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Chapter Title: Classes and Course Offerings

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Classes and Course Offerings

We concluded that one important way to measure a college's commitment to undergraduate education is to look at class size in general education. Do these courses enroll hundreds of students? Are they taught by senior professors? Do students have an opportunity to meet with their teachers?

Ernest Boyer, 1987¹

UNDERLYING an institution's measured expenditures are choices that it makes about how to allocate its teaching resources, notably, its faculty and graduate students. The previous chapter presents data showing that one evident trend in the sample institutions during the period of study was a decline in the average amount of classroom teaching by regular faculty members, at least in the departments examined. This trend is certainly consistent with the notion that an increasing emphasis on research had affected the entire labor market for academic labor, by way of changing the expected conditions of work for faculty. Whatever its genesis, it would be surprising if a change such as this one had no impact on the production processes of colleges and universities, and, in turn, on the outputs. Owing to the primitive nature of our understanding of these processes and the difficulty in measuring the outputs, however, it is impossible to say exactly what the effects might be. The best that can be done is to observe some of the corollary effects of these changes. In particular, it is possible to measure the size of classes and the share of teaching by regular-rank faculty. If characteristics such as these affect the quality of educational experience for students—and there is evidence that they do—useful, if not ideal, information can be obtained. The aim of this chapter, then, is to examine several measurable indices that help to assess the real, as opposed to the purely financial, changes that occurred during the sample period at the four institutions.

The first section of the chapter presents measures describing two major characteristics of courses offered by each institution: the size

of classes and whether the instructors are regular faculty, graduate students or other, nonregular faculty. The second section examines the number of courses offered in several departments. It also touches on several related aspects of the courses offered.

CHARACTERISTICS OF COURSES: HOW LARGE AND WHO TEACHES

The conventional wisdom among practitioners of college and university teaching is that class size matters, but that its effect is not necessarily proportional. Smaller classes give instructors the option of using teaching techniques, principally those that require give-and-take between student and teacher, that are infeasible in larger classes. Beyond the size at which these techniques become impossible, however, it is often claimed that increasing a class's size has little further deleterious effect. Some scientific evidence appears to support the notion that class size matters. In his surveys of Harvard undergraduates, Light (1992, pp. 50–1) finds that students who take at least one small course report higher levels of satisfaction and are “noticeably more engaged, by their own rating, than students who take only larger classes.”

The other measurable characteristic of classes is the type of instructor. The general presumption is that, other things equal, a member of the regular faculty usually will do a better job of teaching than will a graduate student. The student lacks not only the training signified by the degree but also lacks experience in the job at hand. A similar presumption can be defended with respect to the comparison between regular (tenured and tenure-track) faculty and nonregular faculty. One would be hard put to argue that either class size or the category of the instructor functionally determines teaching quality (assuming the latter could be measured), but it seems reasonable to pay attention to both indices.

Given the presumption that class size is important, at least within limits, it seems best to measure it directly, by the number of students who share a given classroom or laboratory experience. Interestingly, this measure is completely different from the statistic that is most commonly reported and compared for the same purpose—the student-faculty ratio. Lower ratios are considered preferable to higher ratios, and indeed, private, selective, and expensive institutions do tend to have the lowest ones. For example, the 1994 *Peterson's Guide* reported the following ratios for the sample institutions: Duke, 12:1; Carleton, 11:1; Harvard, 8:1; and Chicago, 3:1. Assuming that total

faculty was used to calculate these ratios, the ratios would be heavily influenced by the presence and size of graduate and professional schools. Moreover, as chapter 7 shows, even between two institutions with undergraduate, graduate, and professional schools of equal size, there is no necessary correspondence between this ratio and average class size. In the simple model presented in chapter 7, average class size depends not only on enrollments and faculty size—the raw material for the student-faculty ratio—but also on the normal course load taken by students, the classroom teaching load of faculty, the use of graduate students as instructors, and the use of other nonfaculty instructors.

Although average class size seems to be a more useful descriptive statistic than the gross student-faculty ratio, it is not without its own shortcomings. For one, average class size suffers from the drawback of all averages; a more complete description of the size of classes would account for the variation across classes by size as well as the overall average. Another shortcoming of average class size is its dependence on patterns of student enrollment: the inevitable ebb and flow of student enrollments by department stands against the relative fixity in the number of faculty in each department, creating strong forces for larger classes in popular departments and making small classes easier to achieve in less popular fields.

As described in chapter 7 and appendix 7.2, data were collected for three corresponding departments in each institution, one each in humanities, natural sciences, and social sciences, plus an engineering department at Duke. For every course in each department in each sample academic year, information was obtained on the number of undergraduates registered through the department, the number of graduate students so registered, and the number of students who had registered for the same courses through some other department's designation (for cross-listed courses only). For courses that met in discussion sections or labs in addition to lectures, information on the size of each meeting group was collected or estimated. Using a variety of data sources, it also was possible to determine whether the instructor of any class or component section was a regular tenure-track faculty member, a graduate student, or other instructor. The latter group includes visitors, adjunct faculty, and those with a nonregular rank, such as lecturer.² Calculations were then made, taking the perspective of students rather than of faculty members, and asking how the changes in the scheduling and staffing of courses, combined with enrollment shifts, affected the sort of learning environments that students experienced. Despite the common presumptions alluded to here, the calculations incorporate no judgment

about the relative quality of teaching provided by instructors in each of these categories. The objective simply is to examine the composition and determine whether it changed over time. Much the same can be said about class size.

In keeping with the approach of taking a student's perspective, the calculation of average class size weights the various courses by the number of students rather than equally. Consider, for example, the calculation of average class size when 300 students are spread among 10 classes. Regardless of their distribution, the size of the average class (unweighted) will be 30. However, the class size for the average student will depend on the distribution of students among courses. If the 300 students are enrolled equally in 10 classes, then all students and, therefore, the average student, would be in a class of 30. If there were 9 classes with 10 students each and 1 class with the remaining 210, then the average student's class size would rise dramatically, to 150, reflecting the experience of the large number of students enrolled in the 1 large class.³ This example also serves to illustrate the importance of measuring the size distribution as well as the average size of courses. In cases in which courses met in more than one venue, such as in discussion sections and lectures, the class size of each gathering was calculated and was weighted according to the amount of class time (with the exception of science labs, which were assigned one hour's weight). Special assumptions were made to account for some types of courses, such as independent study and colloquia. Appendix 7.2 provides more detail on the calculations.

Class Size

Duke

Graphs showing average class size for Duke's four departments are presented in Figure 8.1. The bars show the averages corresponding to undergraduate and graduate classes, respectively. (Table 8A.1 in the appendix gives values corresponding to these figures, along with summaries of enrollment trends.) Corresponding to the overall growth in arts and sciences graduate programs at Duke over this period, the graduate enrollments in all four sample departments increased as well. Enrollment patterns of undergraduates differed from those of graduate students, showing steady growth in the engineering department, a dip and then sharp growth in the humanities department, and general declines in the social science and natural sciences departments.

One feature that is immediately evident from the graphs is the

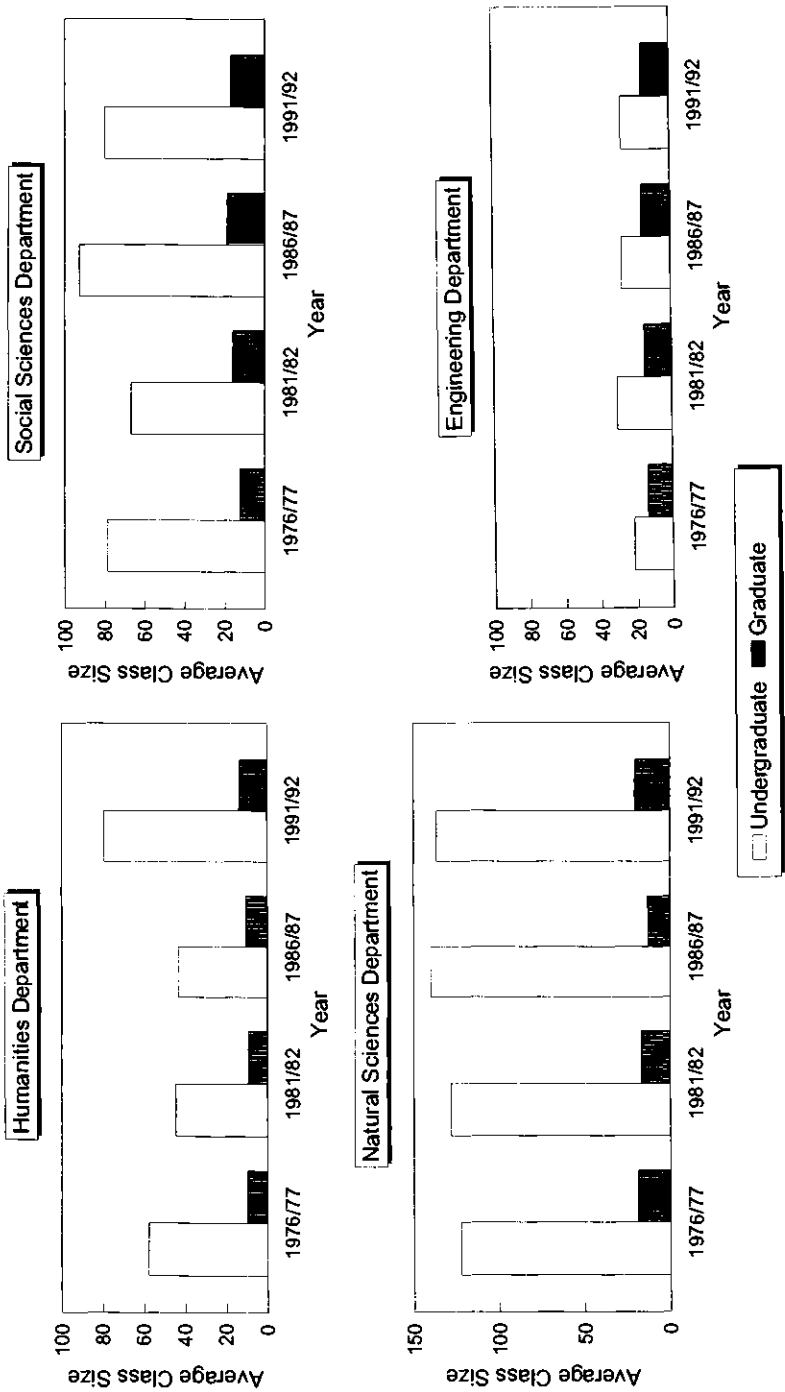


Figure 8.1 Average Class Size, Four Departments: Duke.

Source: Calculations using unpublished data from Duke.

much higher average class sizes in undergraduate courses, which is not surprising in light of the large effect that large classes have on the average. For 1991/92, the average graduate class size ranged from a low of 14 to a high of 20, whereas the average undergraduate class ranged from 28, in the engineering department, to 136, in the natural sciences department. Although they are averages that hide considerable variation among individual classes, these calculations of average class size are sufficient to suggest how little can be learned from a single, university-wide student-faculty ratio. Looking at the changes in these averages, there appears to be little trend in either the natural sciences department or the engineering department. The decline in undergraduate enrollments appeared to be matched by a similar decline in faculty size over the period. In the remaining two departments, average class size for undergraduates varied somewhat. In the case of the humanities department, the average followed the trend for total enrollments, dipping in 1986/87 and rising sharply in 1991/92; the average in the last year reflects enrollments in two survey courses that the department offered as large lectures.

Figure 8.2 shows the distribution of undergraduate classes by size. The most interesting trend, evident in the humanities and the social science departments, was an increase in the percentage of students taking both the smallest classes and the largest classes. Although the percentage of students in classes with more than 75 students increased from 1981/82 to 1991/92, the percentage taking seminars and other classes with enrollments of 18 or less did not fall.

Harvard

Regardless of whether the discussion section as a teaching format actually was developed at Harvard,⁴ undergraduate education at Harvard College is widely associated with a style of teaching that features large lectures and sections run by graduate students. Thus, Harvard presents an interesting case study for applying the measures developed in this study. Unfortunately, data limitations significantly restricted what could be learned about trends in course characteristics in the sample departments at Harvard. Although official enrollment data were available for the sample departments for all years, with the exception of the social science department, it was not possible to obtain complete information on either the size or number of sections. It was possible to obtain two years of data on the humanities department, but no data on the years before 1991/92 could be located for the natural sciences department. Because of the em-

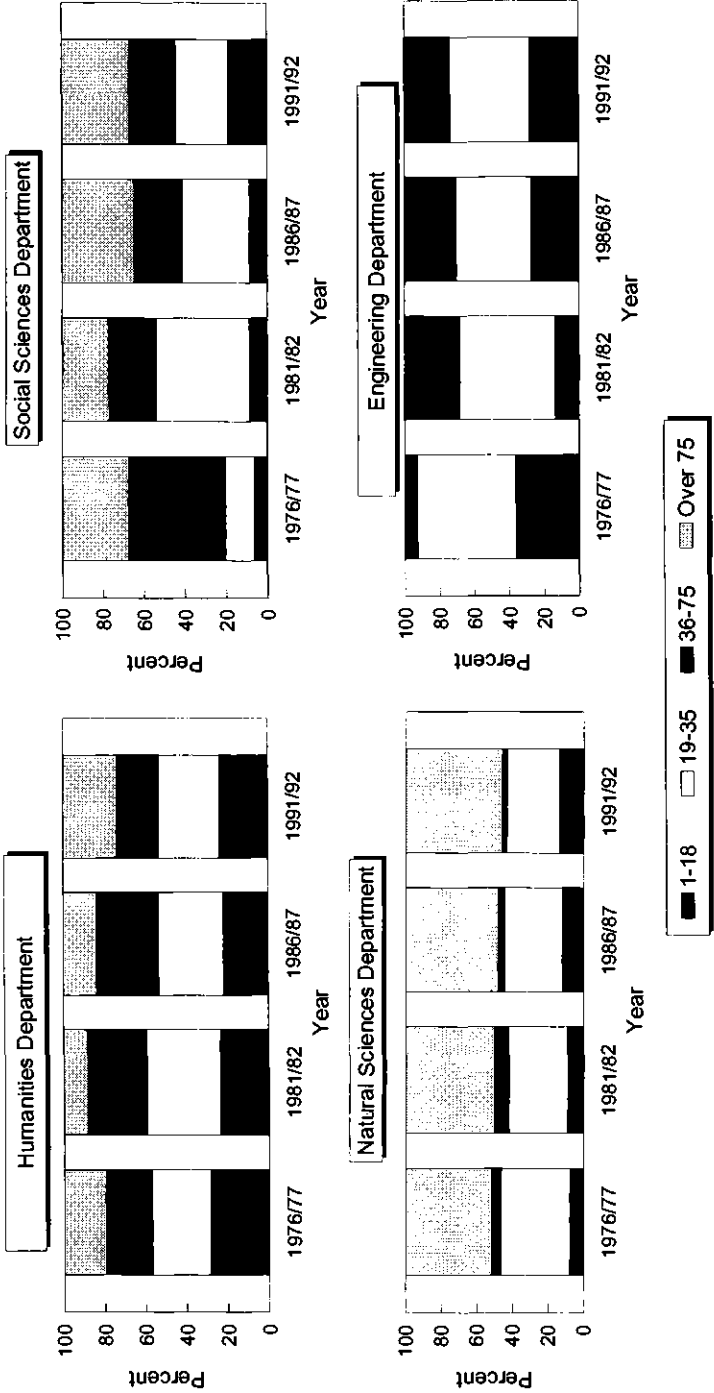


Figure 8.2 Size Distribution of Classes, Four Departments: Duke.

Source: Calculations using unpublished data from Duke.

phasis in this study on time-series comparisons, the natural sciences department was dropped in these calculations.

More recently, Harvard has become known for its "core," a collection of courses that are listed separately from the traditional departments, but some of which were in fact plucked out of those departments and are taught by many of the same professors. For the calculations, performed for the current analysis, the core courses that would in other colleges be part of one of the sample departments were included in the calculation for that department. Because many of these courses featured the lecture-and-section format, their inclusion tends to raise the calculated averages from what they otherwise would have been.

Figure 8.3 shows average size of classes in the two departments. Although the general admonition against comparisons among institutions applies here, as it does in other cases, it seems safe to conclude that the average class sizes for undergraduates and graduate students at Harvard are markedly larger than for the corresponding departments at Duke. In the social science department in 1991/92, for example, the average size for undergraduate courses was 242, compared with 80 at Duke. For graduate classes, the numbers were much closer, 24 versus 17. No trend in the average size of classes in the social science department is evident. Instead, this average appears to track the department's total enrollment, with both figures hitting their highest levels in 1981/82 and their second highest levels in 1991/92.⁵ With respect to the size distribution, shown in Figure 8.4, the percentage of students in the smallest classes appears to have grown; this increase is evident in the two-year comparison for the humanities department as well as over the entire period for the social science department.

Chicago

Unlike Harvard, Chicago did not make extensive use of the large lecture as a teaching format, and this fact becomes evident in the summary measures shown in Figure 8.5. Using 1991/92 as a reference point, the average undergraduate class sizes in Chicago's sample departments were smaller than those of the corresponding departments at Duke and Harvard—strikingly so in the humanities and social science departments, the two departments where these averages also fell over the period. Graduate class sizes were somewhat smaller in these two departments and quite a bit smaller in the natural sciences department.

Data on the distribution by class size, shown in Figure 8.6, also

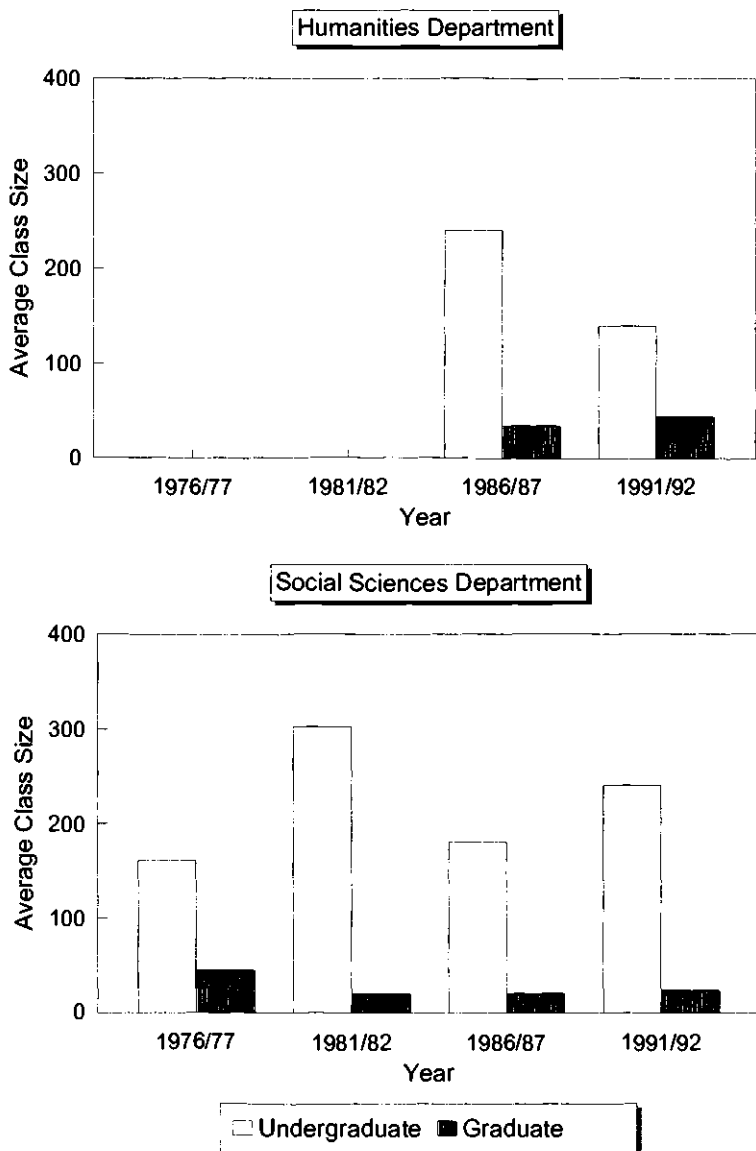


Figure 8.3 Average Class Size, Two Departments: Harvard.

Source: Calculations using unpublished data from Harvard.

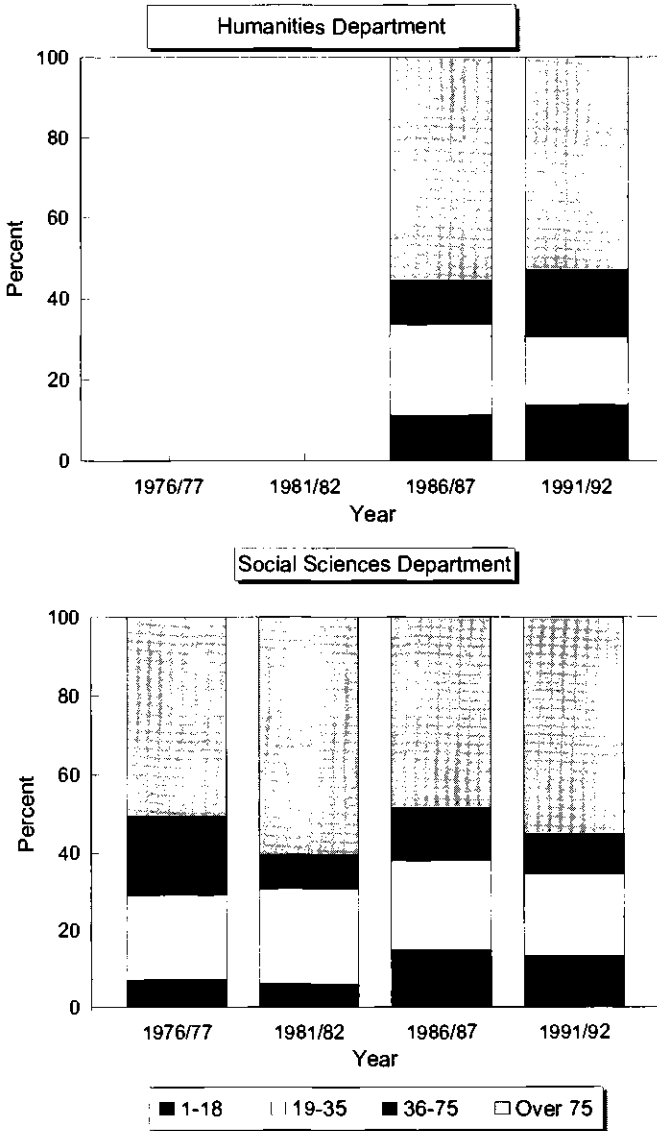


Figure 8.4 Size Distribution of Undergraduate Classes, Two Departments: Harvard.

Source: Calculations using unpublished data from Harvard.

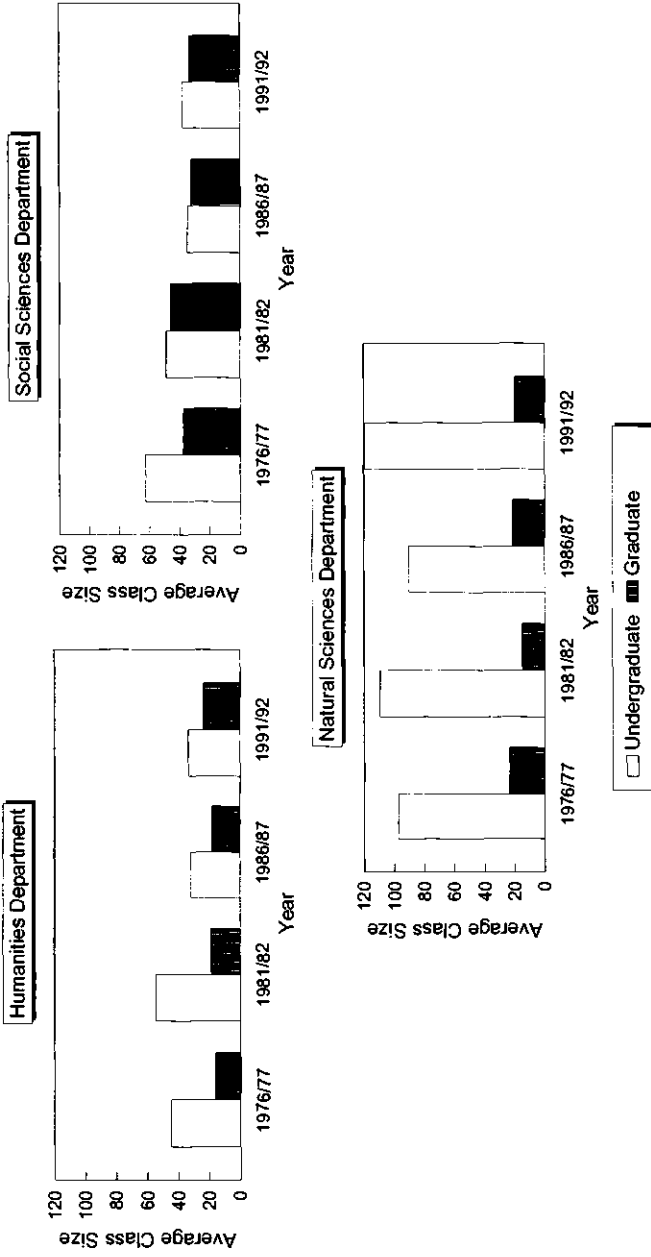


Figure 8.5 Average Class Size, Three Departments: Chicago.
Source: Calculations using unpublished data from Chicago.

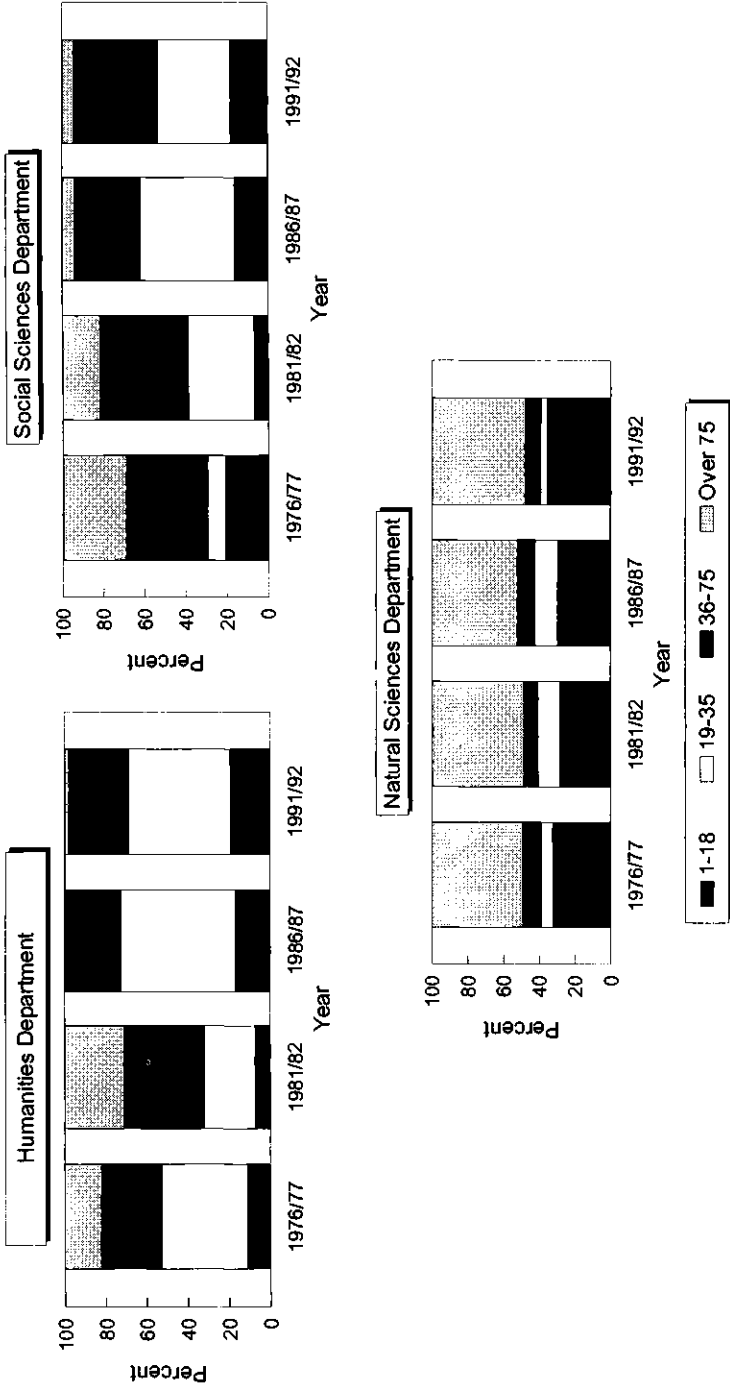


Figure 8.6 Size Distribution of Classes, Three Departments: Chicago.
Source: Calculations using unpublished data from Chicago.

reflects the relative scarcity of large lectures other than in the natural sciences department. The humanities department significantly changed the size distribution of its classes, doubling the percentage of undergraduates in the smallest courses and practically eliminating classes of 75 students or more.

Carleton

In stark contrast to the mode of course organization at Harvard and in the natural sciences department at Duke and Chicago, Carleton made little use of large lectures in the departments examined. Taking advantage of its relatively heavy classroom teaching loads, Carleton was able to offer its students small classes almost across the board, as the graphs in Figure 8.7 reveal. Using the social science department as a point of comparison, the average class size at Carleton in 1991/92 was 24, compared with 80 at Duke, 242 at Harvard, and 38 at Chicago. Over the period, the class size in Carleton's humanities and social science departments averaged about 30 students; its natural sciences department averaged almost 40 students per class. Average enrollment declined between 1981/82 and 1991/92 in both the social science and natural sciences department, paralleling the decline in enrollments in both. Examining the size distribution of classes, summarized in Figure 8.8, indicates how the humanities and social science departments were able to arrive at the same approximate size by quite different routes, the former enrolling higher portions of students in both the largest and smallest classes. It is striking that in 1991/92, no class in the social science department had more than 35 students.

Summary

Data on class characteristics for the four institutions are presented in Table 8.1. Unlike most of the measures used in this study, these calculations are comparable across institutions, as well as over time. Because of data limitations, no information is given for Harvard's natural sciences department or for some years in other departments at Harvard and Duke. The top part of the table, showing average class size, illustrates three points. First, owing to different modes of instruction and to the prevalence of large introductory courses in some departments, average class size differs among departments in the same institution. For each of the three institutions with complete data in 1991/92, the natural sciences department had the highest average class size. Second, differences in class size also exist between

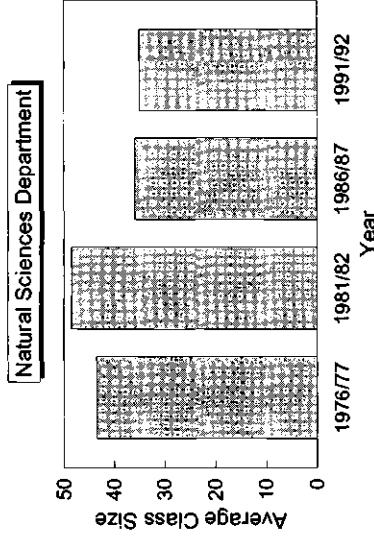
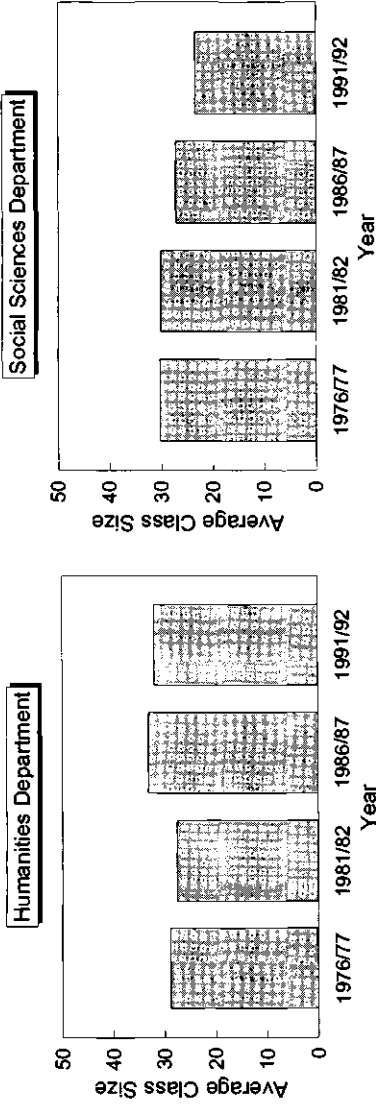


Figure 8.7 Average Class Size, Three Departments: Carleton.

Source: Calculations using unpublished data from Carleton.

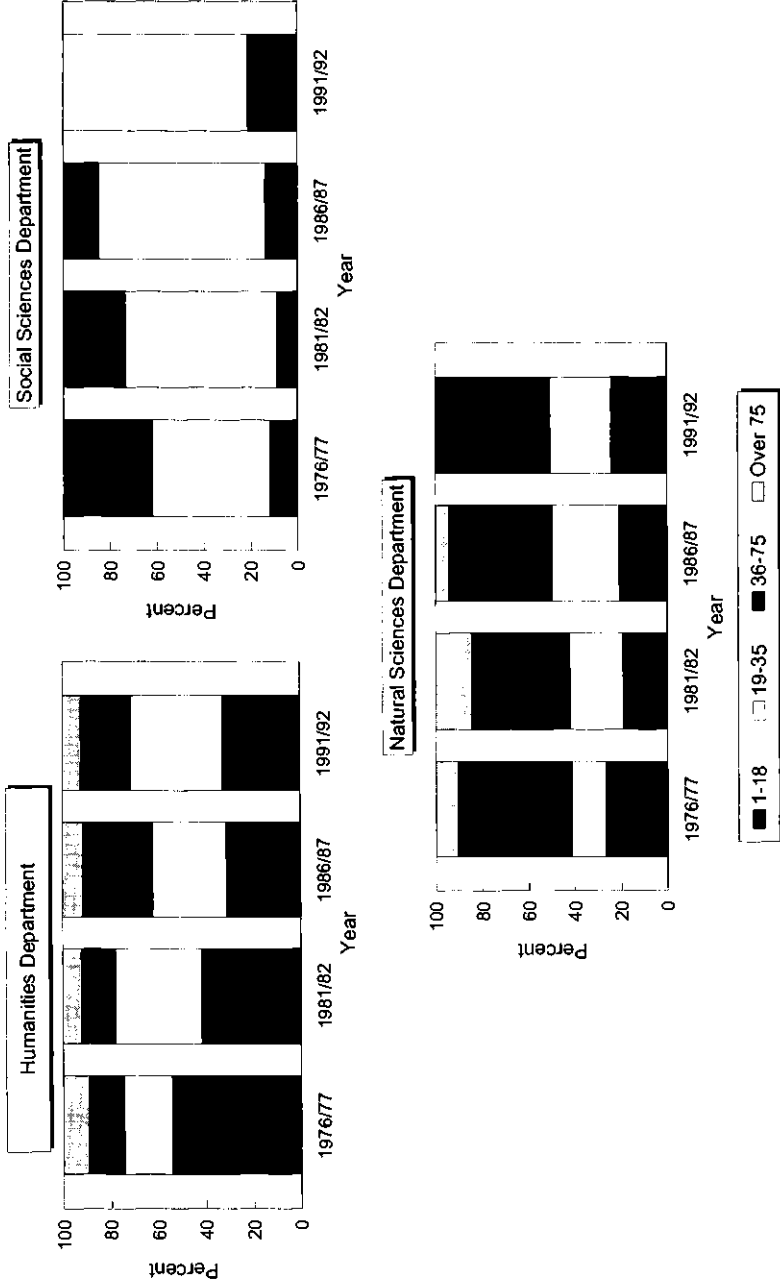


Figure 8.8 Size Distribution of Classes, Three Departments: Carleton.
Source: Calculations using unpublished data from Carleton.

TABLE 8.1

Undergraduate Classes in Three Departments at Four Institutions:
Average Size and Percentage Taught by Regular Faculty, Selected Years

| <i>Average Class Size</i> | <i>1976/77</i> | <i>1981/82</i> | <i>1986/87</i> | <i>1991/92</i> |
|--|----------------|----------------|----------------|----------------|
| Humanities Department | | | | |
| Duke | 57 | 42 | 42 | 76 |
| Harvard | NA | NA | 241 | 139 |
| Chicago | 45 | 54 | 32 | 33 |
| Carleton | 29 | 28 | 33 | 32 |
| Natural Sciences Department | | | | |
| Duke | 122 | 128 | 140 | 136 |
| Harvard | NA | NA | NA | NA |
| Chicago | 97 | 109 | 90 | 119 |
| Carleton | 44 | 49 | 36 | 35 |
| Social Sciences Department | | | | |
| Duke | 79 | 67 | 91 | 80 |
| Harvard | 162 | 303 | 181 | 242 |
| Chicago | 63 | 49 | 35 | 38 |
| Carleton | 30 | 30 | 27 | 24 |
| Percentage of Teaching Conducted by Regular Faculty | | | | |
| Humanities Department | | | | |
| Duke | NA | 82 | 87 | 61 |
| Harvard | NA | NA | 55 | 54 |
| Chicago | 74 | 78 | 79 | 69 |
| Carleton | 91 | 91 | 91 | 99 |
| Natural Sciences Department | | | | |
| Duke | NA | 61 | 57 | 61 |
| Harvard | NA | NA | NA | NA |
| Chicago | 66 | 37 | 67 | 68 |
| Carleton | 100 | 100 | 100 | 82 |
| Social Sciences Department | | | | |
| Duke | 94 | 66 | 69 | 72 |
| Harvard | 56 | 50 | 46 | 48 |
| Chicago | 78 | 47 | 38 | 42 |
| Carleton | 88 | 91 | 77 | 85 |

Source: Calculations using unpublished data from the four sample institutions.
NA: not available.

institutions. Especially striking are the low average class sizes at Carleton. Third, there is no discernible trend in these departments over time. Whatever was happening to average faculty teaching load did not translate into larger classes.

Instructors

The bottom part of Table 8.1 summarizes findings on the share of enrollments in the sample departments taught by members of the regular faculty. (Separate shares for graduate students and other instructors are given in the detailed tables in the appendix.) Significant differences among the institutions are evident. In the social science department, the shares of teaching by regular faculty at Chicago and Harvard in 1991/92 were the lowest, being under one half in the latest year; these compared to 72 percent at Duke and 85 percent at Carleton. In the humanities department, the share of classroom teaching by regular faculty in the latest year ranged from 54 percent at Harvard to 99 percent at Carleton. In the natural sciences departments, the differences among Duke, Chicago, and Carleton are much smaller. What is more interesting, however, is the trend shown in these graphs. In six of the eight departments for which complete data were available for the entire period, the share of undergraduate teaching by the regular faculty declined over the period of study. At Carleton, no trend was evident: these proportions remained high throughout the period.

COURSE OFFERINGS

One of the most prominent descriptions of the educational program of any college or university is its published description of course offerings. Determined largely by individual academic departments, these course listings give substance and a degree of order to that portion of the body of knowledge for which each department takes responsibility for teaching. In a rough way, they can be thought of as a description of one set of the institution's outputs. Together with the requirements set down for obtaining degrees, course offerings define the curriculum—an area that has become the focal point of vigorous debate in American higher education for the last decade. Although much of this debate has little direct bearing on university expenditures, the charge that universities have allowed undergraduate courses to proliferate while emphasizing research at the expense of teaching is relevant. According to this argument, courses are offered not because they are part of a carefully constructed introduction to existing knowledge on a subject but rather because they cover topics of special interest to individual faculty members. The result, according to critics, is that curricula have become little more than

agglomerations of uncoordinated courses, the operative metaphor being a smorgasbord, as opposed to a planned meal.⁶ If a proliferation of courses has occurred, even holding teaching loads constant, at least one of the following would be required: more faculty, an increase in class sizes in introductory courses, or the use of more nonfaculty instructors in the teaching of undergraduates.

It is therefore pertinent to seek evidence of increases in course offerings. To be sure, the growth of knowledge alone would constitute one reason to expect some change in the curriculum over time, and evidence suggests that academic disciplines have undergone increased specialization⁷; an increased number of courses may reflect these developments. Although it is beyond the scope of this study to examine in detail issues of curriculum structure, as Massy and Zemsky (1994) have, it is possible to make several straightforward measurements that are relevant to these concerns. One measure is simply the number of courses, which is applied to several departments in the sample institutions. A proliferation of courses should show up in such a count. In addition, it is useful to investigate the charge that the curriculum is determined by research interests of faculty, rather than by a set of abiding educational principles. One implication of this view is that courses would tend to change when faculty arrive or depart. Conversely, if courses were set as a matter of educational policy, they generally would be taught regardless of who is a member of the faculty. Therefore, the association between faculty turnover and course continuity is examined for a few departments.

Course offerings in several selected departments were compared for the beginning and ending years of the 15-year period of analysis. The departments chosen for these comparisons are not necessarily the same as those in the calculations of classroom teaching loads and course characteristics. Course lists were compared, and courses with similar titles and descriptions were considered to be the same course. For the purpose of these comparisons, generic courses (such as independent study, general senior seminars, courses of reading and research, or the direction of doctoral dissertations) were not included. In general, each of the components of a related series of courses was counted as a separate course if it had a different number, but the precise number of courses, and course changes, ultimately is a judgment call. Any concerted departmental effort to rationalize or rearrange its offerings may result in a large number of changes in its course listing, which may overstate the actual change in course material. For these reasons, the calculations presented here should be considered illustrative only.

Summary measures for 13 departments in the four institutions are

TABLE 8.2
 Number of Courses Offered in Selected Departments,
 1976/77 and 1991/92

| <i>Institution and Department</i> | <i>Number of Courses</i> | | | | | <i>Turnover Rate^a (%)</i> |
|--|--------------------------|----------------|---------------------------|-------------------------|-------------------------|--|
| | <i>Total</i> | | <i>Courses Offered in</i> | | | |
| | <i>1976/77</i> | <i>1991/92</i> | <i>Both Years</i> | <i>1976/77 Only</i> | <i>1991/92 Only</i> | |
| Duke | | | | | | |
| Chemistry | 29 | 34 | 26 | 3 | 8 | 17 |
| English | 127 | 138 | 68 | 59 | 70 | 49 |
| Political science | 136 | 144 | 65 | 71 | 79 | 54 |
| Electrical engineer- ing | 53 | 68 | 18 | 35 | 50 | 70 |
| Harvard | | | | | | |
| Chemistry | 36 | 34 | 19 | 17 | 15 | 46 |
| Government | 111 | 86 | 24 | 87 | 62 | 76 |
| Romance languages and litera- tures | 64 | 123 | 27 | 37 | 96 | 71 |
| Chicago | | | | | | |
| Chemistry | 46 | 44 | 34 | 12 | 10 | 24 |
| English | 195 | 260 | 46 | 149 | 214 | 80 |
| Political science | 184 | 173 | 5 | 179 | 168 | 97 |
| Carleton | | | | | | |
| Chemistry | 14 | 17 | 10 | 4 | 7 | 35 |
| English | 53 | 79 | 23 | 30 | 56 | 65 |
| Political science | 34 | 52 | 15 | 19 | 37 | 65 |

Source: Calculations using unpublished data from the four sample institutions.

Note: Courses listed but not scheduled in the sample year are considered as having been offered in that year.

^aAverage number of courses offered in only one year as percentage of average number of courses.

presented in Table 8.2. The total number of courses for the beginning and ending years, the number of courses that appeared in both years, and the number of courses that appeared in only one of the two years are shown. The number of courses increased in nine of the departments, and in five the number increased by more than 25 percent. Although the growth in a few of the departments was im-

pressive, "proliferation" seems too strong a term to apply to the changes in most of the departments. Generally, the dominant characteristic was the substitution of new courses for old ones, rather than growth in the total number of courses. The last column in the table shows the rate of turnover in courses, defined as the average number of courses offered in one year as a percentage of the average total number of courses. This rate exceeded 50 percent in more than one-half the cases. It seems likely that both differences in turnover rates and growth in numbers largely are discipline-specific, with some disciplines experiencing greater change than others in how topics of inquiry are organized. Among the sample departments in each institution, chemistry exhibited the highest degree of stability in course offerings.

In addition to changes in a discipline's organization of inquiry, another possible reason for course turnover is faculty turnover. If a department offers a course primarily because one of its faculty specializes in the topic, the course is likely to be dropped if that faculty member departs. In order to suggest the importance of this effect in explaining course turnover, data were gathered for a few departments on the faculty members listed in course catalogs in the course descriptions. Accompanying the description of most courses in the course catalogs is a list of faculty who might teach it. For each course offered in 1976/77, the listed faculty were compared with the department's complete faculty roster in 1991/92 in order to determine whether any faculty were available to teach at the end of the period. If no overlap in faculty was observed, the course was deemed to have complete faculty turnover for the period. Similarly, the listed faculty for courses in the 1991/92 catalog were checked against the roster of faculty in the department at the beginning of the period, with faculty turnover for each course defined analogously.⁸ As is clearly evident in Table 8.3, courses offered in only one of the two years were much more likely to have had complete turnover than those offered in both years. This result suggests that changes in courses offered tended to be associated with faculty turnover. As indicated by the chi-square values in the last column, these differences are significant at the 1 percent level in four of the departments and at the 5 percent level in the other.

CONCLUSION

The findings presented in this chapter are intended to be read along with other evidence on expenditure trends and classroom teaching loads. Although these changes are far from definitive, even for the

TABLE 8.3
Course Continuity and Faculty Turnover, Five Departments

| <i>Department</i> | <i>Percentage of Courses with Complete Faculty Turnover from 1976/77 to 1991/92</i> | | <i>Chi-Squared Value</i> |
|-----------------------------------|---|---|--------------------------|
| | <i>Courses Offered in Both Years</i> | <i>Courses Offered in Only One Year</i> | |
| Duke | | | |
| Chemistry | 0 | 18 | 5.00 ^b |
| English | 7 | 35 | 17.82 ^a |
| Electrical engineering | 0 | 31 | 6.98 ^a |
| Political science | 6 | 33 | 17.36 ^a |
| Harvard | | | |
| Romance languages and literatures | 70 | 92 | 10.99 ^a |

Source: Calculations using unpublished data from Duke and Harvard.

^aSignificant at 1% level (critical value, 6.64).

^bSignificant at 5% level (critical value, 3.84).

four sample institutions, they are suggestive of changes that could well have an impact on the nature of undergraduate education. With respect to the measures of classroom size, marked differences among departments were observed. One clear implication is that an institution's student-faculty ratio provides little useful information about the likely classroom environment for undergraduate students. There were changes over the period of study in some of the sample departments. In particular, in Chicago's social science and humanities departments, the use of nonregular faculty increased as a means of reducing the average size of undergraduate classes. At Duke, the use of graduate students in undergraduate instruction in the social science department and of nonregular faculty in the humanities department increased, with a concomitant increase in the reliance on larger lecture courses. Nonregular faculty were increasingly used in some but not all, departments. One very rough interpretation of the developments in the sample departments at Duke was that they implied an increase in the emphasis on graduate education and, probably, on research, at the expense of undergraduate teaching. It is worth noting that an issue of debate at Duke over this period, as in the wider higher education community, was the quality of undergraduate education.⁹ More than one person has suggested that the increasing emphasis on research in universities sets the stage for what Keohane (1993) referred to as a "tacit unholy alliance" between

students and faculty: "You leave me alone, and I'll leave you alone."¹⁰

One feature of undergraduate teaching that appears to be complementary with specialization and research emphasis is the seminar. Data on both Duke and Harvard indicate an increase in the use of small classes, defined as those with enrollments of 18 or less. Still, the differences in the measurable aspects of courses between Duke and Harvard that remained by 1991/92 were substantial. Just as striking were the differences between Carleton and the universities in average class size and the reliance on regular-rank faculty. The absence of graduate students appears to be only one of the factors differentiating the structure of undergraduate classes; Carleton's heavy classroom teaching load and its modest reliance on nonregular faculty appear to be important as well, at least in the sample departments.

Appendix 8.1

Supplementary Tables for Chapter 8

TABLE 8A.1
Trends in Faculty, Enrollment, and Class Size: Duke

| <i>Humanities Department</i> | 1976/77 | 1981/82 | 1986/87 | 1991/92 |
|---|---------|---------|---------|---------|
| <i>As Percentage of 1976/77 Levels</i> | | | | |
| Undergraduate enrollment | 100 | 100 | 85 | 131 |
| Graduate enrollment | 100 | 90 | 128 | 157 |
| Regular faculty | 100 | 85 | 100 | 106 |
| <i>Average Class Size</i> | | | | |
| Undergraduates | 57.6 | 44.4 | 43.2 | 79.4 |
| Graduate students | 9.7 | 9.3 | 10.4 | 13.7 |
| <i>Percentage of Undergraduates Taught by</i> | | | | |
| Graduate students | NA | 5.9 | 0.7 | 5.0 |
| Nonregular faculty | NA | 11.5 | 10.0 | 33.3 |
| Subtotal | NA | 17.4 | 10.7 | 38.3 |
| <i>Percentage of Undergraduates Enrolled, by Class Size</i> | | | | |
| 18 or less | 28.5 | 23.3 | 21.7 | 23.5 |
| 19–35 | 28.4 | 35.9 | 31.5 | 29.4 |
| 36–75 | 22.4 | 28.9 | 30.3 | 20.5 |
| More than 75 | 20.7 | 12.0 | 16.5 | 26.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>Natural Sciences Department</i> | | | | |
| <i>As Percentage of 1976/77 Levels</i> | | | | |
| Undergraduate enrollment | 100 | 101 | 78 | 88 |
| Graduate enrollment | 100 | 149 | 114 | 167 |
| Regular faculty | 100 | 92 | 88 | 88 |
| <i>Average Class Size</i> | | | | |
| Undergraduates | 122.3 | 128.3 | 140.0 | 136.4 |
| Graduate students | 18.8 | 17.0 | 13.2 | 20.3 |
| <i>Percentage of Undergraduates Taught by</i> | | | | |
| Graduate students | NA | 33.9 | 34.9 | 38.0 |
| Nonregular faculty | NA | 4.9 | 8.2 | 0.6 |
| Subtotal | NA | 38.8 | 43.1 | 38.6 |
| <i>Percentage of Undergraduates Enrolled, by Class Size</i> | | | | |
| 18 or less | 7.7 | 9.1 | 12.1 | 13.7 |
| 19–35 | 38.6 | 32.9 | 32.5 | 29.5 |
| 36–75 | 5.5 | 8.1 | 3.5 | 2.6 |
| More than 75 | 48.2 | 50.0 | 51.9 | 54.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

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TABLE 8A.1 (cont.)

| <i>Engineering Department</i> | 1976/77 | 1981/82 | 1986/87 | 1991/92 |
|---|---------|---------|---------|---------|
| <i>As Percentage of 1976/77 Levels</i> | | | | |
| Undergraduate enrollment | 100 | 168 | 234 | 219 |
| Graduate enrollment | 100 | 185 | 222 | 241 |
| Regular faculty | 100 | 109 | 118 | 155 |
| <i>Average Class Size</i> | | | | |
| Undergraduates | 21.7 | 30.6 | 27.4 | 27.6 |
| Graduate students | 13.8 | 15.1 | 16.2 | 15.8 |
| <i>Percentage of Undergraduates Taught by</i> | | | | |
| Graduate students | 0.0 | 0.0 | 0.0 | 0.0 |
| Nonregular faculty | 5.0 | 3.7 | 29.3 | 24.6 |
| Subtotal | 5.0 | 3.7 | 29.3 | 24.6 |
| <i>Percentage of Undergraduates Enrolled, by Class Size</i> | | | | |
| 18 or less | 36.2 | 13.4 | 26.9 | 28.1 |
| 19-35 | 56.4 | 54.8 | 43.4 | 45.9 |
| 36-75 | 7.4 | 31.8 | 29.7 | 26.0 |
| More than 75 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>Social Sciences Department</i> | | | | |
| <i>As Percentage of 1976/77 Levels</i> | | | | |
| Undergraduate enrollment | 100 | 111 | 95 | 68 |
| Graduate enrollment | 100 | 149 | 199 | 229 |
| Regular faculty | 100 | 108 | 104 | 108 |
| <i>Average Class Size</i> | | | | |
| Undergraduates | 78.6 | 66.9 | 92.7 | 80.1 |
| Graduate students | 12.5 | 16.1 | 18.9 | 16.8 |
| <i>Percentage of Undergraduates Taught by</i> | | | | |
| Graduate students | 3.8 | 26.4 | 29.7 | 22.5 |
| Nonregular faculty | 1.8 | 7.9 | 1.3 | 5.9 |
| Subtotal | 5.6 | 34.3 | 31.0 | 28.4 |
| <i>Percentage of Undergraduates Enrolled, by Class Size</i> | | | | |
| 18 or less | 6.3 | 8.6 | 8.6 | 18.9 |
| 19-35 | 13.8 | 45.3 | 32.6 | 25.3 |
| 36-75 | 47.4 | 23.0 | 23.4 | 22.7 |
| More than 75 | 32.5 | 23.2 | 35.4 | 33.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Calculations using unpublished data from Duke.
 NA: not available.

TABLE 8A.2
Trends in Faculty, Enrollment, and Class Size: Harvard

| <i>Humanities Department</i> | 1976/77 | 1981/82 | 1986/87 | 1991/92 |
|-----------------------------------|---------|---------|---------|---------|
| <i>As Percentage of 1986/87</i> | | | | |
| Levels | | | | |
| Undergraduate enrollment | * | * | 100 | 61 |
| Graduate enrollment | | | 100 | 118 |
| Regular faculty | | | 100 | 103 |
| Average Class Size | | | | |
| Undergraduates | | | 240.3 | 139.6 |
| Graduate students | | | 34.4 | 44.6 |
| Percentage of Undergraduates | | | | |
| Taught by | | | | |
| Graduate students | | | 23.1 | 20.0 |
| Nonregular faculty | | | 4.8 | 8.8 |
| Subtotal | | | 27.9 | 28.8 |
| Percentage of Undergraduates | | | | |
| Enrolled, by Class Size | | | | |
| 18 or less | | | 11.2 | 13.8 |
| 19-35 | | | 22.4 | 16.7 |
| 36-75 | | | 10.9 | 16.5 |
| More than 75 | | | 55.6 | 53.1 |
| Total | | | 100.0 | 100.0 |
| <i>Social Sciences Department</i> | | | | |
| <i>As Percentage of 1986/87</i> | | | | |
| Levels | | | | |
| Undergraduate enrollment | 104 | 141 | 100 | 122 |
| Graduate enrollment | 112 | 62 | 100 | 113 |
| Regular faculty | 83 | 88 | 100 | 98 |
| Average Class Size | | | | |
| Undergraduates | 161.2 | 303.2 | 181.1 | 241.7 |
| Graduate students | 45.0 | 20.4 | 20.8 | 24.2 |
| Percentage of Undergraduates | | | | |
| Taught by | | | | |
| Graduate students | 25.8 | 25.3 | 28.8 | 26.2 |
| Nonregular faculty | 14.0 | 3.9 | 13.2 | 12.4 |
| Subtotal | 39.8 | 29.2 | 42.0 | 38.6 |
| Percentage of Undergraduates | | | | |
| Enrolled, by Class Size | | | | |
| 18 or less | 7.1 | 6.0 | 14.8 | 13.3 |
| 19-35 | 22.2 | 24.8 | 23.2 | 21.4 |
| 36-75 | 20.1 | 8.8 | 13.5 | 10.2 |
| More than 75 | 50.7 | 60.4 | 48.4 | 55.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Calculations using unpublished data from Harvard.

*Complete data necessary for calculations not available for the Harvard humanities department for 1976/77 and 1981/82.

TABLE 8A.3

Trends in Faculty, Enrollment, and Class Size: Chicago

| <i>Humanities Department</i> | 1976/77 | 1981/82 | 1986/87 | 1991/92 |
|---|---------|---------|---------|---------|
| <i>As Percentage of 1976/77</i> | | | | |
| Levels | | | | |
| Undergraduate enrollment | 100 | 108 | 83 | 101 |
| Graduate enrollment | 100 | 77 | 73 | 80 |
| Regular faculty | 100 | 85 | 100 | 106 |
| Average Class Size | | | | |
| Undergraduates | 44.7 | 54.3 | 31.8 | 33.1 |
| Graduate students | 16.3 | 18.8 | 18.2 | 23.5 |
| Percentage of Undergraduates Taught by | | | | |
| Graduate students | 0.0 | 0.0 | 0.0 | 3.9 |
| Nonregular faculty | 25.6 | 21.7 | 21.4 | 27.0 |
| Subtotal | 25.6 | 21.7 | 21.4 | 30.9 |
| Percentage of Undergraduates Enrolled, by Class Size | | | | |
| 18 or less | 11.0 | 7.3 | 16.9 | 19.3 |
| 19-35 | 41.6 | 24.7 | 55.6 | 49.5 |
| 36-75 | 29.2 | 38.9 | 27.6 | 29.0 |
| More than 75 | 18.2 | 29.1 | 0.0 | 2.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>Natural Sciences Department</i> | | | | |
| As Percentage of 1976/77 | | | | |
| Levels | | | | |
| Undergraduate enrollment | 100 | 118 | 118 | 112 |
| Graduate enrollment | 100 | 63 | 95 | 77 |
| Regular faculty | 100 | 108 | 96 | 92 |
| Average Class Size | | | | |
| Undergraduates | 97.3 | 109.3 | 90.1 | 119.4 |
| Graduate students | 23.6 | 15.0 | 21.4 | 19.7 |
| Percentage of Undergraduates Taught by | | | | |
| Graduate students | 33.5 | 33.4 | 31.3 | 31.4 |
| Nonregular faculty | 0.9 | 29.5 | 2.0 | 1.1 |
| Subtotal | 34.4 | 62.9 | 33.3 | 32.5 |
| Percentage of Undergraduates Enrolled, by Class Size | | | | |
| 18 or less | 32.3 | 28.4 | 29.6 | 35.4 |
| 19-35 | 6.4 | 12.2 | 12.6 | 3.8 |
| 36-75 | 10.6 | 7.8 | 10.0 | 8.5 |
| More than 75 | 50.7 | 51.5 | 48.8 | 52.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

TABLE 8A.3 (cont.)

| <i>Social Sciences Department</i> | 1976/77 | 1981/82 | 1986/87 | 1991/92 |
|-----------------------------------|---------|---------|---------|---------|
| <i>Social Sciences Department</i> | | | | |
| As Percentage of 1976/77 | | | | |
| Levels | | | | |
| Undergraduate enrollment | 100 | 203 | 202 | 201 |
| Graduate enrollment | 100 | 103 | 94 | 105 |
| Regular faculty | 100 | 105 | 105 | 110 |
| Average Class Size | | | | |
| Undergraduates | 62.7 | 48.9 | 34.9 | 38.0 |
| Graduate students | 37.6 | 46.2 | 32.6 | 33.5 |
| Percentage of Undergraduates | | | | |
| Taught by | | | | |
| Graduate students | 0.0 | 5.0 | 41.8 | 25.5 |
| Nonregular faculty | 21.8 | 48.0 | 20.7 | 32.9 |
| Subtotal | 21.8 | 53.0 | 62.5 | 58.4 |
| Percentage of Undergraduates | | | | |
| Enrolled, by Class Size | | | | |
| 18 or less | 20.8 | 6.7 | 16.2 | 18.1 |
| 19-35 | 8.8 | 32.3 | 45.7 | 35.3 |
| 36-75 | 39.4 | 42.7 | 32.0 | 40.7 |
| More than 75 | 30.9 | 18.4 | 6.2 | 5.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Calculations using unpublished data from Chicago.

TABLE 8A.4

Trends in Faculty, Enrollment, and Class Size: Carleton

| <i>Humanities Department</i> | <i>1976/77</i> | <i>1981/82</i> | <i>1986/87</i> | <i>1991/92</i> |
|--|----------------|----------------|----------------|----------------|
| As Percentage of 1976/77 | | | | |
| Levels | | | | |
| Enrollment | 100 | 116 | 139 | 146 |
| Faculty | 100 | 100 | 110 | 130 |
| Average Class Size | | | | |
| Undergraduates | 28.9 | 27.6 | 33.1 | 32.0 |
| Percentage of Undergraduates Taught by | | | | |
| Nonregular faculty | 8.8 | 9.3 | 9.0 | 0.6 |
| Percentage of Undergraduates Enrolled, by Class Size | | | | |
| 18 or less | 54.4 | 41.8 | 31.2 | 32.8 |
| 19-35 | 19.9 | 36.0 | 30.8 | 38.5 |
| 36-75 | 15.0 | 14.4 | 29.5 | 21.0 |
| More than 75 | 10.8 | 7.8 | 8.5 | 7.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>Natural Sciences Department</i> | | | | |
| As Percentage of 1976/77 | | | | |
| Levels | | | | |
| Enrollment | 100 | 102 | 84 | 81 |
| Faculty | 100 | 100 | 117 | 133 |
| Average Class Size | | | | |
| Undergraduates | 43.5 | 48.5 | 35.9 | 35.1 |
| Percentage of Undergraduates Taught by | | | | |
| Nonregular faculty | 0.0 | 0.0 | 0.0 | 18.3 |
| Percentage of Undergraduates Enrolled, by Class Size | | | | |
| 18 or less | 26.7 | 19.2 | 20.8 | 24.1 |
| 19-35 | 14.7 | 23.0 | 28.8 | 26.2 |
| 36-75 | 49.3 | 42.3 | 44.7 | 49.8 |
| More than 75 | 9.3 | 15.5 | 5.6 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

TABLE 8A.4 (cont.)

| <i>Social Sciences Department</i> | <i>1976/77</i> | <i>1981/82</i> | <i>1986/87</i> | <i>1991/92</i> |
|-----------------------------------|----------------|----------------|----------------|----------------|
| As Percentage of 1976/77 | | | | |
| Levels | | | | |
| Enrollment | 100 | 125 | 114 | 102 |
| Faculty | 100 | 140 | 140 | 160 |
| Average Class Size | | | | |
| Undergraduates | 30.3 | 30.1 | 27.2 | 23.5 |
| Percentage of Undergraduates | | | | |
| Taught by | | | | |
| Nonregular faculty | 12.0 | 8.7 | 23.3 | 15.4 |
| Percentage of Undergraduates | | | | |
| Enrolled, by Class Size | | | | |
| 18 or less | 11.8 | 8.9 | 13.9 | 21.2 |
| 19-35 | 50.2 | 64.8 | 70.9 | 78.8 |
| 36-75 | 38.0 | 26.3 | 15.2 | 0.0 |
| More than 75 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Calculations using unpublished data from Carleton.