results demonstrate that there has been a marked increase during the 1980s in the concentration of students with the greatest scholastic aptitude on that campus. For example, the odds ratio that a UC freshman with an SATV of at least 700 would matriculate at Berkeley increased from 2.3 in 1980 to 5.8 in 1988.²²

In sum, there is considerable evidence that students qualified for admission to an elite school were more likely to choose such a school in the late 1980s than they were a decade earlier. There is also evidence that the trend toward increased concentration began well before the 1980s. Further, the observed changes cannot be accounted for in terms of trends in tuition and other costs; nor did they result solely from changes in the income distribution.

There are many other possible explanations for the observed increases in concentration, several of which we list below:

- Numerous social commentators have described the 1980s as a time of increased materialism, conspicuous consumption, and brand-name consciousness. The colleges with the most prestigious brand names may have been the beneficiaries of this general cultural shift. The proliferation of publications offering national rankings of colleges and universities may be one quantifiable aspect of this shift.
- During this period, there was a considerable increase in colleges' and universities' expenditures on recruiting students, brought on in part by concerns engendered by the declining population of 18-year-olds. This effort may have encouraged college-bound seniors to consider schools that they otherwise would have ignored. We know that college applicants as a group invested more in "shopping" for the right option: in 1988, 37 percent of college freshmen said they had applied to three or more colleges, a higher percentage than ever before (Astin et al. 1988, 8). Only 15 percent applied to that many in 1968.
- The shift may be related to trends in the job market for entry-level managers and professionals, including greater emphasis on educational credentials and a relative decline in preference for graduates of local colleges and uni-

22. A similar analysis of freshmen in the University of North Carolina system (where Chapel Hill has the strongest reputation of the 16 campuses) revealed a different pattern. Unlike what we saw in the California system, there has been little change in the degree of concentration of top students in the UNC system.

Table 4.5 Entering Freshmen, University of California: Distribution by SAT Scores, 1980, 1984, 1988

SAT Score	Verbal			Math		
	In UC System	At UCB	Percentage	In UC System	At UCB	Percentage
<i>1980</i>						
750-800	86	31	36.05%	410	165	40.24%
700-740	362	110	30.39	1,114	387	34.74
650-690	856	271	31.66	2,033	498	24.50
600-640	1,773	456	25.72	3,178	616	19.38
All freshmen with SAT scores	17,732	2,943	16.60	17,729	2,943	16.60
<i>1984</i>						
750-800	68	47	69.12	438	244	55.71
700-740	365	181	49.59	1,538	621	40.38
650-690	899	374	41.60	2,775	848	30.56
600-640	1,901	635	33.40	3,622	810	22.36
All freshmen with SAT scores	20,714	4,040	19.50	20,716	4,041	19.51
<i>1988</i>						
750-800	53	38	71.70	713	349	48.95
700-740	514	245	47.67	2,369	723	30.52
650-690	1,479	518	35.02	3,806	686	18.02
600-640	2,643	622	23.53	4,423	498	11.26
All freshmen with SAT scores	23,393	3,441	14.71	23,393	3,441	14.71

Source: Calculated from unpublished data provided by the Office of the President, University of California.

Table 4.6 Entering Freshmen, University of California: Odds-Ratio of Attending Berkeley, 1980, 1984, 1988

SAT Score	Verbal			Math		
	1980	1984	1988	1980	1984	1988
750+	2.8	9.2	14.7	3.4	5.2	5.5
700+	2.3	4.6	5.8	2.9	3.2	3.1
650+	2.3	3.4	3.7	2.1	2.3	2.0

Source: Calculated from data in table 4.5.

Note: The Odds-ratio is defined as the odds that a UC freshman with a given SAT score attends Berkeley, divided by the odds that any UC freshman attends Berkeley.

versities. (We present some relevant data on recruiting practices in the next section.)

With the data available to us we can do little to quantify the relative strength of these explanations. But regardless of the sources of exogenous shifts in college preference, we suspect that these sources by themselves account directly for only part of the observed increase in concentration. The indirect effects of the positive feedback process described earlier, whereby college choices by top students influence and are influenced by colleges' reputations, may also figure prominently in this process.

4.5 On-Campus Recruiting

One factor that may influence top students' college decisions is their perception of the extent to which attendance at different schools helps them land favored jobs. Thus, for example, top students should find a university more attractive if favored employers actively recruit at that university. For their part, elite employers have an obvious incentive to focus on universities that attract top students. The causal relationship between the elite recruiter's choice of universities and the top student's choice of universities thus runs in both directions—another positive feedback loop of the sort mentioned earlier. As top students become more concentrated in elite universities, elite firms will concentrate more of their recruiting in those universities. And this makes elite universities still more attractive to top students.

As part of our inquiry into the causes of increased concentration of top students, we conducted a survey of past, current, and expected future recruiting practices of a sample of firms who recruit at Cornell University. Cornell appears in *Barron's* list of most competitive universities, and the recruiters who visit the campus gave evidence in their survey responses that much of their other college recruiting takes place on similar campuses. One of our questions, for example, was "Roughly what percentage of the colleges you will visit this year are among those that consistently rank among the top 25 national universities?" Responses averaged 49.7 percent ($N = 60$).

We also asked respondents to report whether the ratio of top-ranked campus visits to total campus visits has increased, decreased, or remained the same over the past ten years. 35 percent of our respondents reported an increase, only 13 percent a decrease. The remaining 51 percent reported no change ($N = 82$).²³

When asked how they expected their proportion of visits to elite universities to change in the future, 22 percent of our respondents expected an in-

23. There is a potential selectivity bias in our sample of Cornell recruiters. As we explain below, this bias does not appear significant.

crease, while only 10 percent expected a decrease. 68 percent expected no change from the current ratio ($N = 82$).

We observed an essentially similar pattern of responses when we asked how the proportion of interviews (as opposed to campus visits) conducted at top-ranked universities has changed over the past 10 years. Thirty-six percent of respondents reported an increase in this proportion while only 14 percent reported a decrease ($N = 80$). When asked about their expectations concerning future changes in the proportion of total interviews conducted at top-ranked universities, 24 percent expected an increase, while only 8 percent expected a decrease ($N = 80$).

Although it appears safe to assume that companies recruiting at Cornell are actively in the market for top students, there was significant variation in the extent to which our respondents confined their attention to such students. Some respondents reported that as little as 5 percent of their recruiting took place on top-ranked campuses, while others reported 100 percent. Similarly, while most firms who recruit at Cornell would probably not bother to do so if they felt they had little chance of appealing to top students, not all firms in our sample are equally attractive to such students. With both of these sources of variation in mind, we constructed a subsample of firms that were either more selective than others in their recruiting efforts or more likely than others to appeal to top students. Our goal in constructing this subsample of elite firms was to test the hypothesis that the increase in concentration of recruiting efforts at top-ranked universities is more pronounced for elite firms than for other firms in our sample.

On the selectivity dimension, a respondent was included in the elite-firm subsample if it conducted at least 70 percent of its campus visits and total interviews at top-25 universities. In terms of attractiveness to top students, a respondent was included in the subsample if it met at least one of the following criteria: (1) it appeared on the Levering list of "the 100 best companies to work for"; (2) it was one of the top three firms in its four-digit industry in terms of annual sales revenue. The result was a subsample consisting of 39 respondents, which we call "elite firms." 43 respondents were excluded on the basis of these criteria.

As shown in figure 4.2, the observed pattern of changes is the one we expected. During the last decade, 41 percent of elite firms had increased their proportion of visits to top-ranked universities, while only 8 percent of elite firms decreased that proportion ($N = 39$). The corresponding figures for other firms are 30 percent and 19 percent, respectively ($N = 43$).

We now consider the possibility that the reported changes in behavior for our sample of current Cornell recruiters may not be representative of the changes in behavior for recruiters as a whole. Suppose, for example, that in the total population of firms that recruit on college campuses, some have become more likely to recruit at elite campuses in the past ten years, others less

Change in the Ratio of Top-25 Visits to Total Campus Visits (%)

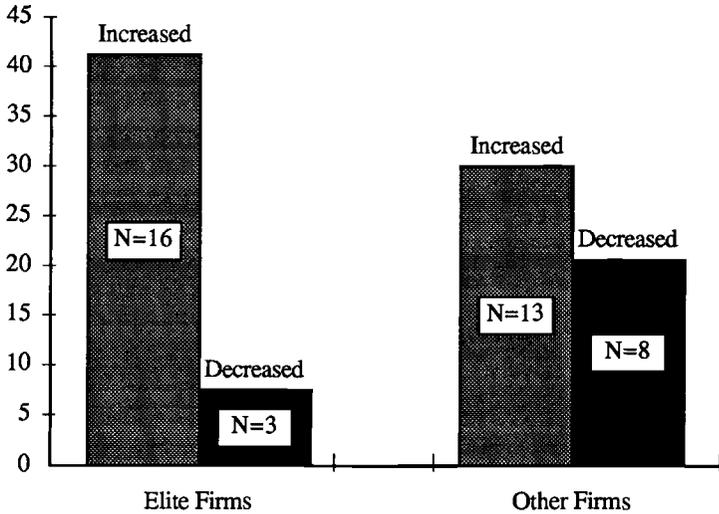


Fig. 4.2 Changes in the proportion of recruiting visits to top-ranked universities: Elite firms versus other firms.

likely. Our 1990 cross section of Cornell recruiters may then contain disproportionately many representatives from the former category, causing our estimates to overstate the increase in concentration. To explore this possibility, we searched Cornell's placement records and found that 36 firms from our sample have been recruiting at Cornell for at least the past ten years. Focusing on this subsample alone, we found that 17 of these firms had increased the proportion of their total interviews conducted on elite campuses, while only 6 had reduced that proportion; 13 firms reported no change. We conclude that selectivity bias does not seem to be a serious problem in this instance.

Cornell's undergraduate placement director, Thomas Devlin, told us that he has observed a steady trend toward more targeted recruiting over the past two decades. He reports that firms have become steadily less likely to choose campuses on the basis of geographic proximity and increasingly likely to choose on the basis of student characteristics. His impressions are thus consistent with the responses of the firms we surveyed. Both lend support to the more general claim that top students have more to gain now than in the past by attending an elite university.

The increased focus of elite corporate recruiters on elite campuses suggests a specific mechanism whereby the signaling function of elite schools can generate large costs that would otherwise be avoidable. For example, a top student might once have found it attractive to attend a nearby state university because the presence of other top students there meant that he would be sought

out by employers upon graduation. But once sufficiently many top students migrate from state universities to elite schools, this is no longer a safe presumption. By going to the nearby state university, the top student may be much more likely to be overlooked by elite employers and graduate schools. The elite university's higher tuition and greater distance from family represent painful sacrifices for many top students; but they are sacrifices that many feel they can no longer avoid.

4.6 Concluding Remarks

In this paper, we have presented evidence that a large and growing proportion of the nation's top students are concentrated in a relatively small number of top-ranked universities. We have also noted that the process whereby students choose universities is characterized by an assortment of externalities and positive feedback effects at several levels. Finally, we have suggested that there are many possible social welfare consequences of increased concentration—some positive, others negative.

Given the externalities and positive feedback effects inherent in the individual's college choice, there can be no presumption that the current aggregate distribution of students is socially optimal. In view of the apparent trend toward increased concentration of top students, additional research on the welfare effects of such concentration deserves high priority.

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Comment Malcolm Getz

The proper education of a society's elite has been a subject of discussion in the social sciences at least since Plato. The discussion is naturally linked to issues of defining *elite*, how one becomes a member of "the" elite, and what good is having an elite, anyway? "The Growing Concentration" is in a long and worthy tradition. These issues have particular relevance for a society in which the results of popular elections have great influence in shaping institutions and in which we have ongoing love/hate relationships with our elite. Reflection upon the names Lincoln, Roosevelt, Kennedy, and Reagan should make the point.

My comments can be summarized by three questions:

1. Is the collegiate education of the "elite" being concentrated at elite institutions?
2. Why might such a development be occurring?
3. What difference might such a development make?

Is the Collegiate Education of the "Elite" Being Concentrated at Elite Institutions?

Before answering this question, one might first want to attempt to define our society's elite. Cook and Frank look at the chief executive officers of large corporations and at the earnings of graduates of elite private schools. Members of Congress, governors, and members of the federal judiciary might be a political elite. The persons with the highest income or greatest wealth (which would include certain entertainers, sports figures, and a variety of persons other than CEOs) might be included in a monied elite. The medical field has its own elite, as do other fields such as the arts, science, engineering, and the military. The overlap among elite groups may be relatively small, an important observation in itself. The degree of concentration of collegiate education of each of the several elite groups might then be examined separately with a view to whether the finding for CEOs in Cook and Frank holds true for the elite of other groups as well. The point is that our society's elite is pluralistic, and no single metric will measure all of it. Given this pluralistic character, one might find that the concentration of the elite at "elite" schools is less than Cook and Frank indicate.

Having defined the elite, we turn to the question of whether their collegiate education is concentrated among elite institutions. What is an elite institution? The essay identifies seven schools for some purposes and uses *Barron's* "most competitive" (forty-four schools in the 1990 edition) for other purposes. The lists include at least one public institution and a mix of research universities, doctoral institutions, and liberal arts colleges. This group does not by itself

seem monolithic. The contrast pointed out by Cook and Frank between the Japanese system and the American system is striking. By comparison, the elite collegiate institutions in America seem to have a decidedly diluted concentration of elite students. Moreover, the rates of concentration of top students at the American elite institutions is hardly alarming. That 18 percent of 300 Presidential Scholars chose Harvard is interesting but is probably not enough to give Harvard a monopoly on elite students.

The essay portrays a trend toward increased concentration of top students in elite institutions. It would be helpful to know when the phenomenon may have started. Although higher education has used entrance exams for centuries, the goal prior to 1945 was principally to assure adequate preparation for collegiate work. After 1945, entrance examinations functioned to promote selectivity in an effort to increase the average ability of the entering class. If the phenomenon dates back no further than 50 years, its full consequences may not yet be manifest. The notion of changing patterns of concentration may have more meaning in a longer historic perspective. Do the elite schools know their admission and yield rates over the last century? How does their experience compare with that at somewhat less selective institutions? Does the phenomenon the authors demonstrate for top institutions hold true to lesser degrees down the line?

Why Might Such a Development Be Occurring?

The essay cites evidence that graduates of elite institutions enjoy higher earnings, perhaps even sufficiently higher to justify their cost. As the essay notes, this phenomenon could reflect the ability of the schools to identify able people, and it could reflect a higher quality of education. In support of the latter, the essay gives several plausible explanations to which I might add two. First, the institutions may be better managed than others and therefore do a better job of turning dollars into educational experiences. They may be less bound by civil-service rules, more aggressive in selecting and rewarding faculty, and more successful in identifying and responding to student and faculty interests. They may also do a better job of marketing. Second, private institutions tend not to have their fortunes rise and fall with the yield of state taxes. Therefore, their operations may be less susceptible to economic downturns than are public institutions whose own health may rise and fall with the state's fiscal health.

The essay also identifies a "snowball" mechanism, wherein the successes of graduates make the institution more attractive to subsequent applicants. As the school is more successful, it can be more selective and so enhance its future appeal and success. I might suggest a second such mechanism, albeit one with a longer period for realization. As successful graduates advance in their careers, they can contribute more generously to their alma maters. As an institution's fund-raising appeals are more successful, the institution becomes better off financially and can use its improved resources to make itself more

attractive to prospective students. It is hardly coincidence that the most selective institutions are also the best endowed.

What Difference Might Such a Development Make?

Even a social welfare function as egalitarian as that proposed by John Rawls would value better education for the elite when the role of the elite is important in advancing the welfare of all. If advances in science, medicine, management, politics, warfare, and public policies arise from the good ideas of, and their successful implementation by, the elite, then education that enhances the performance of the elite will be likely to advance not only their own fortunes but also the welfare of the least well off.

If the elite schools provide better education for the elite, then increasing concentration of members of the elite in such institutions would seem to be a good thing. The important point here may be that success-bound individuals define the better institutions by selecting them in open competition. If an institution fails to provide suitable experiences, the success bound will choose other, more effective institutions.

Concentration would be alarming if it reached the point where institutions had a significant monopoly position, such as might occur under some regulatory scheme guaranteeing that position (e.g., a single national military academy). In such a circumstance, the institution need only satisfy its regulators. Students would not be in a position to exercise selection, and so the function of the marketplace would be lost. There may be such institutions in relatively narrow niches in the United States, but the national elite institutions are not so confined.

Concentration of collegiate education for the elite within several dozen institutions may yield market discipline. However, if the institutions are essentially similar in culture and outlook, excess concentration might homogenize members of the elite so as to make them more resistant to “foreign” ideas. One might think of the problem as cultural inbreeding. However, this does not seem to be a particular problem for the American elite schools. The institutions described have some diversity. The level of concentration of collegiate education of the elite is not high enough to suggest that members of the elite are all educated in the same way. Moreover, collegiate education is not a requirement for “elitehood.” The current governor of Tennessee does not have a college degree.

Finally, one might be concerned about the effect of the increasing concentration of outstanding students in outstanding schools on the distribution of income and opportunity. What is the bottom-line equity consequence of concentration? That bright people are somewhat more likely to have higher income, and that they are likely to earn even more when they are well educated, does not necessarily violate any ethical principle. Equity concerns might arise in thinking about criteria other than ability that might influence admission to selective colleges. Race, sex, parental wealth, and ethnicity all have influ-

enced admissions decisions from time to time. How such considerations should influence—both positively and negatively—admission to college, and by extension admission to the elite, will continue to be controversial. Such controversy will likely surround any and all pathways to elitehood. Given the financial aid, aggressive marketing, and quest for diversity of the dozens of institutions involved, concentration of collegiate education at the levels described in this essay may well improve prospects for access to elitehood for persons of disadvantaged backgrounds or who are otherwise underrepresented. Moreover, public policies and philanthropic institutions are available to modify the balance, should it become desirable to do so.