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Notes to the Chapters

Preface

1. Derek Bok, "Reclaiming the Public Trust," *Change*, July/August 1992, pp. 13–9.

Chapter 1

1. President of Princeton University; Shapiro (1993, p. 12).

2. U.S. Department of Education (1992, Table 31, p. 34). These costs refer to the explicit, out-of-pocket expenditures for higher education. They do not measure the significant implicit component of costs in the form of forgone earnings by students.

3. The educational and general category excludes expenditures on construction, auxiliaries, and sponsored research. Inflation is measured by increases in the GDP price deflator.

4. Between 1978/79 and 1987/88, Getz and Siegfried found that educational and general spending per FTE student in all institutions of higher education rose 2.7 percent per year faster than the overall rate of inflation. The comparable rate for all private institutions was 4.0 percent; for private research universities without medical schools, 4.1 percent; for private research universities with medical schools, 3.9 percent; for private liberal arts colleges with enrollments of less than 1,000 students, 4.3 percent; and for private liberal arts colleges with enrollments of more than 1,000 students, 4.8 percent (Getz and Siegfried 1991, pp. 380, 382).

5. The discount, calculated here as the ratio of scholarships and fellowships financed out of unrestricted funds to all tuition and fee revenues, increased for all private institutions from 8.7 percent in 1975/76 to 15.3 percent in 1991/92, and from 7.9 to 8.7 percent over the same period for public institutions (Clotfelter 1991, p. 71; and U.S. Office of Education 1994, Tables 317-8 and 327-8). Because the net cost is the product of stated tuition and the net price (one minus the discount percentage), the growth of net tuition is the difference between the growth rates of stated tuition and the net price. For example, the net price of private college fell from 0.913 to 0.847 between 1975/76 and 1991/92, for a growth rate of -0.0047 , or -0.5 percent.

6. From 1975 to 1992, the annual rate of increase in all prices (Consumer Price Index) was 5.6 percent; for medical costs, it was 7.6 percent (U.S. Council of Economic Advisers 1994, p. 335). At private universities, the rate of increase for the period 1975/76 to 1991/92 for tuition, room, and board at private universities was 8.6 percent (U.S. Department of Education 1992, p. 308). The financial aid discount for private institutions rose from 8.7

percent in 1975/76 to 15.3 percent in 1991/92, for an annual growth rate of -0.5 percent over this 16-year period (U.S. Department of Education 1989, Tables 270 and 280). Applying this rate to the 8.6 percent rate in stated tuition rates yields a growth in net tuition of 8.1 percent.

7. See Cook and Frank (1993) for an analysis of the concentration of top students in these institutions. To indicate their relative size, the authors note that the 33 colleges and universities designated by the *Barron's* guide as "most competitive" enrolled just 2.4 percent of the seniors who took the Scholastic Aptitude Test in 1980 (p. 127).

8. Edward R. Fiske. *New York Times*, May 12, 1987.

9. "Colleges: A Machine with No Brakes." *Washington Post Weekly*, August 21-27, 1989; *Washington Post*, January 28, 1993.

10. "Time to Prune the Ivy." *Business Week*, May 24, 1993, pp. 112-8. For similar attacks on the growth of administration in universities, see Bergmann (1991) or Wagner and Bowermaster (1992).

11. Gene I. Maeroff. "College Teachers, the New Leisure Class." *Wall Street Journal*, September 13, 1993, sec. A; and Sykes (1988, p. 5).

12. Sowell (1993, p. 13).

13. See, for example, Gary Putka. "Tracking Tuition: Why College Fees Are Rising so Sharply." *Wall Street Journal*, December 11, 1987, or *Business Week*, May 24, 1993.

14. William Bennett. "Our Greedy Colleges." *New York Times*, February 18, 1987, sec. A. Similar themes are raised by another member of the Reagan administration, Chester Finn. See Finn (1984).

15. Representative Wyden's comment expressed the indignation with which the committee greeted these revelations and Kennedy's apparently unrepentant attitude: "I think that this is a very sad day for one of the world's great universities. Speaking both as a Stanford graduate, as a taxpayer, I never thought that one would see this day where the president of Stanford University was going to be sitting where you are and asked to explain why antique fruitwood commodes were billed to the taxpayer. . . ." U.S. House of Representatives (1991, p. 193).

16. Among the initial stories on the investigation was Barbara Vobejda's, "Antitrust Probe Targets College Tuition Aid." *Washington Post*, August 9, 1989, sec. A.

17. See, for example, Davidson Goldin. "Full-Tuition Students Increasingly Pay for Others." *New York Times*, March 22, 1995, sec. A, or Fred M. Hechinger. "About Education." *New York Times*, April 25, 1990, sec. B.

18. See, for example, Kennedy (1985) or Joseph Berger. "College Officials Defend Sharply Rising Tuition." *New York Times*, March 23, 1988, sec. B.

19. For a bibliography relevant to the economic impact of both university and corporate research, see Trajtenberg, Henderson, and Jaffe (1992).

20. For a comparison to Japan, see Clotfelter et al. (1991, p. 12).

21. See, for example, Clotfelter (1991, p. 89).

22. For a discussion of explanations for increasing costs in higher education, see chapter 2.

23. To be sure, some variation exists even among the most selective insti-

tutions in the application of this dual commitment, with some institutions offering "merit" scholarships or athletic scholarships in addition to need-based aid. For the purposes at hand, it seems most useful to group together those institutions that make this commitment, regardless of whether they also offer other forms of aid.

24. Sowell (1992, p. 26) states, "colleges and universities use the same methods as business cartels or monopolies. Like monopolistic price discriminators in the commercial world, private colleges and universities set an unrealistically high list price and then offer varying discounts. In academia, this list price is called tuition and the discount is called 'financial aid.'" For a contrary view, however, see Bowen and Breneman (1993).

25. The Higher Education General Information Survey and its successor, the Integrated Postsecondary Education Data System, both undertaken and maintained by the U.S. Department of Education, have been the standard data sets for empirical analysis of higher education. See Getz and Siegfried (1991, ch. 11) for a description of these surveys.

26. The Carnegie scheme of classification divides colleges and universities into six major types: (1) research universities, (2) doctoral-granting universities, (3) comprehensive universities, (4) liberal arts colleges, (5) two-year institutions, and (6) specialized institutions. For a short description of this classification scheme, see Clotfelter et al. 1991, Table 2.

27. Getz and Siegfried (1991), for example, divide research universities in this way in their analysis.

28. See Getz and Siegfried (1991, pp. 271-85) and Halstead (n.d.).

29. The growth rates calculated in the present study are exponential growth rates, corresponding to instantaneous compounding. Where X_0 is a beginning quantity and X_1 is a comparable quantity after t years, the average annual growth rate is g in the equation:

$$X_1 = X_0 e^{gt}.$$

Chapter 2

1. Clark (1987, p. 264).

2. In the parlance currently in use in the theory and application of business "reengineering," activities such as those described here often are characterized as business "processes," which refer to functions of a business that may or may not correspond to existing organizational divisions within the business. See, for example, Davenport (1993).

3. See, for example, Keohane (1993, p. 114) or Stigler (1993, p. 175).

4. Carleton College, *Academic Catalog 1993-94*, p. 3.

5. Surveys of faculty indicate a marked increase in the perceived importance of research in obtaining tenure. The percentage of all faculty who strongly agreed with the statement, "In my department it is difficult for a person to achieve tenure if he or she does not publish," increased from 21 to 42 percent between 1969 and 1989. Among faculty in research universities, the percentage strongly agreeing rose from 44 to 83 percent (Boyer 1990, p. 12).

6. Caplow and McGee (1958, p. 221) note the irony of the situation: “It is only a slight exaggeration to say that academic success is likely to come to the man who has learned to neglect his assigned duties in order to have more time and energy to pursue his private professional interests.”

7. Cole (1993 p. 6).

8. The view of Sykes (1988, p. 7) is at one extreme: “Professors, after all, control everything that matters in the universities.”

9. Quoted in Clark (1987, p. 156). In assessing their role in governance, Clark (p. 264) states that faculty in the research university:

[D]evelop a strong sense of nationhood in their own department, ruling it by collective decision making and holding administrators at arm's length from the core tasks. Since trustees have ultimate authority and make occasional large decisions, and since the administrative staff steadily elaborates bureaucratic controls, the setting is far from innocent of contrary forces. But the greater power lies in subjects, the stuff of academic work itself.

10. Arnold R. Weber (1989), then president of Northwestern University, remarked, “A few imaginative college administrators have raised prices above competitive levels to try to persuade consumers that a higher price indicates a higher-quality product.” For another expression of this idea, see Noah (1983, p. 18).

11. See McPherson and Winston (1993b). The study by Spies (1978) of admissions trends at selective colleges and universities provides empirical support for this argument. He observes, “[A]n institution faced with the choices of increasing tuition or damaging its academic reputation by cutting back programs might do more to discourage applications if it followed the latter course” (p. 17). As noted in chapter 3 of this book, at least some institutions appeared to believe that raising tuition would not necessarily hurt their admissions outcomes.

12. See McPherson and Winston (1993b, pp. 69–105) for a discussion of this issue.

13. See, for example, Massy and Wilger (1992, p. 370).

14. I believe this wish to make a difference is one of the central reasons for the existence of endowments, an issue that has been discussed at length by Hansmann (1990). Endowments are stocks of financial assets generating spendable revenue, most of which are designated for named funds that are restricted to specified uses. To me, the wishes of the donor to have recognition, to make a difference—and to do both in perpetuity—and the amenability of the tax law in making virtually all such gifts, in life or after death, fully deductible, explain the prevalence of this form of giving.

15. For a discussion of their calculations, see the appendix to this chapter.

16. In the view of some observers, studies examining per-student costs are inherently flawed, in that they may be interpreted as taking constant returns to scale (that is, constant per-student costs) to be the norm. Moreover, if enrollments were to fall very rapidly, these costs almost certainly would increase, owing to the stickiness of many expenditures. To interpret such increases as increases in cost would be misleading, according to this view.

17. The Higher Education Price Index (HEPI) gives more than one-half of its weight to professional salaries and more than four-fifths to compensation of all kinds (Halstead 1983, p. 52). Between 1976/77 and 1989/90, the HEPI increased by 128 percent, whereas the Consumer Price Index rose by 116 percent (U.S. Department of Education 1992, p. 41, Table 38).

18. Massy and Wilger (1992, p. 366) cite this effect.

19. See also Shapiro (1993, p. 13) or Bowen (1992, p. 175).

20. See, for example, Meisinger and Dubeck (1984, pp. 16-9), Getz and Siegfried (1991, p. 266), or Massy and Wilger (1992, p. 365).

21. Massy (1990, p. 3) defines growth force as the "constant pressure to layer new courses, programs, and disciplines on old ones, to increase the specialization and hence the size of the faculty. . . ." Bergmann (1991), in contrast, focuses on growth in administrative areas, ascribing it to "the desire of each administrator for more underlings" and the absence of effective curbs on administrative growth. See also Getz and Siegfried (1991, p. 266).

22. Bowen (1968) discusses the importance of revenues in a slightly different way in his analysis of rising expenditures by private universities: "[T]he level of expenditures depends to a considerable extent on the amount of income available—just as the amount of income available depends to a considerable extent on the strength of the pressures for increased expenditures. The interdependence of the expenditure and income sides of the budget is a basic characteristic of all non-profit organizations. . . ."

23. For general statements of this widely cited hypothesis, see, for example, Baumol and Bowen (1966) or Baumol (1967). Bowen (1968, pp. 12-6) applies the thesis directly to private universities and to the increase in their expenditures during the 1950s and 1960s.

24. See also Cole (1993), who argues that administrators embraced and pushed the emphasis on research during the 1980s, and Massy and Wilger (1992, pp. 367-8), who refer to the increased emphasis on research as "output creep."

25. See, for example, Niskanen (1971).

26. See also Breneman (1994, p. 106) for a reference to logrolling in determining college budgets.

27. He states (p. 39): "Lacking the power to make changes without painful confrontation and lacking the personal incentive to overcome that obstacle, administrators are likely to prefer the status quo and to avoid initiatives that would make their institution different from others."

28. See, for example, Kennedy (1993, p. 139).

29. For a summary of these admissions indicators for 1991/92, see Table 3.2.

30. *Peterson's Guide to Four-Year Colleges 1994* (Princeton, NJ: Peterson's Guides, 1994).

31. Address to the Board of Trustees, September 28, 1984.

32. Graduate students in education were counted with professional students, although Duke had no separate school of education. The number of education graduate students was large, constituting about one-fifth of the graduate school's enrollment in 1976.

33. This committee, the Administrative Planning Committee, was composed of four faculty members, three administrators, and three students.

34. Minutes of the Administrative Policy Committee, January 25, 1984.

35. This relationship is discussed at greater length in the remainder of this appendix.

36. The assumption in the model that direct costs are fully covered may not be correct. One practice that apparently became more common during the 1980s was for granting agencies to insist that institutions contribute matching funds for certain research-related expenditures. Furthermore, direct costs might not be covered fully if the depreciation schedules used for scientific machinery tend to overstate useful lives or if grants end before the useful lives of this equipment have ended.

37. Although Figure 2.1 may be viewed as a picture of cross-subsidy, it remains impossible to pick any point of demarcation showing whether research subsidizes instruction or vice-versa. To say, for example, that at levels below D^* instruction is subsidizing research implicitly would assume that donors and students have no interest in research; to the extent that they do, one would expect the net costs of research to be positive. This may be what Kennedy (1993, p. 148) has in mind when he refers to the growth in restricted expenditures as taxing the general fund.

38. Two empirical studies of institutional response are those by McPherson and Schapiro (1991) and by Ehrenberg, Rees, and Brewer (1993).

39. Where the growth in X over t years can be described by the exponential function $X_1 = X_0 e^{rt}$, then the growth rate of any product is $r(bc) = r(b) + r(c)$, and the growth rate of any quotient is $r(b/c) = r(b) - r(c)$.

Chapter 3

1. Farewell Address to the Nation, January 11, 1989 (Reagan 1989, pp. 412-3).

2. For a discussion of the components of this increase, see Clotfelter et al. (1991, chap. 1).

3. The rise in applications is reflected in an annual survey of freshmen. Among those attending private universities, the percentage who applied to as many as seven institutions increased from 12.1 percent in 1979 to 22.5 percent in 1992 (Astin, 1979, 1992), tables entitled, "Weighted National Norms for All Freshmen." For a description of the increase in applications to the most selective institutions, see Deirdre Carmondy, "Better Students Finding Colleges Reject Them," *New York Times*, April 20, 1988, sec. B.

4. Calculations are based on data from U.S. Bureau of the Census, *Current Population Reports*, Series P-60, No. 184, *Money Income of Households, Families, and Persons in the United States: 1992* (Washington, DC: Government Printing Office, 1993), Table B-7. See Table 3A.1 in the appendix to this chapter.

5. These rates applied to ordinary, as opposed to capital gains, income and do not reflect the 33 percent marginal tax rate "bubble" applying to one band of income classes.

6. According to one set of tabulations, the effective tax rate for the top 20 percent of households fell from 27.2 percent in 1977 to 26.4 percent in 1989 (U.S. House of Representatives, Committee on Ways and Means, *1992 Green Book*, p. 1510, Table 14). Similarly, Kasten, Sammartino, and Toder (1992, Table 12) estimate that the average federal tax rate on the top one-fifth of households declined over the period 1980 to 1989.

7. Between 1981 and 1988, median sales prices increased by 50 percent in Washington, DC, 73 percent in San Francisco, 126 percent in Boston, and 150 percent in the New York metropolitan area (Phillips 1990, Appendix 1-2). See also Richard W. Stevenson, "Housing Prices Expected To Be Sluggish in the 90's," *New York Times*, April 6, 1990, sec. A.

8. U.S. Bureau of the Census, *Current Population Reports*, Series P-60, No. 118, *Money Income in 1977 of Families and Persons in the United States* (Washington, DC: Government Printing Office, 1979), Table 22; and *Money Income of Households, Families, and Persons in the United States: 1992* (Washington, DC: Government Printing Office, 1993), Table 9. Using the Gross Domestic Product price deflator, the dollar value in 1977 corresponding to \$65,000 in 1992 was \$30,004. The estimate of average family size for families with incomes of \$30,004 or more in 1977 was computed using interpolation. Cook and Frank (1993, p. 133) also make this point.

9. For evidence, see, for example, Clotfelter (1991, p. 46, Table 2.13) or Hearn (1990).

10. See Freeman (1976). For further discussion of the return to college education, see Clotfelter (1991, pp. 64-9).

11. The exact timing of the trough in the earnings advantage depends on the measure used. One time series presented in Clotfelter et al. (1991, p. 66, Figure 3.1) suggests 1980 for men. For further discussion of the economic returns from college, see also Murphy and Welch (1989).

12. Minutes of the Administrative Policy Committee, Carleton College, May 8, 1986.

13. For analyses of the academic labor market and salaries, see Hansen (1986) or Ehrenberg (1991).

14. Calculations are based on data in *The Lawyer's Almanac*, various years (Englewood Cliffs, NJ: Prentice Hall Law and Business), and American Medical Association, *Socioeconomic Characteristics of Medical Practice*, 1987 through 1994 editions. Data on starting salaries, comparing three doctoral fields with MBAs and lawyers, similarly show that increases in academic salaries were well within the range of those in other professions (Ehrenberg 1991, p. 182, Table 8.3).

15. For a description of the methodology for computing the Higher Education Price Index, see Halstead (1983).

16. A monopsonist is a firm that is the only buyer in a factor market. See Ransom (1993) for an application of the monopsony model to the market for faculty.

17. Conversation with Irwin Feller, November 17, 1994. Similarly, Kennedy (1985) argues that there has been a general decline in the federal gov-

ernment's commitment to pay for scientific equipment and cites attempts by the National Institutes of Health to reduce research support by withholding a portion of indirect costs.

18. That reimbursements systematically fail to cover costs is suggested, for example, by Richardson (1992, p. 182) and Rosovsky (1992, p. 184).

19. Institutions themselves made up for some of the declines in federal student aid grants. See, for example, Clotfelter et al. (1991, p. 105).

20. For a discussion of this econometric work, see Clotfelter et al. (1991, pp. 107-13).

21. A listing for 1987/88, for example, showed 9 national universities, including such universities as Harvard and Chicago, with an average tuition and fees of \$16,767; 9 national colleges other than Carleton, including such colleges as Wellesley and Oberlin, with an average of \$15,658; and 10 Mid-western colleges other than Carleton, including such colleges as Grinnell and St. Olaf, with an average of \$12,192. Carleton's figure for that year was \$13,640, the highest of the its group, \$3,100 below the average for the national universities, and \$2,000 below that of the national colleges.

22. The minutes of the Administrative Policy Committee, February 28, 1978, made specific reference to the empirical study by Spies (1978): "Citing passages from a COFHE report entitled 'The Effect of Rising Costs on College Choice' to support his point, Mr. Sullivan urged that since it has been demonstrated that students in the market for a school like Carleton are less influenced in their choice by the cost than by the academic quality of the institution, we should not hold down Carleton's comprehensive fee at the risk of lowering its quality." At a meeting a decade later, committee members heard a report on research indicating that some students, particularly those from the East, were likely to equate price with quality (Minutes, April 3, 1989).

23. Minutes of the Administrative Policy Committee, Carleton College, May 13, 1980.

24. He also noted that this would be a good time for an increase because of favorable press that Carleton had received in an article in *U.S. News and World Report* (Minutes of the Administrative Policy Committee, Carleton College, February 1, 1988).

25. Minutes of the Administrative Policy Committee, Carleton College, April 3, 1989.

26. For evidence that selective colleges and universities enroll a disproportionate share of students from affluent families, see McPherson and Winston (1993a, chap. 5).

27. Hauptman (1990, pp. 80, 82) makes a similar argument, emphasizing the ability of institutions to raise tuitions and their wish to enhance their academic and student service offerings.

Chapter 4

1. Bowen (1980, p. 15).

2. Defining a cost function is more difficult even than assigning costs,

because it requires a measure of the firm's output. In the case of higher education, it is the unfortunate fact that we cannot adequately describe, let alone measure, the output. Higher education produces many different outputs, and we have only a vague idea of the "technology" involved. (Although it is generally believed, for example, that teaching a seminar is different from teaching a lecture, and that student time and effort are vital inputs in the process, our understanding of these differences is rudimentary.)

3. It is worth noting one inherent difficulty in the omission of medical schools and centers. To varying degrees, most major university medical centers contain faculty whose work would be judged as "basic," as opposed to applied research, in such fields as genetics and microbiology. Although such fields could be classified in arts and sciences, the approach taken here is to omit such departments when they are part of the university's medical center.

4. University accounting systems typically place all fringe benefits in the same account. In order to estimate the fringe benefits applying to each category of employee, the appropriate fringe benefit rate for the year and class of worker was added to salaries and deducted from total fringe benefits. To the extent that this method did not exhaust the fringe benefit totals precisely, the difference was reflected in the residual category.

5. For example, annual capital outlays for the University of Chicago were available for the years 1983/84 to 1992/93. These expenditures were divided by departmental group and converted into constant 1991/92 dollars. Averages then were formed: for 1983/84, the average of capital spending in 1983/84 and 1984/85; for 1986/87, the average of 1985/86, 1986/87, and 1987/88; and for 1991/92, the average of 1990/91, 1991/92, and 1992/93.

6. The departmental groups include four sets of academic departments (humanities, social sciences, natural sciences, and engineering), library, student services, plant, admissions and financial aid, arts and sciences administration, provost, alumni affairs and development, and other general administration. A 13th department, athletics, is shown separately. The expenditure types are as follows: compensation for regular faculty, other faculty, administrative staff, nonexempt workers, and students; professional services; contract work; computers; financial aid (including stipends for graduate students); supplies; general operating expenses; capital expenditures; maintenance; and a residual, which includes excess or insufficient fringe benefits. For a detailed listing of departmental components and spending categories used to create the table, see appendix Table 4A.2.

7. The specific proportions used for Duke were: 90 percent of the library, 95 percent of student services and alumni affairs and development, 75 percent of the provost's office, and 20 percent of plant and general administration. All other categories were assigned exclusively to arts and sciences and engineering. These percentages reflect administrators' estimates. The 20 percent figure for general administration reflects the large number of buildings, employees, and financial transactions in the university's medical center. By comparison, the percentages of departmental groups assigned to arts and sciences at the University of Chicago were: 60 percent of the library, 53 percent of the provost, and 80 percent each of student services, plant, and

general administration. All other categories were assigned to arts and sciences entirely. The first of the above estimates for Chicago was based on the proportion of students in arts and sciences and the second on the proportion of faculty. The 80 percent figure was an estimate made by administrators in the budget office.

8. The interested reader can verify this assertion by applying alternative allocation percentages to the tabular data given in this chapter.

9. As noted in the appendix, however, the inclusion of transfers combined with the apportioning of nonallocatable general expenditures means that internal transfers do not necessarily cancel out completely.

10. During this period, the way in which payments to graduate students were allocated between fellowships and salaries for teaching changed significantly. For this reason, most categories covering salaries to graduate students are included in the category of fellowship spending.

11. For the purpose of computing full compensation, wages and salaries in each category were multiplied by the applicable fringe benefit rate, and the resulting amount was transferred from the separate fringe benefit account to the appropriate compensation category. These calculated fringe benefits did not equal exactly the totals in the university's fringe benefit accounts; the residual category shown in the table consists almost entirely of the difference.

12. As noted in the text, the use of the eight-year period 1983/84 through 1991/92 was necessitated by the lack of computer-readable accounting data before 1983/84. As a check on the validity of relying on this shortened period in the analysis of expenditure trends, a comparison using data for Duke was made, using other data between the period 1976/77 to 1983/84 and the more recent period covered in the tables. This comparison is presented in appendix 4.3.

13. Where X_1 and X_2 are expenditures for one category in years 1 and 2, respectively, and T_2 is total expenditure in year 2, the percentage increase in total spending attributable to increased expenditures for category X is $(X_2 - X_1)/T_2 = (X_2/T_2)((X_2 - X_1)/X_2)$, or the product of the category's share of the total and the percentage growth in that category.

14. The large change in the federal share for admissions/financial aid and arts and sciences administration is due apparently to a change in the unit to which ROTC scholarships were assigned.

15. For the Harvard tables, the General Academic group includes the Core Curriculum, Freshman and House Seminars, and General Education; Natural Sciences includes departments 44, 49, 52, and 66; and Plant includes Physical Resources and Grounds and Buildings.

16. As noted in Table 4A.3, faculty compensation refers to Harvard's classes 01 (tenured professors) and 02 (faculty on term appointments longer than one year, mostly associate and assistant professors). Class 01 also includes some administrators who were grandfathered into that classification by virtue of being in their jobs in 1976, when administrators first were included in class 03.

17. See the appendix for a brief discussion of internal transfers and recharges.

18. Where to classify history has been a subject of debate for some time. See, for example, Sills (1968, p. xxi).

19. Further use is made of fund codes in the next chapter.

20. The departmental group into which any expenditure item was classified in the detailed analysis of financial data was determined by the "primary component," usually the unit responsible for the expenditure.

21. These amounts may differ for several reasons. First, the "unrestricted" expenditures taken from the detailed financial data include "allocated" expenditures, which were spent out of special fund codes, using money that might have been taken out of previous years' unrestricted budgets. The payments into these allocated fund codes were not counted in the detailed analysis; only the expenditures out of them were counted. However, the fund codes examined included no accounts for such allocated expenditures.

22. As is shown in chapter 6, because the staff size of the counsel's office grew modestly over the period, this increase in spending by the university counsel appears to be the result of hiring of outside counsel.

Chapter 5

1. President, University of Chicago. Gray (1992, p. 235).

2. For data on broader averages of faculty salaries, see Table 5A.1 in the appendix to this chapter.

3. In a steady state, in which the number of professors retiring and being replaced is constant, the difference would depend on the average growth in real salaries for continuing faculty and the average length of service from promotion to full professor to retirement. In actual institutions, the difference also would depend on the age distribution of the faculty.

4. Report of the Faculty Compensation Committee to the Executive Committee of the Academic Council, "Additional Information on Faculty Salaries," March 8, 1993.

5. It seems likely that some portion of the increase in the calculated fringe benefit rate for Duke overstates the actual increase. At least one category, benefits administration, reflects costs that were incurred in previous years but that, apparently, were noted only in the most recent years for the purpose of indirect cost recovery.

6. Exponential growth rate for 15 years of 1.1528 to 1.2269.

7. For a discussion of journal price inflation, see Noll and Steinmueller (1992).

8. Between 1981/82 and 1991/92, a period in which prices overall increased by 47 percent, the increases in the following components of the Higher Education Price Index were: professional salaries, 72 percent; non-professional salaries, 49 percent; library acquisitions, 99 percent; supplies and materials, 18 percent; services, 53 percent; construction, 39 percent; and capital equipment, 36 percent.

9. See, for example, Bowen and Rudensine (1992, chap. 10).

10. As explained in chapter 4, each of the lines of the expenditure tables for Duke and Chicago has been multiplied by a constant that approximates the arts and sciences share of each departmental group. In the case of arts

and sciences academic departments and arts and sciences administration, in addition to all the lines at Harvard and Carleton, this constant is 100 percent, since these units were by definition wholly in arts and sciences.

11. For each of 10 expenditure categories, price indices P_i from Research Associates of Washington (1994) were used to calculate changes in factor market prices. The increased spending in any category attributable to the increase in prices of that category is $E_{i1}I_1(P_{2i}/P_{1i}) - E_{i1}$, where I_1 is the general price level in period 1 relative to 1991/92 and E_{i1} is expenditures for that category in the base year, in 1991/92 dollars. The categories are: professional salaries, nonprofessional salaries, library acquisitions, supplies and materials, services, capital (the average of the construction and capital equipment indices), and faculty salaries. The index of faculty compensation at the universities was based on a weighted average of full, associate, and assistant professor salaries plus fringe benefits for private independent doctoral institutions (category I) from the American Association of University Professors (AAUP) annual survey (Academe 1982, p. 18; 1984, p. 9; and 1992, pp. 19, 28). Data on private, independent, baccalaureate colleges (category IIB) were used to make the comparable calculation for Carleton.

12. Averages in Tables 5A.1 and 5A.2 reflect changes in the distribution of faculty by rank, whereas the index used in the current chapter uses weights of three ranks based on the relative number of faculty in those institutions in 1991/92.

13. Where C_1 is first-period compensation for regular faculty, the portion deemed attributable to growth in the size of the faculty is $C_1(N_2/N_1) - C_1$, where N refers to the faculty size in years 1 and 2, respectively.

14. Harvard figures are full-time-equivalents; figures for other institutions are numbers of regular faculty.

15. Where S is average salary for the institution and S^* is average salary for the market, the over-market increase in salaries is given by $(S_2/S_1 - S^*/S^*_1) C_1$. Where f is the institution's fringe benefit rate and f^* is the average for all institutions, the increase attributable to an extraordinary increase in the fringe benefit rate is $[(1+f_2)/(1+f_1) - (1+f_2^*)/(1+f_1^*)] C_1$.

16. Where N is the number of graduate or undergraduate students, as applicable, and A_1 is the amount of aid awarded in period 1, the portion of increased financial aid expenditure is $A_1(N_2/N_1) - A_1$. The portion attributable to aid per student is the residual increase in financial aid, or $A_2 - A_1(N_2/N_1)$.

17. For a description of the formula used in calculating need-based aid, see Clotfelter (1991, pp. 95-8).

18. At Duke, the percentage of total arts and sciences spending devoted to administration rose from about 38 to 41 percent; at Harvard, the increase was from 30 to 34 percent.

19. Negative values in expenditure accounts ordinarily signify repayments for services rendered. Thus, significant negative amounts as well as positive amounts would indicate existence.

20. Calculation by Office of Dean of Arts and Sciences.

21. The four primary entities here are: (1) the Division of Applied Sciences, (2) Organismal and Evolutionary Biology, (3) the Museum of Comparative Zoology, and (4) the Harvard Observatory.

22. The federal government's share of academic research and development expenditures declined from 67 to 59 percent from 1980/81 to 1991/92 (Feller 1995, p. 7). Blasdell, McPherson, and Schapiro (1993, p. 29) show that private universities experienced the same trend for the period 1979 to 1989.

23. For a discussion of the manifestations and effects of such cost-shifting, see Feller (1995, pp. 16-20).

Chapter 6

1. Comment on Shapiro in *Minerva* 30 (summer 1992): 185.

2. "Here is a partial list of new undergraduate services provided at Harvard during the past decade: special advice and counselling for minority students and personnel to work on race relations issues; special resources for disabled students; additional public service programs; programs pertaining to sexual harassment; expansion of office of career services; increased security costs, i.e., shuttle buses, police, guards, escort services, improvement in lighting; major increases in women's athletics and recreational sports; increased staff for financial aid services; greater supervision of extracurricular activities. There have also been major increases in services to graduate students" (Rosovsky 1992, p. 185).

3. See, for example, Getz and Siegfried (1991, p. 263).

4. One of the most well-known pieces of federal regulation is Circular A-21, which establishes the rules for determining reimbursement to universities for the indirect costs of research. One paragraph chosen at random, C5 (b), suggests the degree of complexity that may be involved in compliance with regulations: "In some instances, the amounts received from the federal government to finance institutional activities or service operation should be treated as applicable credits. Specifically, the concept of netting such credit items against related expenditures should be applied by the institution in determining the rates or amounts to be charged to sponsored agreements for services rendered whenever the facilities or other resources used in providing such services have been financed directly, in whole or in part, by federal funds. (See Sections F8 and J44 for areas of potential application in the matter of direct federal financing.)" (U.S. Office of Management and Budget, *Office of Management and Budget Circular A-21—Cost Principles for Educational Institutions*, Washington, DC: Government Printing Office, November 1991, p. 3.)

5. They state (1992, p. 367): "Consensus management . . . has become the norm for conducting business throughout higher education. Administrative and academic support staff personnel are widely consulted on a variety of issues. Agreements are hammered out before decisions are made. Although this process has the merit of being broadly participatory, it has many drawbacks." Among the drawbacks mentioned are the time required to reach

decisions and the lack of accountability. For a complementary interpretation of the role of university administrators, see Feldstein (1993).

6. For inefficiency, or any cause, to cause costs to increase, it also must increase; to raise the rate of cost increase, it must rise at a more rapid rate than other components of the total. In the present discussion, in consideration of the abstractness of the causes themselves, these distinctions are taken for granted.

7. Economists distinguish two kinds of inefficiency. *Allocative inefficiency* is the uneconomic use of resources. Allocative inefficiency may manifest itself, for example, in a capital-labor ratio that makes it more expensive to produce a given unit of output, or in an excessive amount of an output, which might be higher education itself. A second kind, which probably corresponds more closely to the common interpretation of the term, is what Leibenstein (1966) termed *x-inefficiency*, the failure to employ whatever resources are used in their best way. This type of inefficiency may show up as disorganization, old-fashioned routines, or long coffee breaks.

8. For a study of innovation in higher education, including some of the computing and communications equipment mentioned here, see Getz, Siegfried, and Anderson (1994).

9. For ease of data collection, I chose a set of seven administrative component codes rather than try to follow the changing set of codes corresponding to the four administrative areas discussed here.

10. One estimate made around 1980 was that 40 percent of commercial applications of computers had proven uneconomic, in the sense that the cost to perform the same job had increased as a result of computerization (Kidder 1981, p. 244).

11. Committee to Study the Impact of Information Technology on the Performance of Service Activities (1994, pp. 156-70). In explaining the lag in the impact of new technology, this report states: "In many cases, knowledge workers have used IT [information technology] to do more busy work without necessarily enhancing output—spreadsheets can be recalculated, presentations fine-tuned, or manuscripts revised more frequently with little noticeable benefit" (p. 170). See also Sylvia Nasar, "90's May Be the Growth Decade," *New York Times*, February 17, 1992, sec. C.

12. Shapiro (1992) suggests the proposition that productivity is directly related to the speed with which information can be gathered and processed. Of the innovations in higher education noted by Getz, Siegfried, and Anderson (1994), several have had dramatic effects on this speed, including on-line databases, automated circulation and public catalogs in libraries, and interbuilding data networks, not to mention personal computers.

13. At various times, other functions have been housed in the counsel's office at Duke, including public affairs and patents. The first of these functions was excluded from the present tabulations, and the second was included in the area of sponsored research.

14. At Duke, the administrative units that existed during the period of study in this area include the Office of Research Support, the Office of Research and Development, the Office of Research Administration and Pol-

icy, the Patent Office, the Office of Technology Transfer, the Office of Sponsored Programs, and the Office of Cost Accounting. At Harvard, they include the Office for Sponsored Research and the Office for Technology and Trademark Licensing.

15. The entities covered at Duke were counseling and psychological services, plus all offices under student affairs with the exception of cultural affairs, religious activities, university union, and the Mary Lou Williams Center for Black Culture. Several parts of student affairs at the University of Chicago were omitted from the tabulations in Table 6.6: registrar, graduate admissions and financial aid, resident halls, and physical education.

16. Also included at Duke were employee health fitness programs and employee discrimination, the latter being covered by a special assistant to the president for equal opportunity and the university ombudsman.

17. See note 2 above.

18. Data from Harvard were provided on a full-time-equivalent (FTE) basis. In the case of Duke, the FTE basis was calculated by multiplying the percentage of weeks of the year worked by the percentage of hours out of 40 typically worked.

19. See Table 4A.6 in chapter 4, appendix 4.3.

20. See Table 5.4 in chapter 5.

21. It is worth noting that information on nonregular faculty at universities tends to be of poor quality. One reason may be the highly individualized arrangements that often accompany this kind of employment, ranging from a lump payment for teaching one course to no payment whatever for university administrators who teach occasional courses.

Chapter 7

1. “The Way We Live Now,” *Faculty Newsletter*, Duke University 4 (October 1992).

2. Massy and Wilger (1992, p. 367) state: “While quantitative data to demonstrate the ratchet are sparse, the discretionary time model developed by Massy and Zemsky . . . shows that faculty do behave in ways that are consistent with the concept.”

3. By the 1903/04 academic year, Harvard’s introductory lecture courses had enrollments in the hundreds. Economics 1 had an enrollment of 529; Geology 4, an enrollment of 489; and History 1, an enrollment of 408 (Veysey 1965, p. 339a).

4. This simulation is described in more detail in appendix 7.1.

5. Minutes of the Administrative Policy Committee, Carleton College. See, for example, minutes from meetings on January 31, 1978; April 25, 1978; and October 31, 1985.

6. The basic data for each institution were registrar lists of courses taught, with accompanying information on instructors and enrollments. These lists were complemented by faculty lists with ranks. For two institutions, information on full-time-equivalent status also was used; for another, “census forms” also were used. These forms were distributed to faculty each semester and

asked for verification of data on teaching assignments compiled by the registrar. They were a means of obtaining additional information on shared teaching, advising, and other duties.

7. In 1991/92, these four departments had an average of 25 regular faculty and slightly more than 100 graduate students.

8. According to administrative records, 41 of the 48 pre-major advisors in 1976/77 were regular-rank faculty, compared with 51 of the 122 in 1991/92—a decline from 85 to 42 percent.

9. The growth in graduate enrollment counts both master's and doctoral students. The inclusion of master's students, plus the lag between matriculation and dissertation writing would explain why the number of supervisions would not necessarily have grown by 87 percent.

10. Two trends in graduate education, noted by Bowen and Rudenstine (1992), namely increased time-to-degree and higher attrition rates, could explain the relative constancy in dissertation advising in the face of growth in total graduate enrollments.

11. The regressions are given in appendix Table 7A.3 of this chapter.

12. For example, Public Policy Studies 114, The Politics of the Policy Process, also might be listed separately as Political Science 114, but with the same title. Thirty-five undergraduates might be enrolled in the course under the Public Policy number, and another 10 might be enrolled in it as a Political Science course. The total class size would, of course, be 45.

13. In several cases at Harvard, data from course catalogs and discussions with administrators revealed that actual contact hours occasionally differed from the number of contact hours recorded in official records. In such cases actual hours were used.

14. Harvard's course catalog provides the names of all of the professors participating in workshops. These workshops were treated as team-taught classes, following the methodology noted in Appendix 7.2.

15. At Duke, all the courses described as independent study-type were three hours. At Carleton, students can sign up for one to six credit hours of independent study-type courses, with six considered a full course; therefore, a faculty member's load of such courses for a term was calculated as the total number of credits for independent study-type divided by six.

16. *TOTAL* is the total enrollment in the class. It is the sum of undergraduate enrollment (*UNDER*), graduate enrollment (*GRAD*) and other students (*OTHER*).

17. For the present study, these were calculated for regular (tenured and tenure-track) faculty only.

18. In equation (1), substitute *GRAD_i* for *UNDER_i*; and sum over all *m* meetings of the graduate courses to perform this calculation.

Chapter 8

1. Boyer (1987, p. 145).

2. For the purpose of these calculations related to the size and instructors of classes, both instructors who would become assistant professors

after they had earned their doctoral degree and emeritus faculty who had been tenured professors were counted as regular tenure-track faculty. By contrast, emeritus faculty were not included in the calculations of teaching loads.

3. The weighted averages are $(300 \times 30)/300$ in the first case and $(90 \times 10 + 210 \times 210)/300$ in the second. In practice, the weights are not necessarily the same as class size (as they are in this example). The calculations presented in the chapter were made separately for graduate and undergraduate students in the universities. In the calculation for undergraduates, for example, the number of undergraduates enrolled in each course of a department is the weight, whereas the total class size includes undergraduates as well as graduate students and other students enrolled in the course through some other department (for cross-listed courses).

4. Noted in chapter 2. See Boyer (1987, p. 149).

5. In the same way that average class size is sensitive to the distribution of classes by size, it also can be affected by a single large course. This effect can be seen by comparing the two years' of data for the humanities department. A large lecture class that was offered in 1986/87 was not offered in 1991/92; this class accounts for most of the very significant difference in the department's enrollments between the two years.

6. For statements to this effect, see, for example, Bennett (1986) or Massy (1990).

7. Bowen and Rudenstine (1992, pp. 234-47), citing English, history, and political science as illustrations, argue that the number of subfields in various disciplines has increased. They note the growing importance of interdisciplinary work, non-Western and other international perspectives, and the application of approaches from one discipline to other disciplines as factors in the growth of subfields. They note this effect on overall curricular structure: "[T]here has obviously been some loss of articulated coherence in the formal curriculum, some measurable loss of structure and control in program definition and management, and an increased sense of uncertainty about where to draw sensible boundary lines . . ." (p. 235).

8. If the catalog listed staff or gave no list of faculty, the assumption was made that complete turnover of available faculty had not occurred.

9. One public critique that gained attention was an address by Price (1993).

10. Clearly, a full investigation of this issue would require a careful analysis that is well beyond the scope of this study. One suggestive piece of information that may be relevant is the trend at Duke in the use of final examinations in courses. Any instructor who does not plan to give a final examination is asked to submit a form to the registrar listing any such courses. The ratio of forms to the total number of courses, an imperfect measure of the proportion of courses in which no examinations were given, increased from 0.121 in 1978/79 to 0.155 in 1991/92. Although this trend obviously is open to more than one interpretation, it is one concrete measure of a teaching technique for which comparable data over time exist.

Chapter 9

1. Provost, Stanford University, quoted in Susan Chira, "How Stanford, Wealthy and Wise, Is Cutting Costs to Stay that Way," *New York Times*, July 8, 1990, p. 1.

2. Duke Provost's Office. Part of this growth was offset by a decline in nursing faculty.

3. The 32 colleges and universities belonging to the Consortium on Financing Higher Education (COFHE) enrolled 122,000 undergraduates in 1993/94, which was 1.4 percent of the approximately 8.6 million full-time-equivalent undergraduates reported for the 1990/91 year nationwide (U.S. Department of Education 1992, p. 177, Table 165).

4. As noted in chapter 1, the growth of financial aid in private institutions had the effect of moderating the growth of net tuition by about 0.6 percent per year.

5. COFHE (1991, appendix A) and U.S. Department of Education (1994, p. 312, Table 304). In a similar vein, Rothschild and White (1993) remark on the similarity of tuition levels among private institutions of quite different quality.

6. The changes in the unweighted average classroom teaching loads from 1976/77 to 1991/92, respectively, were: 3.74 to 3.79 in the departments corresponding to the natural science discipline, 5.22 to 3.74 in social science, and 5.08 to 4.49 in the humanities. See chapter 7 for further discussion of these measures.

7. The example of Kenneth Pye's retrenchment efforts at Duke could serve as the exception that proves the rule. With much fanfare, university committees deliberated over the possible elimination of five academic units. In the end only two of the five were dropped—the nursing school and the education department. These changes were significant, allowing a large increase in arts and sciences undergraduate enrollments to take the place of nursing students and the elimination of the university's largest PhD program, that in education. Nevertheless, no tenured faculty member had to be let go as a result of these changes, and, within a decade, the university was offering graduate degrees in both nursing and education.

8. Some of these institutions offered, in addition to need-based aid, scholarships awarded strictly on the basis of merit. For a description of the uniform methodology that served as the basis for the financial aid awards made by these institutions, see Clotfelter (1991).

9. Such cushioning is rarely complete, however, as self-help amounts typically are increased when tuition and fees are increased.

10. As noted in chapter 5, universities may exploit an employee's ties to a locality to a certain extent, by offering less to continuing faculty than it would to attract new hires.

11. See, for example, Rosovsky (1990, p. 71) and Rothschild and White (1993) for discussions of the unwillingness of colleges and universities to charge the theoretical equilibrium price.

12. The gap, based on the average salaries of all faculty in public and

private independent category I universities, was 10.0 percent in 1976/77 and 23.2 percent in 1991/92 (*Academe*, 1977 and 1992).

13. For a discussion of the role of education in the shifts in relative earnings during the 1980s, see, for example, Murphy and Welch (1989).

14. See Rosovsky (1991) and "Bok's Outline of Right Role for Academy," *New York Times*, September 7, 1984.

15. An apparent exception is Antioch's reengineering effort, which combines a rearrangement of administrative functions and the introduction of new teaching techniques. See Guskin (1995) for a description of this effort.

16. In using this phrase, Riesman (1980, p. 5) excluded the most selective private research universities; similar ideas have been applied to those universities as well.

17. University of Chicago *Directory*, 1991/92; *Peterson's Guide to Four-Year Colleges 1993*; and unpublished data from the University of Chicago.

18. Comparing research and undergraduate teaching to the lions and zebras on the Serengeti Plain, Coleman summarized his argument for separation: "[L]ions eat the zebras, and the research or consulting time eats the teaching time" (1973, p. 381). Recently, Shapiro (1992) has questioned whether such a separation ought not be instituted.

