Chapter 1

Summary of CBMS2005 Report

Highlights of Chapter 1

A. Enrollments

- Between fall 1995 and fall 2005, total enrollment in U.S. four-year colleges and universities grew by about 21%, while enrollment in those institutions' mathematics and statistics departments grew by only about 8%. See Table S.1.
- Between fall 1995 and fall 2005, mathematics and statistics enrollments in the nation's public two-year colleges grew by 18%, compared with the roughly 21% rise in overall public two-year college enrollment. See Table S.1.
- Between fall 2000 and fall 2005, enrollments in the mathematics and statistics departments of the nation's four-year colleges and universities declined slightly, and lagged far behind total enrollment growth. See Table S.1.
- Between fall 2000 and fall 2005, mathematics and statistics enrollments in the nation's public two-year colleges reached a new high, growing by about 26% and more than erasing a decline that occurred between 1995 and 2000. See Table S.1.
- Between fall 2000 and fall 2005, enrollments in pre-college-level courses (formerly called remedial courses) at four-year colleges and universities dropped slightly. Enrollments in pre-college-level courses in fall 2005 were about 10% below their levels in fall 1995. See Table S.2.
- Between fall 2000 and fall 2005, four-year college and university enrollments in introductory-level courses (including precalculus) dropped slightly, but fall 2005 introductory-level enrollments were still 15% above their levels in fall 1995. See Table S.2.
- In fall 2005, calculus-level course enrollments in four-year colleges and universities were about 3% higher than in fall 2000, and exceeded fall 1995 calculus-level enrollments by about 9%. See Table S.2.
- In fall 2005, advanced-level mathematics enrollments exceeded fall 2000 levels by about 10%, and surpassed fall 1995 levels by about 17%. See Table S.2.
- In four-year college and university mathematics departments, elementary-level statistics enrollments in fall 2005 exceeded the levels of fall 2000 by about 9% and were about a third larger than in fall 1995. Upper-level statistics enrollments declined slightly between 2000 and 2005 but still surpassed 1995 levels by about 20%. See Table S.2.
- In four-year college and university statistics departments, elementary-level enrollments in fall 2005 were essentially unchanged from fall 2000 levels and were 10% above 1995 levels. Upper-level statistics enrollments grew by about 20% between 2000 and 2005, after increasing by about 25% between 1995 and 2000. See Table S.2.
- In two-year colleges, statistics enrollments, which had increased by less than 3% between 1995 and 2000, increased by almost 60% between fall 2000 and fall 2005. See Table S.2.
- Computer science enrollments in mathematics departments of four-year colleges and universities, which had risen between fall 1995 and fall 2000, dropped by about 55% between fall 2000 and fall 2005, for a net decline of about 42% between 1995 and 2005. This decline occurred at all course levels, with upper-level computer science enrollments in mathematics departments dropping by nearly 70% between 2000 and 2005. See Table S.2.

B. Bachelors degrees granted

- The total number of bachelors degrees awarded through the nation's mathematics and statistics departments (including some computer science degrees) declined by about 5% between the 1999–2000 and 2004–2005 academic years, and about 6% fewer bachelors degrees were awarded in 2004–2005 than in 1994–1995 by mathematics and statistics departments. If computer science degrees are excluded from the count, then the five-year decline was only half as large, but the ten-year decline was slightly larger. See Table S.4.
- The number of bachelors degrees in computer science awarded through mathematics and statistics departments declined by about 21% between the 1999–2000 and 2004–2005 academic years. See Table S.4.
- The number of mathematics education bachelors degrees granted through mathematics departments dropped by about a third between 1999–2000 and 2004–2005 and by about 30% when 2004–2005 is compared with 1994–1995. See Table S.4.

- The percentage of bachelors degrees awarded to women through U.S. mathematics and statistics departments declined from 43.4% in 1999–2000 to 40.4% in the 2004–2005 academic year, a percentage that is below the 41.9% figure for 1994–1995. If computer science degrees are excluded, then the percentage of bachelors degrees awarded to women through mathematics and statistics departments declined from 46.7% in the 1999–2000 academic year to 43.4% in 2004–2005, which was also below the 45% figure from 1994–1995. See Table S.4.

C. Who taught undergraduate mathematics and statistics courses?

- The percentage of undergraduate mathematics and statistics sections in four-year colleges and universities taught by tenured and tenure-eligible (TTE) faculty declined between fall 2000 and fall 2005. In two-year colleges, the percentage of mathematics and statistics sections taught by permanent full-time faculty rose marginally from the levels of fall 2000. See Table S.6.

D. What pedagogical methods were used in undergraduate mathematics and statistics courses?

- Among four "reform pedagogies" studied by CBMS2005, four-year colleges and universities used graphing calculators in about half of their calculus courses, and computer assignments were used as a teaching tool in about a fifth of sections taught, while use of writing assignments and group projects in calculus courses fell to nearly single-digit levels. The four reform pedagogies were more widely used in two-year mathematics programs than in four-year departments, and were more widely used in Elementary Statistics courses than in calculus courses. See Tables S.11, S.12, and S.13.

E. The number of faculty

- Between 1995 and 2005, the number of full-time faculty members in four-year college and university mathematics departments grew by 12%, with the majority of the growth occurring after 2000. In doctoral statistics departments, the number of full-time faculty members reversed a decline that had occurred between 1995 to 2000, and in fall 2005 was about 13% larger than in fall 1995. In the mathematics programs of two-year colleges, the 21% growth in full-time faculty numbers matched the overall enrollment growth of two-year colleges and matched the increase in mathematics and statistics enrollments between 1995 and 2005. See Table S.14.
- Between fall 2000 and fall 2005, the number of part-time faculty in four-year mathematics departments declined by about 10% and increased by about 10% in doctoral statistics departments while the number of part-time faculty in two-year college mathematics programs increased by 22%. See Table S.14.
- The number of tenured and tenure-eligible faculty in four-year mathematics departments rose by 6% between fall 2000 and fall 2005. During that same five-year period, the number of TTE faculty in doctoral statistics departments grew by 10%, and the number of permanent full-time faculty members in mathematics programs at two-year colleges grew by 26%. See Table S.15.

F. Gender and ethnicity in the mathematical sciences faculty

- The percentage of women among the tenured faculty of mathematics departments grew from 15% to 18% between fall 2000 and fall 2005, with considerable variation in this percentage when departments are grouped by the highest degree that they offer. During that same period, the percentage of women among tenure-eligible faculty held steady at 29%. In doctoral statistics departments, the percentage of women among tenured faculty grew from 9% to 13% between fall 2000 and fall 2005, while the percentage of women among tenure-eligible faculty grew from 34% to 37%. The percentage of women in the permanent full-time faculty of two-year college mathematics programs rose slightly, reaching 50% in fall 2005. See Table S.17.
- The percentage of faculty classified as "White, not Hispanic" dropped from 84% to 80% in mathematics departments, and declined from 76% to 71% in doctoral statistics departments between fall 2000 and fall 2005. See Tables S.20 and S.21.

G. Changes in the mathematical sciences faculty due to deaths and retirements

The mathematics departments in two- and four-year colleges lost about three percent of their permanent full-time members (respectively, their TTE faculty) to deaths and retirements in the 1999–2000 and 2004–2005 academic years. In doctoral statistics departments, losses due to deaths and retirements were closer to 2% in each of those academic years. See Table S.22.

An overview of enrollments (Tables S.1, S.2, and S.3)

Total enrollment growth in four-year colleges and universities during the 1995–2005 decade outstripped mathematics and statistics enrollment growth, and in fall 2005 there were many more American college students taking substantially less mathematics and statistics courses than did their predecessors a decade earlier. Four-year colleges and universities saw fall-term enrollments in mathematics and statistics rise

by about 8% between 1995 and 2005, at the same time that total enrollment in four-year colleges and universities grew by about 21%. The problem was even more pronounced in the decade's last five years, between fall 2000 and fall 2005, when mathematics and statistics enrollments in four-year colleges and universities actually declined, at the same time that total enrollment in four-year colleges and universities rose by about 13%.

Information about mathematics and statistics enrollments comes from CBMS surveys in 1995, 2000, and 2005, while estimates of total enrollment in four-year colleges and universities come from the National Center for Educational Statistics (NCES) and are based on data that post-secondary educational institutions must submit to the Integrated Post-secondary Education Data System (IPEDS). Most national data cited in this report are drawn from the NCES report *Projections of Education Statistics to 2015*, which is available at http://nces.ed.gov/programs/projections/tables/asp .

NCES data show that total enrollments in the nation's public two-year colleges (TYCs) also increased by about 21% between fall 1995 and fall 2005. CBMS survey data suggest that the same ten-year period saw a roughly 18% growth in the mathematics and statistics enrollments in the mathematics departments and programs of the nation's public TYCs.

That 18% estimate requires explanation because the TYC enrollment totals in Table S.1 (1,498,000 for fall 1995 and 1,697,000 for fall 2005) suggest a 13% increase. Two factors explain why the estimate is 18%. First, recall that the 1995 TYC total included some computer science course enrollments, as well as mathematics and statistics enrollments, while the data for 2005 included only mathematics and statistics enrollments. Table S.1 allows us to remove those computer science enrollments, and we see that there were approximately 1,455,000 mathematics and statistics enrollments in fall 1995. Second, as careful readers will already have noted, the TYC sample frames for CBMS1995 and CBMS2005 were different. The CBMS1995 sample frame included approximately

TABLE S.1 Enrollment (in 1000s) in undergraduate mathematics, statistics, and computer science courses taught in mathematics departments and statistics departments of four-year colleges and universities, and in mathematics programs of two-year colleges. Also NCES data on total fall enrollments in two-year colleges and four-year colleges and universities in fall 1990, 1995, 2000, and 2005. NCES data includes both public and private four-year colleges and universities, and includes only public two-year colleges.

	Four-Year College & University Mathematics & Statistics Departments						Two-Year College Mathematics Programs[4]			
	Fall				2005 by Dept		Fall			
	1990	1995	2000	2005	Math	Stat	1990	1995	2000	2005
Mathematics	1621[1]	1471[1]	1614	1607	1607	--	1241	1384	1273	1580
Statistics	169	208	245	260	182	78	54	72	74	117
Computer Science	180	100	124	59	57	2	98[2]	43[2]	39[2]	--[2]
Total	1970	1779	1984	1925	1845	80	1393	1498	1386	1697
NCES Total Fall Undergraduate Enrollments[3]	6719	6739	7207	8176			4996	5278	5697	6389

[1] These totals include approximately 2000 mathematics enrollments taught in statistics departments.

[2] Computer science totals in two-year colleges before 1995 included estimates of computer science courses taught outside of the mathematics program. In 1995 and 2000, only those computer science courses taught in the mathematics program were included. Starting in 2005, no computer science courses were included in the two-year mathematics survey.

[3] Data for 1990, 1995, and 2000, and middle alternative projection for 2005, are taken from Tables 16,18, and 19 of the NCES publication *Projections of Educational Statistics to 2015* at http://nces.ed.gov/programs/projections/tables.asp.

[4] Starting in 2005, data on mathematics, statistics, and computer sciences enrollments in two-year colleges include only public two-year colleges.

half of the nation's private, not-for-profit TYCs while the CBMS2005 frame consisted of public TYCs only. To estimate the impact of that sample-frame change, we note that NCES data from 2002 show that public TYC enrollment was just over 99% of the combined enrollment in private not-for-profit and public TYCs. If we assume that public TYCs also taught just over 99% of the mathematics and statistics enrollment in the combined public and private, not-for-profit TYCs, and that the 99% figure still applied in 2005, we estimate that the combined mathematics and statistics enrollment in public and private, not-for-profit TYCs grew from 1,455,000 in 1995 to 1,714,000 in 2005, which is roughly an 18% increase. Alternatively, assuming that the 99% figure applied in 1995 as well as in 2002, we get the same 18% growth estimate.

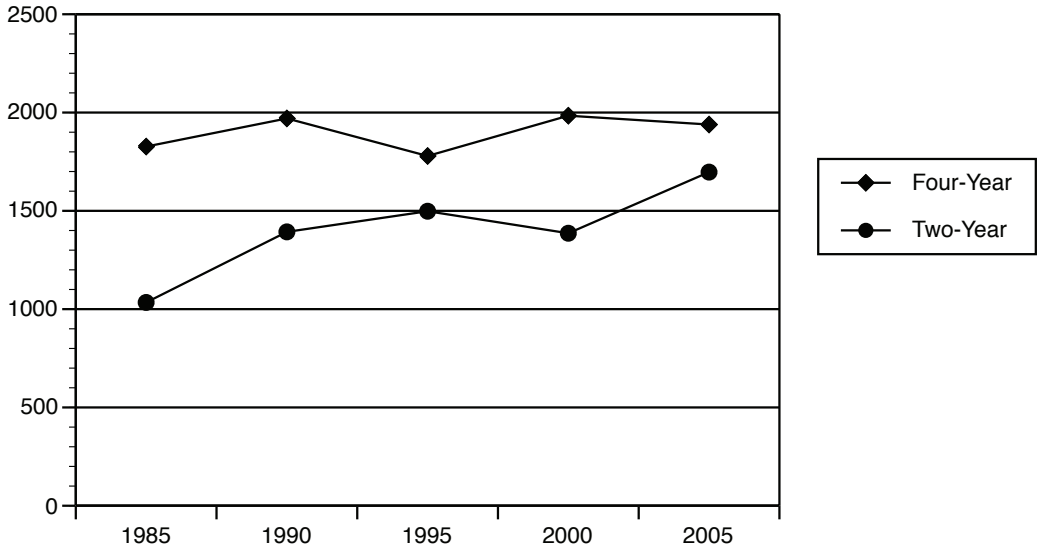

FIGURE S.1.1 Combined enrollment (in 1000s) in undergraduate mathematics, statistics, and computer science courses at four-year colleges and universities in mathematics departments and statistics departments, and in mathematics programs of two-year colleges: Fall 1985[1], 1990, 1995[2], 2000[2], and 2005[2]. Data for 2005 include only public two-year colleges.

[1] 1985 totals do not include computer science enrollments in mathematics and statistics departments.
[2] Before 1995, two-year enrollment totals included computer science enrollments taught outside of the mathematics program. In 1995 and 2000, only computer science courses taught within the mathematics program were counted. Starting in 2005, no computer science courses were included in the CBMS survey of two-year mathematics programs.

Table S.2 begins the process of breaking total mathematical sciences enrollment (shown in Table S.1) into its component parts. Among four-year mathematics and statistics departments, the course categories used in fall 2005 were pre-college courses, introductory-level courses, calculus-level courses, and advanced-level courses. The course category called "pre-college level" in CBMS2005 was called "remedial level" in previous CBMS studies, but the courses within the renamed category were essentially unchanged. Among four-year departments, the category of introductory-level courses was essentially unchanged from previous surveys, and included liberal arts mathematics courses, mathematics courses for elementary teachers, and a cluster of courses with names such as College Algebra, Precalculus, and Trigonometry. The category called "calculus-level courses" included all calculus courses and courses in linear algebra and differential equations. Appendix I shows that enrollments in various calculus courses accounted for about 82% of the 586,000 calculus-level enrollments reported in Table S.2. To see the complete listing of courses in each of the categories of Table S.2, see Appendix I or Section C of the questionnaires reproduced in Appendix IV.

Table S.2 also shows enrollments in various course categories in two-year mathematics programs. However, direct comparisons between course-category enrollments in four-year and two-year mathematics departments are problematic because the categories included different courses in the four-year and two-year mathematics questionnaires, as can be seen from Appendix 4 where the questionnaires are reproduced. In particular, the list of pre-college courses for two-year colleges is larger than the corresponding list for four-year colleges, and courses such as Linear Algebra and Differential Equations are not included in the two-year college calculus-level category.

In four-year mathematics departments, the sum of all mathematics course enrollments dropped marginally, from 1,614,000 in fall 2000 to 1,607,000 in fall 2005. Those totals mask more interesting changes. Between fall 2000 and fall 2005, the number of students in pre-college courses declined by about 8% (from 219,000 to 201,000) and introductory-level enrollments fell by about 2% (from 723,000 to 706,000). These declines were almost offset by other mathematics enrollment increases. Calculus-level enrollments, which, as noted above, include some sophomore-level courses as well as various calculus courses, increased by about 3% in four-year mathematics departments, and advanced-level mathematics enrollments increased by almost 10%.

When compared with the levels of fall 1995, pre-college-level enrollments in four-year mathematics departments were down by about 10%, while introductory-level and calculus-level enrollments were up by about 15% and 9% respectively, and advanced-level mathematics enrollments increased by about 17%. The total number of all mathematics enrollments in four-year mathematics departments increased by about 9% in the 1995–2005 decade.

Two-year college total mathematics enrollments rose by about 24%, from 1,273,000 in fall 2000 to 1,580,000 in fall 2005, with substantial increases in the pre-college, introductory, and "other" categories. These increases more than wiped out a moderate enrollment decline that occurred between 1995 and 2000 in two-year college mathematics programs.

Between fall 2000 and fall 2005, the nation's undergraduate statistics course enrollments continued their pattern of long-term growth. Enrollments in the elementary-level statistics category (which includes several courses in addition to Elementary Statistics) continued to rise, growing by about 9% in four-year mathematics departments and by 58% in two-year colleges between fall 2000 and fall 2005. The only exception to this growth pattern was in separate departments of statistics, where enrollment in elementary-level statistics held steady at about 54,000.

Ten-year growth for statistics enrollments between fall 1995 and fall 2005 was 62% in two-year colleges, 25% in four-year mathematics departments, and 20% in four-year statistics departments. As Table E.2 of Chapter 3 will show, almost all of the growth in statistics department enrollments occurred in masters-level departments—undergraduate enrollment in doctoral statistics departments began and ended the decade at about the 62,000 level.

The bottom row of Table S.2 shows that total course enrollments in four-year mathematics departments declined by about 3%, from 1,908,000 in fall 2000 to 1,845,000 in fall 2005. That decline is attributable primarily to a sharp decrease in computer science enrollments in mathematics departments, from 123,000 in fall 2000 to 57,000 in fall 2005. The decline in computer science enrollments in mathematics departments might be part of a broader national trend, but it might also be explained by the growth of computer science as a separate discipline with its own academic departments. If computer science enrollments are excluded, then the combination of mathematics and statistics course enrollments in four-year mathematics departments was essentially the same in fall 2005 as in fall 2000, and was about 11% larger in fall 2005 than in fall 1995.

In previous CBMS studies, computer science enrollments were included as a separate category in both the four-year and two-year CBMS questionnaires. In contrast, CBMS2005 did not collect data on computer science enrollments in two-year college mathematics programs, because anecdotal evidence suggested that these courses had moved into separate programs within the two-year-college system. It might have happened that some two-year mathematics programs included computer science enrollments in the "other mathematics courses" category in the two-year college questionnaire. In fact, the "other-courses" category in the two-year college total expanded from 130,000 enrollments in fall 2000 to 187,000 enrollments in fall 2005, a surprising 44% increase that happens to be close to the total number of computer science enrollments in two-year colleges in fall 2000. Alternatively, the 44% increase might be due to the creation of new courses that do not fit conveniently into any course description in the current two-year college questionnaire, e.g., a single course that combines high school algebra and college algebra (two separate courses in the CBMS2005 questionnaire) into a single course. The large number of "other course" enrollments in CBMS2005 suggests that a revision in the two-year course listing is in order for the CBMS2010 survey.

A frequently quoted number is the percentage of all undergraduate enrollments in the nation's mathematics and statistics departments and programs that occur in two-year colleges. The previous paragraph shows that there are two different ways to calculate that percentage; fortunately, the two methods give more or less the same answer. If a substantial number of two-year-college computer science enrollments were included under "Other mathematics courses," then two-year-college enrollments (1,697,000) should be compared with the sum of all enrollments in four-year mathematics and statistics departments (1,925,000). By that calculation, two-year colleges taught about 47% of all undergraduate enrollments in mathematical sciences departments and programs. Alternatively, if two-year college enrollments did not include a substantial number of computer science courses, then the two-year total (1,697,000) should be compared with the 1,867,000 mathematics and statistics enrollments in four-year mathematics and statistics departments,

excluding computer science, which gives a percentage closer to 48%. For comparison, note that in fall 1995 the percentage of undergraduate mathematics and statistics enrollments (excluding computer science) taught in two-year colleges was 46%, and in 2000, it was 42%.

TABLE S.2 Total enrollment (in 1000s), including distance learning enrollment, by course level in undergraduate mathematics, statistics, and computer science courses taught in mathematics and statistics departments at four-year colleges and universities, and in mathematics programs at two-year colleges, in fall 1990,1995, 2000, and 2005. (Two-year college data for 2005 include only public two-year colleges and do not include any computer science.)

	Mathematics Departments				Statistics Departments				Two-year College Mathematics Programs			
Course level	1990	1995	2000	2005	1990	1995	2000	2005	1990	1995	2000	2005
Mathematics courses												
Precollege level	261	222	219	201	--	--	--	--	724	800	763	965
Introductory level (including Precalculus)	592	613	723	706	--	--	--	--	245	295	274	321
Calculus level	647	538	570	587	--	--	--	--	128	129	106	108
Advanced level	119	96	102	112	--	--	--	--	0	0	0	0
Other (2-year)									144	160	130	187
Total Mathematics courses	**1619**	**1469**	**1614**	**1607**	**--**	**--**	**--**	**--**	**1241**	**1384**	**1273**	**1580**
Statistics courses												
Elementary level	87	115	136	148	30	49	54	54	54	72	74	117
Upper level	38	28	35	34	14	16	20	24	0	0	0	0
Total Statistics courses	**125**	**143**	**171**	**182**	**44**[2]	**65**[2]	**74**	**78**	**54**	**72**	**74**	**117**
CS courses [1]												
Lower level	134	74	90	44	0	1	1	2	98	43	39	0
Middle level	12	13	17	8	0	0	0	0	0	0	0	0
Upper level	34	12	16	5	0	0	0	0	0	0	0	0
Total CS courses [1]	**180**	**99**	**123**	**57**	**0**	**1**	**1**	**2**	**98**	**43**	**39**	**0**
Grand Total	**1924**	**1711**	**1908**	**1845**	**44**[2]	**66**[2]	**75**	**80**	**1393**	**1499**	**1386**	**1697**

Note: Round-off may make column totals seem inaccurate.

[1] Computer science enrollment starting in 1995 and 2000 includes only courses taught in mathematics programs. For earlier years it also includes estimates of computer science courses taught outside of the mathematics program. Starting in 2005, computer science courses were no longer included in the two-year college survey.

[2] These totals were adjusted to remove certain mathematics enrollments included in statistics totals in 1990 and 1995.

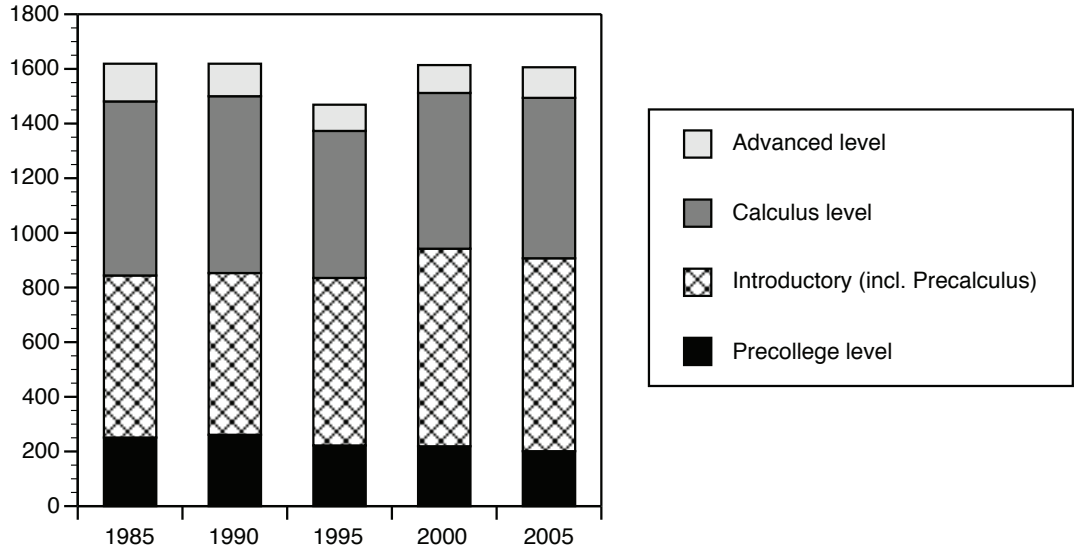

FIGURE S.2.1 Enrollments (in 1000s) in undergraduate mathematics courses in mathematics departments of four-year colleges and universities, by level of course: fall 1985, 1990, 1995, 2000, and 2005.

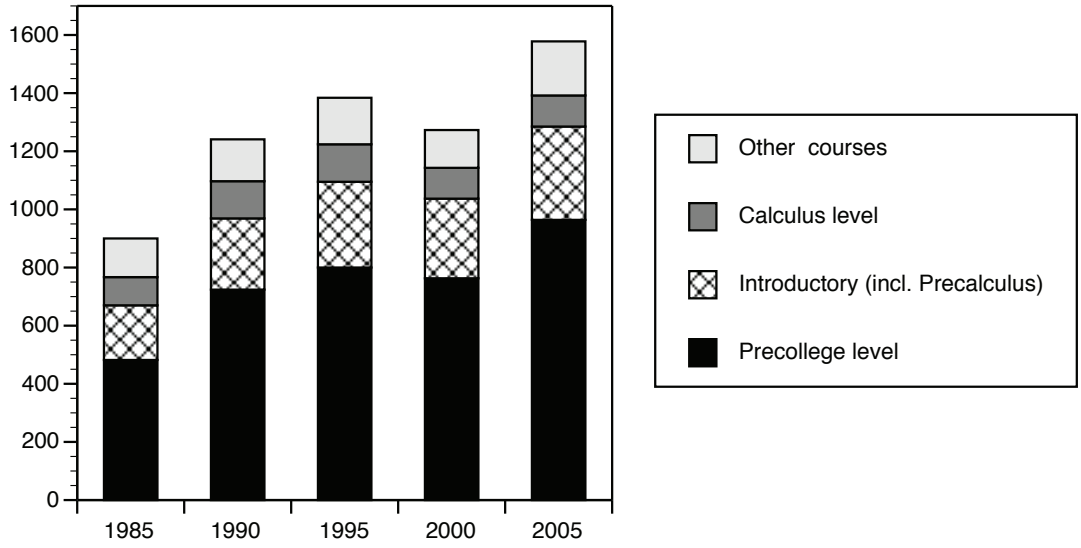

FIGURE S.2.2 Enrollments (in 1000s) in mathematics courses in two-year college mathematics programs by level of course in fall 1985, 1990, 1995, 2000, and 2005.

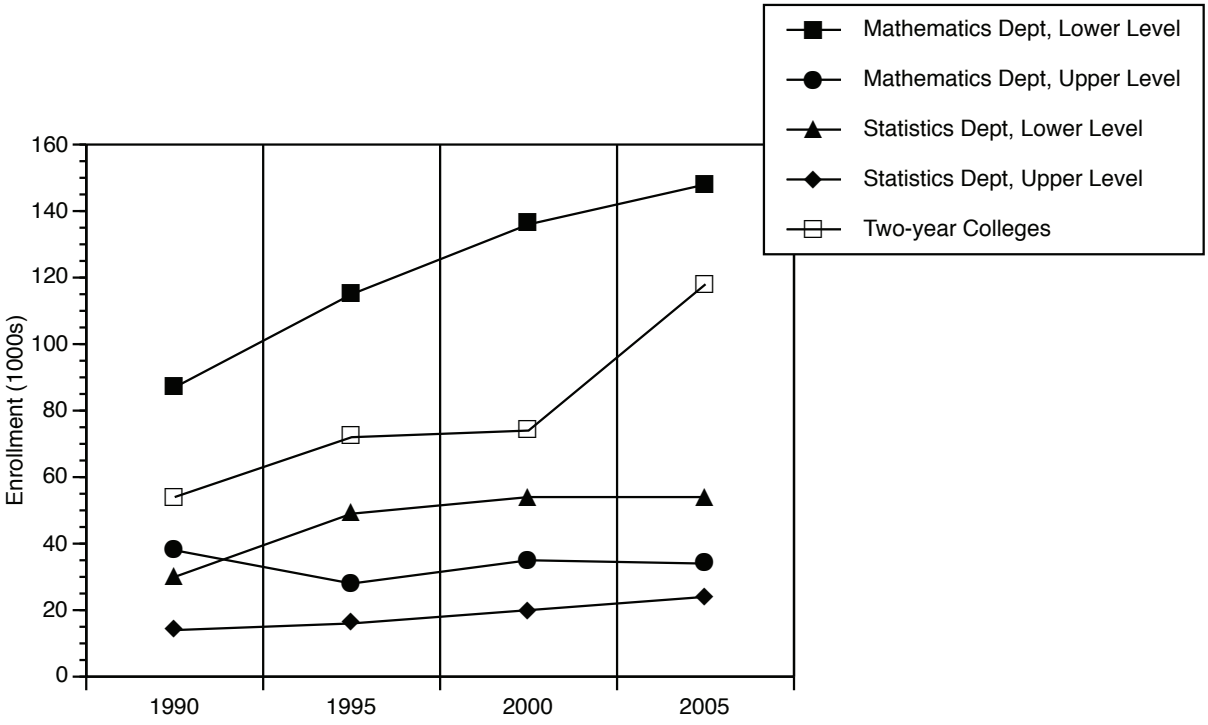

FIGURE S.2.3 Enrollments (in 1000s) in statistics courses in two year college mathematics programs, and in mathematics and statistics departments of four-year colleges and universities in fall 1990,1995, 2000, and 2005.

Academic year enrollments

CBMS surveys follow the NCES pattern and focus only on fall enrollments. However, CBMS data also make it possible to use fall enrollments to project full-year enrollments, and recent CBMS studies reveal an interesting trend among mathematics and statistics departments at four-year colleges and universities. In the surveys of fall 1990, 1995, 2000, and 2005, departments were asked to give their total enrollment for the previous academic year's fall term, and also their total enrollment for the entire previous academic year. Using this data one can estimate the national ratio of full-year enrollment to fall-term enrollment in the mathematical sciences programs of four-year colleges and universities. The ratios found in 1990, 1995, 2000, and 2005 were, respectively, 2, 2, 1.85 (SE = 0.03) and 1.75 (SE = 0.03), and those ratios can be used to project full-year enrollment from fall-term enrollment.

What is responsible for the change in that ratio from 2 to 1.85 to 1.75? Table S.3 provides one possible explanation, namely the widespread shift to the semester system. Why would the shift to the semester system cause the academic year to fall term ratio to decline? The authors of CBMS1995 (who found a ratio of 2) argued that "[t]he lesser Spring semester enrollment in those institutions with a two semester calendar is precisely balanced by those institutions on the term or quarter calendar, where the Fall enrollment is substantially less than half of the academic year enrollment." That argument, when combined with the substantial growth in the percentage of schools on the semester system (see Table S.3), probably explains the change in the academic-year-to-fall-term ratio noted above.

TABLE S.3 Percentages of four-year colleges and universities with various types of academic calendars in fall 1995, 2000 and 2005.

	Percentage of Four-year Colleges & Universities		
Type of calendar	1995 %	2000 %	2005 %
Semester	77	89	91
Trimester	0	1	1
Quarter	8	4	6
Other	15	6	2

Note: Zero means less than one-half of one percent.

Bachelors degrees in the mathematical sciences (Table S.4)

Table S.4 presents data on the total number of bachelors degrees awarded through the mathematics and statistics departments of four-year colleges and universities in the U.S. Because some mathematics departments also offer computer science programs, these totals include some degrees in computer science. In addition—see below—CBMS includes certain double majors and joint majors in its total of mathematics and statistics bachelors degrees.

The total number of degrees in the 2004–2005 academic year awarded through mathematics and statistics departments was down by more than 6% from the number awarded ten years earlier, in 1994–1995. Most of that decline occurred between 1999–2000 and 2004–2005. Women received 40.4% of all degrees awarded by mathematics and statistics departments in 2004–2005, down from the 41.8% figure in 1994–1995 and down from the 43.4% figure in 1999–2000.

Even if one excludes the number of computer science degrees granted through mathematics and statistics departments, a number that naturally declined as colleges and universities established separate computer science departments, the number of bachelors degrees in mathematics and statistics dropped by about 2% between 1999–2000 and 2004–2005, and by about 6% between 1994–1995 and 2004–2005. The number of mathematics education bachelors degrees granted through mathematics departments dropped by about a third over a five-year period, from 4991 in 1999–2000 to 3369 in 2004–2005. The number of bachelors degrees in mathematics increased between 1999–2000 and 2004–2005.

Table S.4 shows that the number of computer science bachelors degrees awarded through the nation's mathematics departments dropped from 3,315 in the 1999–2000 academic year to 2,603 in the 2004–2005 academic year. The annual Taulbee Surveys, published by the Computing Research Association, study the nation's doctoral computer science departments and include data on computer science bachelors degrees awarded through such departments. This can provide some context for the figures in Table S.4. Comparison of Table 9 of [BI] and Table 9 of [Z] shows that the number of computer science bachelors degrees granted through doctoral computer science departments rose from 12,660 in 1999–2000 to 15,137 in 2004–2005. Of the bachelors degrees awarded through doctoral computer science departments, 20% were awarded to women in 1999–2000, a percentage that dropped to 15% by 2004–2005. Table S.4 shows that in mathematics departments, the percentage of computer science degrees awarded to women in 1999–2000 was about 24% and declined to about 18% in 2004–2005.

As noted above, CBMS counts of bachelors degrees included double majors, i.e., students who completed two separate majors, one being mathematics or statistics. CBMS counts also included a separate category called "joint majors." What defines a joint major? In the CBMS questionnaire sent to mathematics departments, a joint major was defined as a student who "completes a single major in your department that integrates courses from mathematics and some other program or department and typically requires fewer

credit hours than the sum of the credit hours required by the two separate majors". An analogous definition appeared in the questionnaire sent to statistics departments. Joint majors in mathematics and statistics, or in mathematics and computer science, are traditional joint majors. The number of mathematics and statistics joint majors rose slowly, from 188 in 1994–1995, to 196 in 1999–2000, to 203 in 2004–2005. The number of mathematics and computer science joint majors rose from 453 in 1994–1995 to 876 in 1999–2000 and fell back to 719 in 2004–2005, still registering a substantial increase over the decade 1994–1995 to 2004–2005. CBMS2005 Table S.4 contains a new category of joint major, one that combines upper-level mathematics with upper-level business or economics (or mixes statistics and business or economics). In 2004–2005, the number of bachelors degrees of this new type of joint major was somewhat larger than in the more traditional joint mathematics and statistics degree.

In Chapter 3, Table E.1 and its figures give more detail on the number of bachelors degrees awarded through mathematics and statistics departments of different types, classified by highest degree offered. There is considerable variation by type of department in terms of the number of bachelors degrees awarded and in the percentage of degrees awarded to women.

Bachelors-degree estimates from previous CBMS surveys have differed from NCES degree counts. This was in part because CBMS figures rely on departmental counts rather than on university-wide counts, with the result that any student who has a double major "Mathematics and X" is counted as a mathematics major by CBMS. How was such a student counted in the IPEDS reports that are the basis for NCES estimates? Before 2002, IPEDS data assigned each student one and only one major, so that a student who double majored in "Mathematics and X" might or might not be counted as a mathematics

TABLE S.4 Combined total of all bachelors degrees in mathematics and statistics departments at four-year colleges and universities between July 1 and June 30 in 1984-85, 1989-90, 1994-95, 1999-2000 and 2004-2005 by selected majors and gender.

Major	84-85	89-90	94-95	99-00	04-05
Mathematics (except as reported below)	13171	13303	12456	10759	12316
Mathematics Education	2567	3116	4829	4991	3369
Statistics (except Actuarial Science)	538	618	1031	502	527
Actuarial Mathematics	na	245	620	425	499
Operations Research	312	220	75	43	31
Joint Mathematics & Computer Science	2519	960	453	876	719
Joint Mathematics & Statistics	121	124	188	196	203
Joint Math/Stat & (Business or Economics)	na	na	na	na	214
Other	9	794	502	1507	954
Total Mathematics, Statistics, & joint degrees	**19237**	**19380**	**20154**	**19299**	**18833**
Number of women	na	8847	9061	9017	8192
Computer Science degrees	**8691**	**5075**	**2741**	**3315**	**2603**
Number of women	na	1584	532	808	465
Total degrees	**27928**	**24455**	**22895**	**22614**	**21437**
Number of women	na	10431	9593	9825	8656

Note: Round-off may make column totals seem inaccurate.

major. Since 2002, colleges and universities have the option of reporting double majors in "Mathematics and X" both under the mathematics disciplinary code and under the code for discipline X, but they are not required to do so. That would seem to introduce additional ambiguity into the IPEDS-based counts of

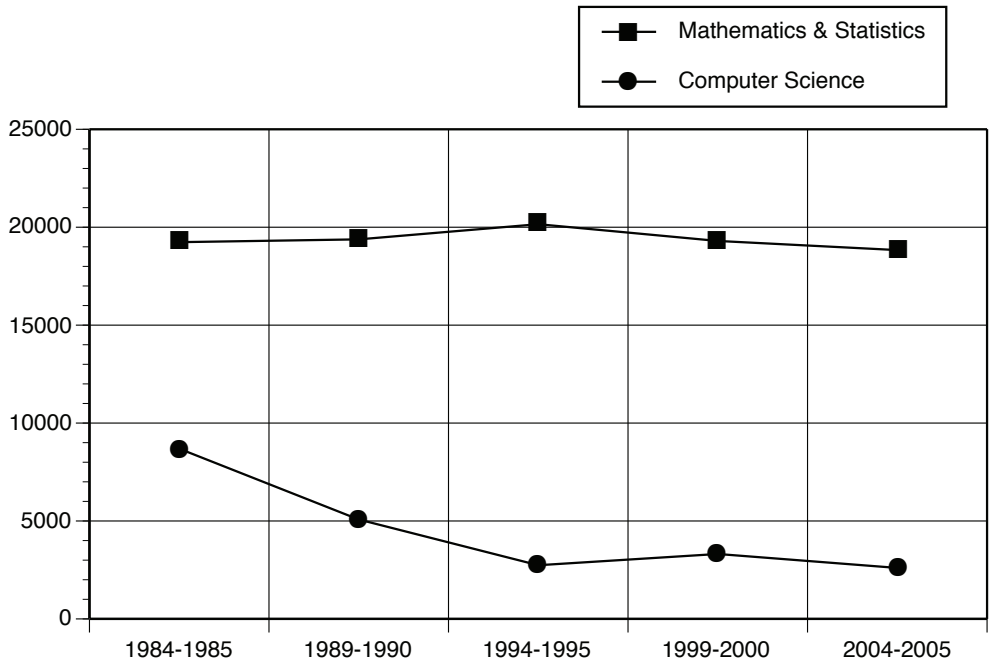

FIGURE S.4.1 Number of bachelors degrees in mathematics and statistics, and in computer science, granted through mathematics and statistics departments in academic years 1984-1985, 1989-1990, 1994-1995, 1999-2000, and 2004-2005.

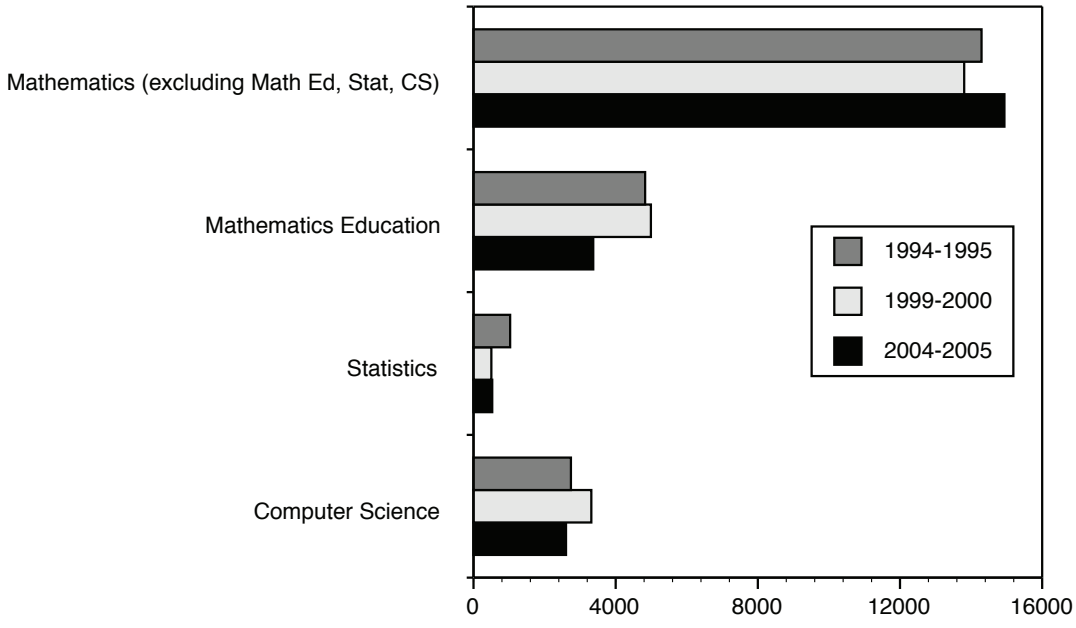

FIGURE S.4.2 Number of bachelors degrees awarded by mathematics and statistics departments (combined) at four-year colleges and universities between July 1 and June 30 in 1994-95, 1999-2000, and 2004-2005.

mathematics majors. Furthermore, CBMS estimates of mathematics majors include Mathematics Education majors so long as they receive their degrees through a mathematics or statistics department, and that is not necessarily the case in IPEDS reports. Finally, CBMS estimates of mathematical sciences majors include several thousands of computer science majors who received their bachelors degrees through mathematics departments, and these students would be reported in IPEDS data under a disciplinary code not included in the Mathematics and Statistics category used by NCES.

Who teaches undergraduates in mathematics and statistics departments? (Tables S.5 through S.10)

CBMS2005 Tables S.5 through S.10 study the kinds of instructors assigned to teach undergraduate mathematical science courses in two- and four-year colleges and universities. Faculty in four-year colleges and universities are broken into four broad categories: tenured and tenure-eligible (TTE) faculty, other full-time faculty who are not TTE (called OFT faculty), part-time faculty, and graduate teaching assistants (GTAs). For two-year colleges, which typically do not have a tenure-track system, CBMS2005 tables distinguish between courses taught by full-time faculty and part-time faculty.

The faculty categories used to study four-year college and university mathematics and statistics departments are self-explanatory, except the GTA category. Instructions in the CBMS questionnaires were very specific about GTA-taught courses; a course was to be reported as taught by a GTA if and only if the GTA was completely in charge of the course (i.e., was the "instructor of record" for the course). GTAs who ran discussion or recitation sections as part of a lecture/recitation course were not included in this special category.

The faculty-classification system described above for four-year colleges and universities is complicated by the fact that some colleges and universities do not recognize tenure. However, such schools typically distinguish between permanent and temporary full-time faculty. Departments in such schools were asked to report courses taught by permanent faculty in the column labeled TTE, while courses taught by temporary full-time faculty were to be reported as taught by OFT faculty. In addition, CBMS2005 found that the number of four-year college and university departments that do not recognize tenure was small; CBMS2005 projects that in fall 2005, only 5% of the nation's mathematics departments belonged to colleges and universities that did not recognize tenure. If departments are classified by the highest degree that they offer in the mathematical sciences, then CBMS2005 found that in fall 2005, 100% of the nation's doctorate- or masters-granting mathematics departments belonged to tenure-granting colleges or universities, as did 93% of all bachelors-granting departments. Among masters- and doctoral-level statistics departments, all belonged to tenure-granting universities.

Readers must take special precautions when comparing the findings of CBMS2000 and CBMS2005 because CBMS2000 sometimes presented its findings in terms of percentages of enrollment and sometimes in terms of percentages of sections offered. For statistical reasons, CBMS2005 presented most of its results in terms of percentage of sections offered.

Table S.5 presents a macroscopic view of faculty who taught undergraduate courses in the mathematics and statistics departments of four-year colleges and universities and in mathematics programs at two-year colleges in the fall of 2005. Less than half of mathematics sections in four-year colleges and universities were taught by tenured and tenure-eligible (TTE) faculty, and the same was true of statistics courses taught in statistics departments. If TTE and OFT faculty are combined, CBMS2005 shows that about 70% of all sections in mathematics and statistics departments were taught by full-time faculty in fall 2005. In mathematics programs of two-year colleges (which typically do not have tenure-track systems), 56% of sections were taught by full-time faculty.

No single table in CBMS2000 compares directly with CBMS2005 Table S.6. The historical data in Table S.6 present percentages of sections taught by various types of instructors and were derived from Tables E.12 to E.18 in Chapter 3 of the CBMS2000 report. Tables S.7 through S.10 contain some comparisons with data from the Chapter 1 tables (coded "SFY") in CBMS1995 and CBMS2000, and we ask the reader to notice that the historical data concern percentages of *enrollments*, while data from CBMS2005 involve percentages of *sections taught*.

CBMS2000 and independent American Mathematical Society surveys detected a trend toward using fewer tenured and tenure-eligible (TTE) faculty and markedly greater reliance on other full-time (OFT) faculty in teaching undergraduates between fall 1995 and fall 2000 [LM]. CBMS2005 found a continued decline in the percentage of TTE faculty teaching undergraduate mathematics courses between fall 2000 and fall 2005. The decrease in TTE-taught sections was most noticeable among pre-college-level courses, which were called "remedial courses" in previous CBMS studies.

CBMS2005 Table S.6 suggests that the percentage of sections in mathematics departments that were taught by part-time faculty in fall 2005 was not much different than in fall 2000. The same was true for two-year colleges. This is consistent with national data across all disciplines, but contrasts with data from Table S.14 of this report showing that the percentage

of part-time faculty among all faculty in four-year mathematics and statistics departments declined between fall 2000 and fall 2005. See the discussion associated with S.14 for further details.

Table S.6 presents a new feature of CBMS2005—a study of those who taught upper-level mathematics courses. Previous CBMS surveys had made the assumption that essentially all upper-division courses were taught by TTE faculty, and once upon a time that may have been true. Anecdotal evidence suggested that such an assumption was problematic today, and to test that hypothesis CBMS2005 asked departments how many of their upper-division sections were taught by TTE faculty. In mathematics departments, CBMS2005 found that the percentage was 84% in fall 2005. The remaining 16% of sections—whose instructors might have been visiting scholars, postdocs, etc.—are listed as having unknown instructors.

It is perhaps interesting to note that between fall 2000 and fall 2005, the nation's mathematics departments actually increased the percentage of sections of statistics and of computer science that were taught by TTE faculty, at the same time they were decreasing the percentage of mathematics sections taught by TTE faculty.

In the nation's statistics departments, the percentage of sections taught by TTE faculty seemed to decrease slightly in elementary-level courses. Teaching by part-time faculty apparently fell by about a third between fall 2000 and fall 2005, as did teaching by GTAs. This appears to have been offset by a substantial increase in teaching by OFT faculty. These conclusions are somewhat tentative because data from statistics departments did not identify the type of instructors who taught 21% of statistics departments' elementary-level sections. Among upper-level sections in statistics departments, 74% were taught by TTE faculty, with the remaining 26% listed as taught by unknown instructors.

As noted above (see also Chapter 7), few two-year colleges have a tenure system, so CBMS2005 (and its predecessors) asked two-year college departments

TABLE S.5 Percentage of sections (excluding distance-learning sections) in various types of courses taught by different types of instructors in mathematics and statistics departments of four-year colleges and universities, and percentage of sections taught by full-time and part-time faculty in mathematics programs of public two-year colleges, in fall 2005. Also total enrollments (in 1000s), excluding distance-learning enrollments.

	Percentage of sections taught by					
Four-Year College & University	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Departments						
Mathematics courses 2005	46	21	20	8	5	1588
Statistics courses 2005	52	24	19	2	2	179
Computer Science courses 2005	70	11	11	0	7	56
All mathematics department courses 2005	48	21	19	7	5	1825
Statistics Departments						
All statistics department courses 2005	47	23	7	11	13	79
Two-Year College Mathematics Programs	Full-time		Part-time			Enrollment in 1000s
All TYC mathematics program courses 2005	56	--	44	--	--	1616

Note: zero means less than one-half of one percent.

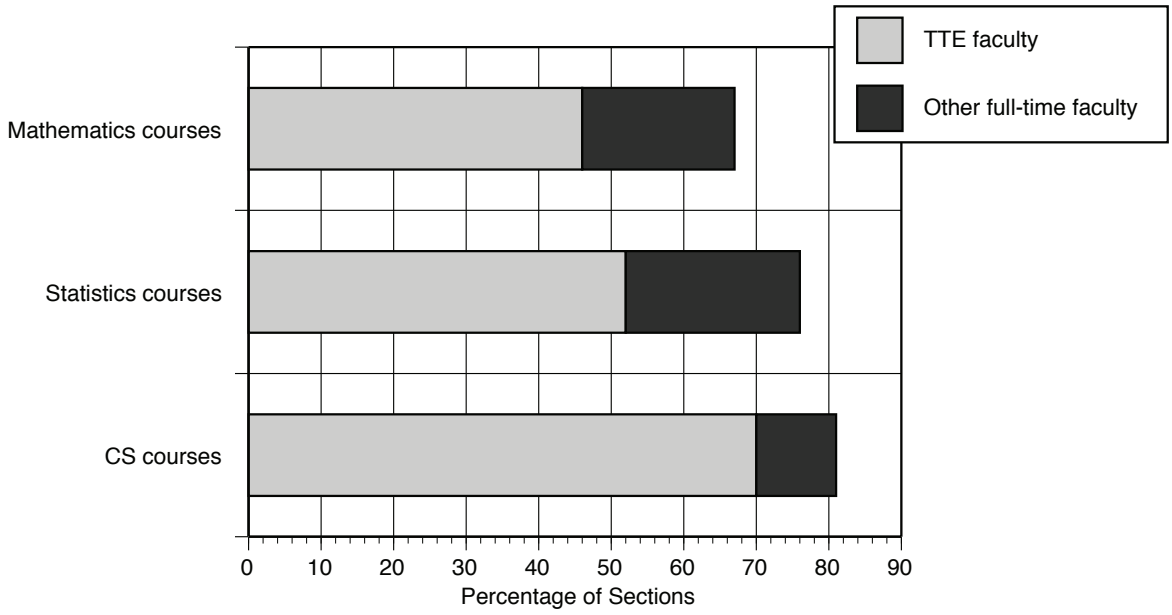

FIGURE S.5.1 Percentage of sections in four-year college and university mathematics departments taught by tenured/tenure-eligible (TTE) faculty and by other full-time (OFT) faculty in fall 2005, by type of course. Deficits from 100% represent courses taught by part-time faculty, graduate teaching assistants, and unknown faculty.

to report the number of sections of each course that were taught by full-time faculty. CBMS2005 found that in fall 2005, 56% of sections in the mathematics programs of two-year colleges were taught by full-time faculty, up two points from fall 2000.

Among first-year courses, calculus courses have long been of particular importance to mathematics departments, as well as to the client departments for which mathematics is a prerequisite (e.g., the sciences and engineering). Consequently, CBMS surveys pay special attention to calculus courses. Tables S.7 and S.8 present data on two types of calculus courses, traditionally called "mainstream" and "non-mainstream". The term "mainstream calculus" refers to courses that serve as prerequisites for upper-division mathematics courses and as prerequisites for physical science and engineering courses, while other calculus courses (often with names such as "Calculus for Business and Social Sciences" and "Calculus for the Life Sciences") are lumped together as "non-mainstream". Fall 2005 enrollments in Mainstream Calculus I were roughly double the fall 2005 enrollments in Non-mainstream Calculus I.

TABLE S.6 Percentage of fall 2005 sections (excluding distance-learning sections) in courses of various types taught in mathematics and statistics departments of colleges and universities by various types of instructors, and percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2005, with data from fall 2000 from CBMS2000 tables E12 to E18. Also total enrollments (in 1000s).

	Percentage of sections taught by					
Four-Year Colleges & Universities	Tenured/ tenure-eligible %	Other full- time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Department courses						
Mathematics courses						
Precollege level 2005	9	25	46	14	5	199
Precollege level 2000	20	18	43	10	10	219
Introductory level 2005	31	25	28	10	6	695
Introductory level 2000	35	21	28	10	6	723
Calculus level 2005	61	17	9	7	6	583
Calculus level 2000	64	14	10	6	5	570
Upper level 2005	84*				16*	112
Statistics courses						
Elementary level 2005	49	16	28	3	3	145
Elementary level 2000	47	16	24	5	8	136
Upper level 2005 sections	59*				41*	34
Computer Science courses						
Lower level 2005	63	12	17	1	8	43
Lower level 2000	42	19	28	0	11	90
Statistics Department Courses						
Elementary level 2005	25	21	13	20	21	53
Elementary level 2000	27	14	20	29	10	54
Upper level 2005	74*				26*	23
Two-Year College Mathematics Programs	Full-time		Part-time			
All 2005 sections	56		44			1739
All 2000 sections	54		46			1347

* CBMS2005 asked departments to specify the number of upper division sections and the number taught by tenured and tenure-eligible faculty. The deficit from 100% is reported as "unknown".

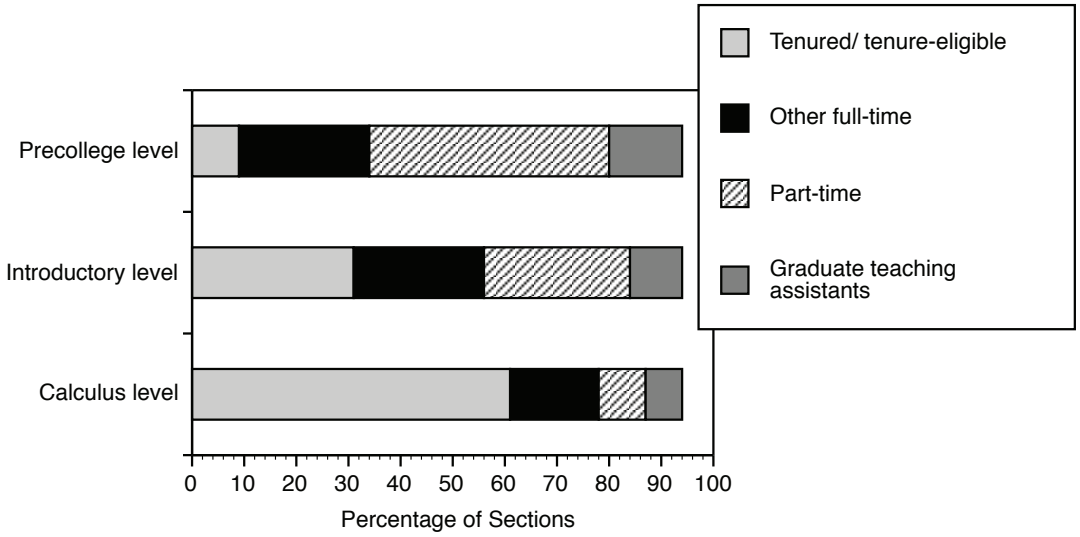

FIGURE S.6.1 Percentage of sections in lower-division undergraduate mathematics courses in mathematics departments at four-year colleges and universities by level of course and type of instructor in fall 2005. Deficits from 100% represent unknown instructors.

There are three major ways that mathematics departments organize their calculus teaching. The first, found primarily in larger universities, is based on the large lecture/small recitation model in which a large group of students meets with a faculty lecturer several times per week, and is broken into smaller recitation, discussion, problem, or laboratory sessions that typically meet just once per week, often with a graduate student. The second and third methods (called "regular sections" by CBMS studies) involve all enrolled students meeting in a single group throughout the week. Among these regular sections, CBMS2005 distinguished between sections of size thirty or less, and sections of size more than thirty. (The number thirty was chosen because it is the recommended maximum section size for mathematics courses in [MAA Guidelines].) Previous CBMS studies found that different types of faculty are typically used to teach the three different course models.

Tenure-track faculty (i.e., tenured and tenure-eligible faculty) taught almost two-thirds of Mainstream Calculus I sections in fall 2005, and only about a third of Non-mainstream Calculus I courses. Combining the TTE and OFT faculty categories shows that about 80% of Mainstream Calculus I sections were taught by full-time faculty, marginally higher than the percentage of enrollment taught by TTE faculty in fall 2000. (Recall the caveat about comparing CBMS2000 percentages, which are percentages of enrollments, with CBMS2005 percentages, which are percentages of sections taught.) Table S.9 shows an example of the different staffing patterns used to teach different types of sections. The differences are best understood in terms of the highest degree offered by the mathematics department, as can be seen in the tables in Chapter 5.

For Non-mainstream Calculus I, the percentages of sections taught by TTE faculty were substantially lower than for Mainstream Calculus I, and the percentage of

TABLE S.7 Percentage of fall 2005 sections in Mainstream Calculus I and II (not including distance-learning sections) taught by various kinds of instructors in mathematics departments at four-year colleges and universities by size of sections with historical data showing fall 2000 percentage of enrollments. Percentage of sections taught by full-time and part-time faculty in mathematics programs at two-year colleges in fall 2000 and 2005. Also total enrollments (in 1000s) and average section sizes. (Two-year college data for 2005 include only public two-year colleges.)

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Mainstream Calculus I							
Large lecture/recitation	52	27	9	5	7	80	46
Regular section <31	77	10	5	5	3	63	22
Regular section >30	49	17	10	16	8	58	36
Course total 2005	**63**	**17**	**7**	**8**	**5**	**201**	**32**
Course total 2000 (% of enrollment)	60	18	11	7	4	190	32
Mainstream Calculus II							
Large lecture/recitation	58	24	5	5	8	36	50
Regular section <31	80	8	3	7	2	25	22
Regular section >30	51	19	11	11	7	24	36
Course total 2005	**66**	**15**	**6**	**8**	**5**	**85**	**33**
Course total 2000 (% of enrollment)	66	13	10	7	4	87	32
Total Mnstrm Calculus I & II 2005	**64**	**16**	**7**	**8**	**5**	**286**	**32**
Total Mnstrm Calculus I & II 2000 (% of enrollment)	62	16	11	7	4	277	32

	Percentage of sections taught by			
Two-Year Colleges	Full-time %	Part-time %	Enrollment in 1000s	Average section size
Mainstream Calculus I 2005	**88**	**12**	**49**	**22**
Mainstream Calculus I 2000	84	16	53	23
Mainstream Calculus II 2005	**87**	**13**	**19**	**18**
Mainstream Calculus II 2000	87	13	20	20
Total Mnstrm Calculus I & II 2005	**87**	**13**	**68**	**21**
Total Mnstrm Calculus I & II 2000	85	15	73	22

Non-mainstream Calculus I sections taught by full-time faculty (TTE and OFT) was seven percentage points lower than the percentage of enrollment taught by those same faculty in fall 2000. However, such comparisons between percentage of sections and percentage of enrollment may be problematic.

A similar pattern held in two-year colleges, where 88% of Mainstream Calculus I sections were taught by full-time faculty (up slightly from fall 2000) compared to 73% of Non-mainstream Calculus I sections (down slightly from fall 2000).

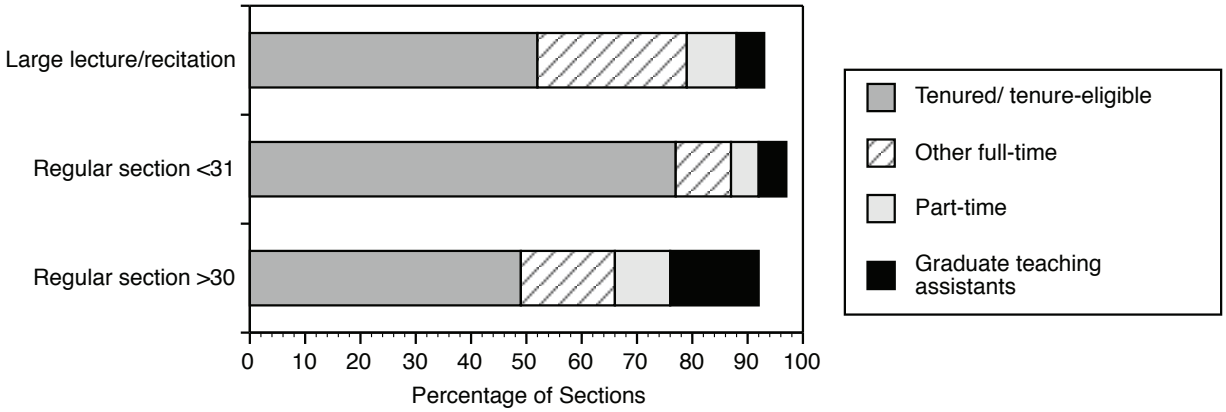

FIGURE S.7.1 Percentage of sections in Mainstream Calculus I taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2005. Deficits from 100% represent unknown instructors.

Table S.8 lists the percentage of unknown instructors in large lecture sections of Non-mainstream Calculus I as being 30%. An unknown percentage of 30% makes it impossible to draw any conclusions from the first row of Table S.8.

Between 1995 and 2005, a first-year course of growing importance in the mathematical sciences curriculum was Elementary Statistics (where the word "elementary" means "no Calculus prerequisite"). Table S.9 describes the situation in mathematics depart-

TABLE S.8 Percentage of sections in Non-Mainstream Calculus I and II taught by tenured/tenure-eligible faculty, postdoctoral and other full-time faculty, part-time faculty, graduate teaching assistants, and unknown in mathematics departments at four-year colleges and universities by size of sections, and percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2005. Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included. (For four-year colleges and universities, data in parentheses show percentage of enrollments in 1995, 2000.)

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Non-Mainstream Calculus I							
Large lecture/recitation	19	33	9	9	30	28	64
Regular section <31	40	18	20	14	8	30	23
Regular section >30	36	24	26	13	2	50	44
Course total 2005 % of sections	35	23	21	13	9	108	37
Course total (1995,2000) % of enrollment	(57,44)	(10,21)	(18,19)	(15,12)	(--,4)	(97, 105)	(39,40)
Non-Mainstream Calculus II							
Course total 2005 % of sections	33	26	23	17	1	10	46
Course total (1995,2000) % of enrollment	(44,53)	(11,10)	(18,22)	(26,15)	(--,1)	(14,10)	(35,40)
Total Non-Mnstrm Calculus I & II 2005 % of Sections	35	23	21	13	8	118	38
Total Non-Mnstrm Calculus I & II (1995,2000) % of enrollment	(55,44)	(10,20)	(18,19)	(16,12)	(--,5)	(111, 115)	(38, 40)

Two-Year Colleges	Percentage of sections taught by Full-time	Part-time		
Non-Mainstream Calculus I 2005 % of sections	73	27	20	23
Non-Mainstream Calculus I (1995,2000) % of sections	(77,74)	(23,26)	(26,16)	(26,22)
Non-Mainstream Calculus II 2005 % of sections	66	34	1	21
Non-Mainstream Calculus II (1995,2000) % of sections	(63,92)	(37,8)	(1,1)	(19,20)
Total Non-Mnstrm Calculus I & II 2005 % of sections	72	28	21	23
Total Non-Mnstrm Calculus I & II (1995,2000) % of sections	(76,76)	(24,24)	(27,17)	(26,22)

TABLE S.9 Percentage of sections in Elementary Statistics (no Calculus prerequisite) and Probability and Statistics (no Calculus prerequisite) taught by various types of instructors in mathematics departments at four-year colleges and universities by size of sections, and percentage of sections in Elementary Statistics (with or without Probability) taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2005. Also total enrollments (in 1000s) and average section sizes. Distance-learning enrollments are not included. (For four-year colleges and universities, data from 1995, 2000 show percentage of enrollments.)

	Percentage of sections taught by						
Mathematics Departments	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Elementary Statistics (no calculus prerequisite)							
Large lecture/recitation	30	27	34	2	7	12	32
Regular section <31	56	12	28	2	2	54	24
Regular section >30	49	18	22	6	5	56	40
Course total 2005	**51**	**16**	**27**	**3**	**4**	**122**	**31**
% of sections							
Course total (1995,2000)	(65,45)	(7,13)	(19,24)	(8,7)	(--,11)	(97, 114)	(33,42)
% of enrollment							
Probability & Statistics (no calculus prerequisite)							
Course total 2005	**29**	**24**	**44**	**1**	**2**	**18**	**30**
% of sections							
Course total (1995,2000)	(61,50)	(6,28)	(15,23)	(19,0)	(--,0)	(18,13)	(31,25)
% of enrollment							
Total All Elem.Probability & Statistics courses 2005	**48**	**17**	**29**	**3**	**3**	**140**	**31**
% of sections							
Two course total (1995,2000)	(64,46)	(7,14)	(18,24)	(10,6)	(na,10)	(115, 127)	(33,25)
% of enrollment							

Two-Year Colleges	Percentage of sections taught by Full-time	Part-time	Enrollment in 1000s	Average section size
Elementary Statistics (with or without probability)	**65**	**35**	**101**	**26**
Course total (1995,2000)	(69,66)	(31,34)	(69,71)	(28,25)

Note: 0 means less than one half of 1%.

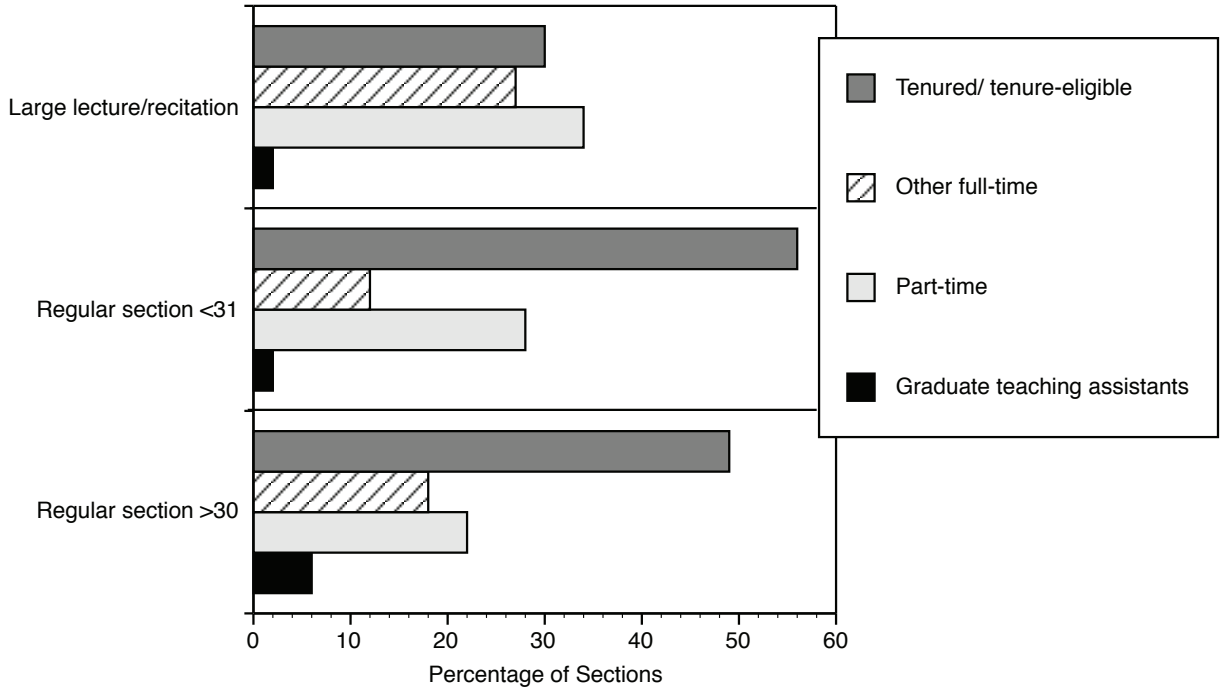

FIGURE S.9.1 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2005.

ments of two- and four-year colleges and universities, while Table S.10 describes the situation in separate statistics departments. These two tables suggest that mathematics departments (which taught the vast majority of the nation's Elementary Statistics courses in fall 2005) devoted a much higher percentage of full-time faculty resources to the course than did statistics departments. In addition, the percentage of Elementary Statistics sections taught by TTE faculty (and by the combination of TTE and OFT faculty) in mathematics departments lies about midway between the corresponding percentages for Mainstream and Non-mainstream Calculus I sections. Also note that the average section size in Elementary Statistics courses taught in statistics departments increased between fall 2000 and fall 2005.

TABLE S.10 Percentage of sections in Elementary Statistics (no Calculus prerequisite) and Probability and Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown in statistics departments at four-year colleges and universities by size of sections in fall 2005. Also total enrollments (in 1000s) and average section sizes. Distance enrollments are not included. (Data from 1995,2000 show percentage of enrollments.)

	Percentage of sections taught by						
Statistics Departments	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Elementary Statistics (no calculus prerequisite)							
Large lecture/recitation	19	27	16	17	21	28	82
Regular section <31	33	18	7	23	20	1	12
Regular section >30	33	14	18	30	5	13	50
Course total 2005 % of sections	**26**	**21**	**16**	**22**	**15**	**42**	**63**
Course total (1995,2000) % of enrollment	(47,36)	(15,17)	(10,22)	(29,19)	(--,6)	(35,40)	(51,65)
Probability & Statistics (no calculus prerequisite)							
Course total 2005 % of sections	**34**	**38**	**0**	**16**	**13**	**2**	**68**
Course total (1995,2000) % of enrollment	(32,18)	(4,12)	(2,13)	(61,32)	(--,25)	(8,4)	(48,55)
Total Elem. Probability & Statistics courses 2005 % of sections	26	22	15	22	15	44	64
Two course total (1995,2000) % of enrollment	(44,34)	(13,17)	(9,21)	(35,21)	(--,7)	(43,44)	(50,58)

Note: 0 means less than one half of 1%.

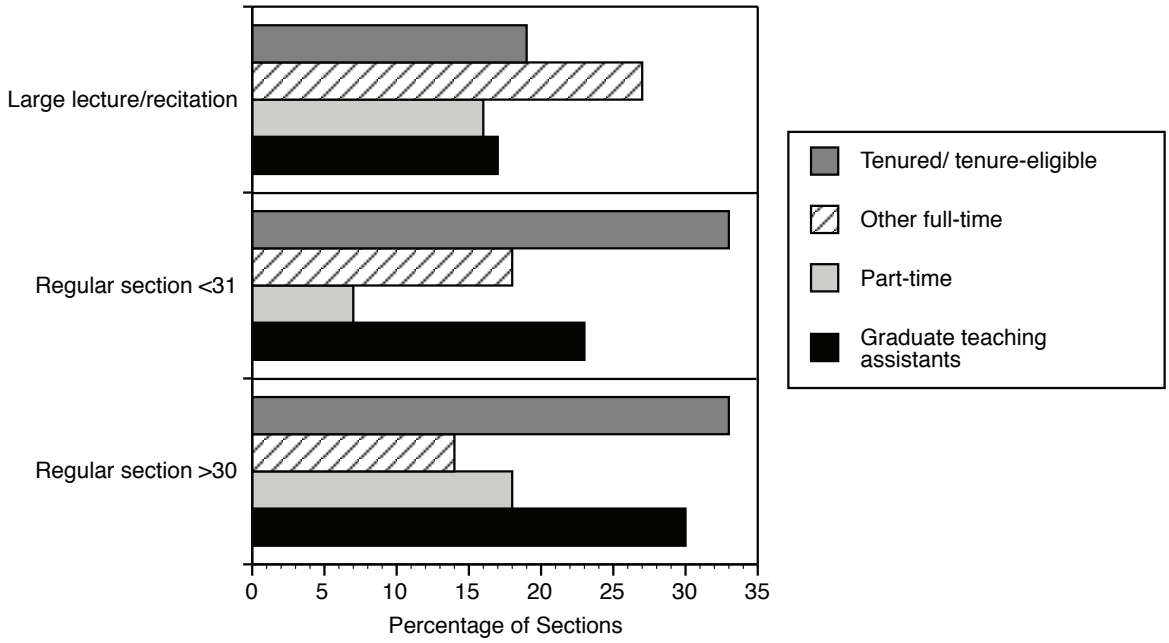

FIGURE S.10.1 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible faculty, other full-time faculty, part-time faculty, and graduate teaching assistants in statistics departments at four-year colleges and universities by size of sections in fall 2005.

How are first-year courses taught? (Tables S.11, S.12, and S.13)

The calculus-reform movement of the early 1990s stressed changes in how mathematics courses should be taught, as well as changes in their content. Starting in 1995, CBMS surveys tracked the spread of two broad families of pedagogical methods used to help students learn in their first-year courses. One family of techniques was technology-based, including the use of graphing calculators, computers, and computer assignments. The second family was sometimes described as "humanistic methods" and included the use of group projects and writing assignments. Tables S.11, S.12, and S.13 summarize the findings of CBMS2005 concerning use of these pedagogical methods in the nation's first-year courses in fall 2005. See the tables in Chapter 5 for more details, including presentation of this data based on the highest degree offered by the mathematics or statistics department that taught the course.

Tables S.11 and S.12 show that in four-year mathematics departments nationally, graphing calculators and computer assignments are widely (but far from universally) used in Mainstream Calculus courses, while the use of writing assignments almost never exceeded the fifteen percent level and the use of group projects was even lower. Calculator use in Non-mainstream Calculus I was somewhat higher than in Mainstream Calculus I, while the use of the other pedagogical methods in Non-mainstream Calculus I was in the single digits.

In both types of Calculus I courses, the percentage of two-year college sections that used any one of the four pedagogical techniques mentioned above exceeded the corresponding percentage for four-year mathematics departments.

CBMS2005 asked departments about the use of a new teaching tool in their first-year classes, namely the use of online homework and testing software that was offered by many textbook publishers (and others) in fall 2005. The two-year questionnaire described these online systems as using "commercial or locally produced online-response homework and testing systems", and the questionnaires sent to four-year mathematics and statistics departments described them as "online homework generating and grading packages." The results were somewhat surprising, given the apparent level of resources invested in such systems by textbook publishers. In almost every type of course, utilization percentages for such online resource systems were in the single digits. Of course, those percentages represent departmental responses, and perhaps students' voluntary use of the systems is higher.

Table S.13 investigates the use of the same five pedagogical tools in Elementary Statistics courses and reveals some marked differences between different types of departments. The percentage of sections of Elementary Statistics that used graphing calculators

ranged from 73% in two-year colleges, to 36% in four-year mathematics departments, to only about 5% in statistics departments. The use of computer assignments in Elementary Statistics courses varied over a much smaller range, from 45% in two-year colleges to 58% in statistics departments, and Table S.13 suggests that almost 40% of Elementary Statistics sections taught in statistics departments use neither

TABLE S.11 Percentage of sections in Mainstream Calculus I and II taught using various reform methods in mathematics departments of four-year colleges and universities by size of sections, and percentage of sections taught using various reform methods in public two-year college mathematics programs in fall 2005 (For four-year colleges and universities, figures in parentheses show percentages of enrollments from 1995 and 2000.) Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included.

	Percentage of sections taught using						
Four-Year Colleges & Universities	Graphing calculators %	Writing assignments %	Computer assignments %	On-line resource systems %	Group projects %	Enrollment in 1000s	Average section size
Mainstream Calculus I (Section %)							
Large lecture/recitation	48	13	24	6	12	80	46
Regular section <31	58	16	20	2	7	63	22
Regular section >30	43	10	20	6	13	58	35
Course total (section %)	**51**	**13**	**21**	**4**	**10**	**201**	**32**
(1995,2000) enrollment %	(37,51)	(22,27)	(18,31)	na	(23,19)	(192, 190)	(33,32)
Mainstream Calculus II (Section %)							
Large lecture/recitation	38	9	20	4	7	36	50
Regular section <31	47	13	24	2	5	25	21
Regular section >30	42	5	18	5	5	24	36
Course total (section %)	**43**	**9**	**21**	**3**	**6**	**85**	**33**
(1995,2000) enrollment %	(29, 48)	(24,18)	(17,27)	na	(20, 15)	(83,87)	(30,32)
Total Mnstrm Calculus I & II (Section %)	**49**	**12**	**21**	**4**	**9**	**285**	**32**
(1995, 2000) enrollment %	(35, 50)	(23, 24)	(18, 30)	na	(22,18)	(275, 277)	(32, 32)
Two-Year Colleges							
Mainstream Calculus I (Section %)	**79**	**19**	**20**	**5**	**19**	**49**	**22**
(1995, 2000) section %	(65, 78)	(20, 31)	(23, 35)	na	(22, 27)	(58,53)	(25,23)
Mainstream Calculus II (Section %)	**81**	**18**	**30**	**7**	**25**	**19**	**18**
(1995,2000) section %	(63, 74)	(13, 25)	(16, 37)	na	(18, 25)	(23,20)	(23,20)
Total Mainstream Calculus I & II (Section %)	**80**	**18**	**23**	**5**	**21**	**68**	**21**
(1995, 2000) section %	(65, 76)	(18, 28)	(24, 35)	na	(22, 27)	(81,73)	(24,22)

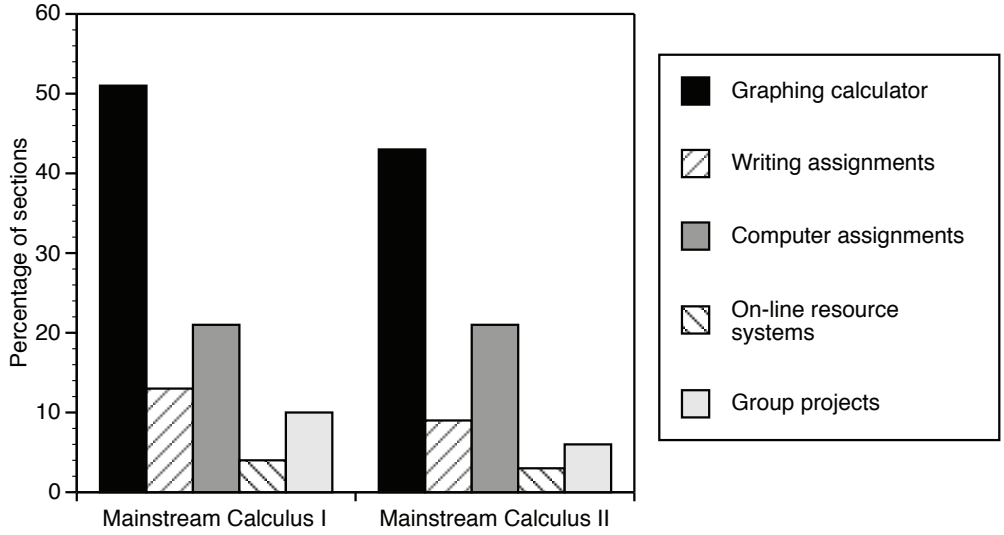

FIGURE S.11.1 Percentage of sections of Mainstream Calculus I and Mainstream Calculus II taught using various reform methods in mathematics departments at four-year colleges and universities in fall 2005.

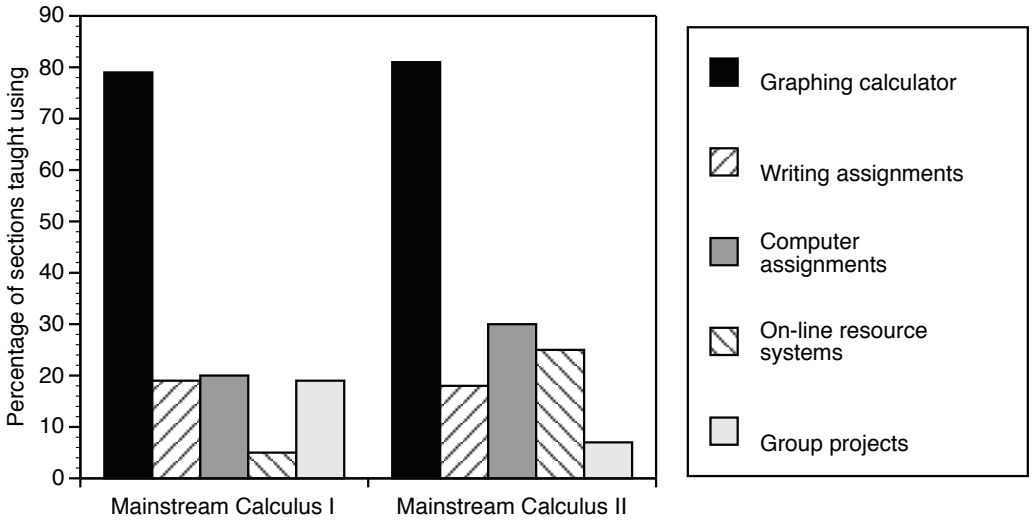

FIGURE S.11.2 Percentage of sections in Mainstream Calculus I and Mainstream Calculus II taught using various reform methods in mathematics programs at public two-year colleges in fall 2005.

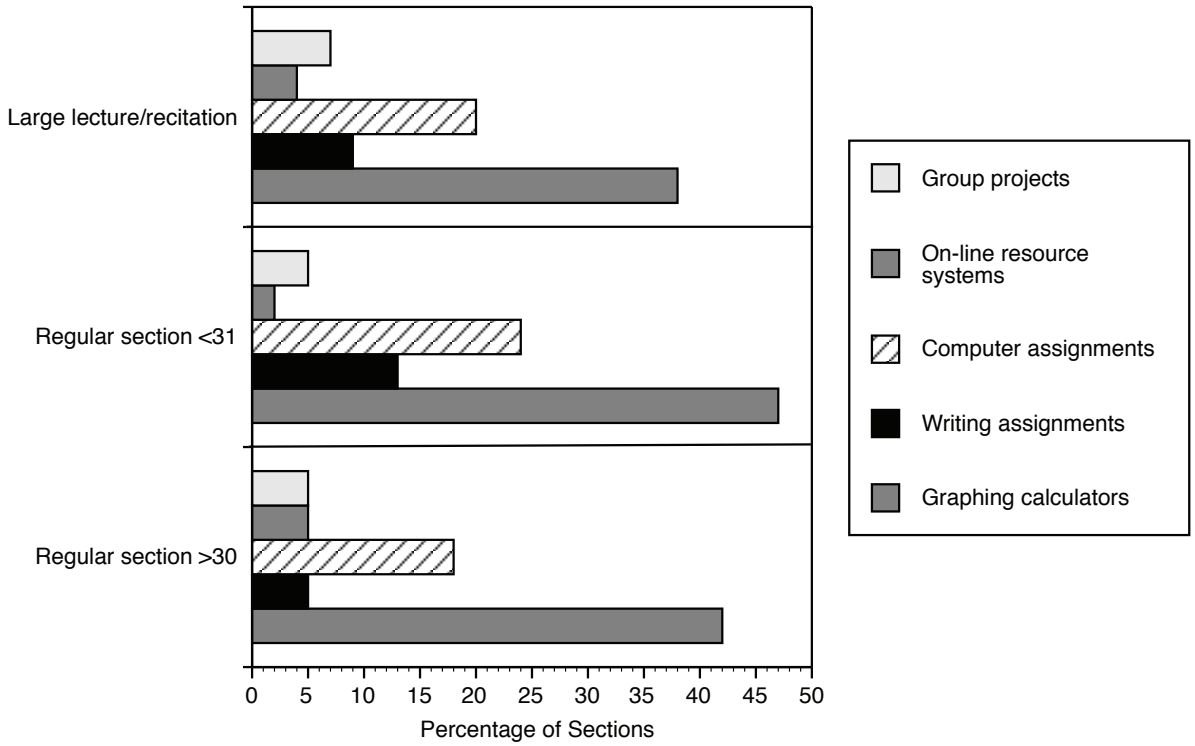

FIGURE S.11.3 Percentage of sections in Mainstream Calculus II taught using various reform methods in mathematics departments at four-year colleges and universities by size of sections in fall 2005.

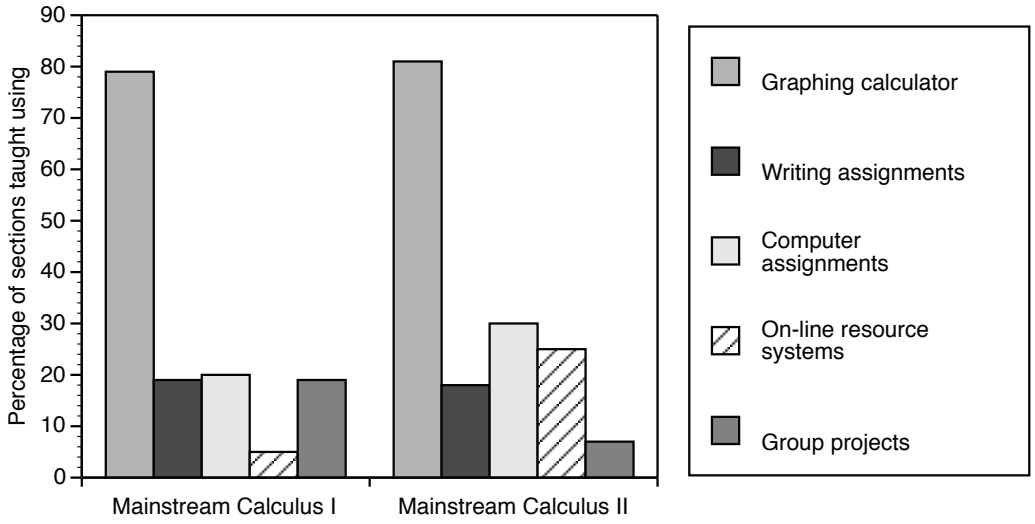

FIGURE S.11.4 Percentage of sections in Mainstream Calculus I and Mainstream Calculus II taught using various reform methods in mathematics programs at public two-year colleges in fall 2005.

TABLE S.12 Percentage of sections in Non-Mainstream Calculus I taught using various reform methods in mathematics departments at four-year colleges and universities by size of sections, and percentage of sections taught using various reform methods in mathematics programs at public two-year colleges, in fall 2005. Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included. (For four-year colleges and universities, data from 1995 and 2000 show percentage of enrollments.)

	Percentage of sections taught using						
Four-Year Colleges & Universities	Graphing calculators %	Writing assignments %	Computer assignments %	On-line resource systems %	Group projects %	Enrollment in 1000s	Average section size
Non-Mnstream Calculus I							
Large lecture/recitation	60	7	8	7	4	28	64
Regular section <31	63	1	5	4	1	30	23
Regular section >30	37	7	4	5	6	50	44
Course total 2005 % of sections	**53**	**4**	**5**	**5**	**3**	**108**	**37**
(1995,2000) % of enrollment	(26,45)	(7,14)	(6,13)	na	(7,9)	(97, 105)	(39, 40)
Two-Year Colleges							
Non-Mnstream Calculus I 2005 % of sections	**77**	**14**	**9**	**3**	**14**	**20**	**23**
(1995,2000) % of sections	(44,72)	(17,20)	(8,15)	na	(20,20)	(26, 16)	(26,22)

Note: 0 means less than one-half of 1%.

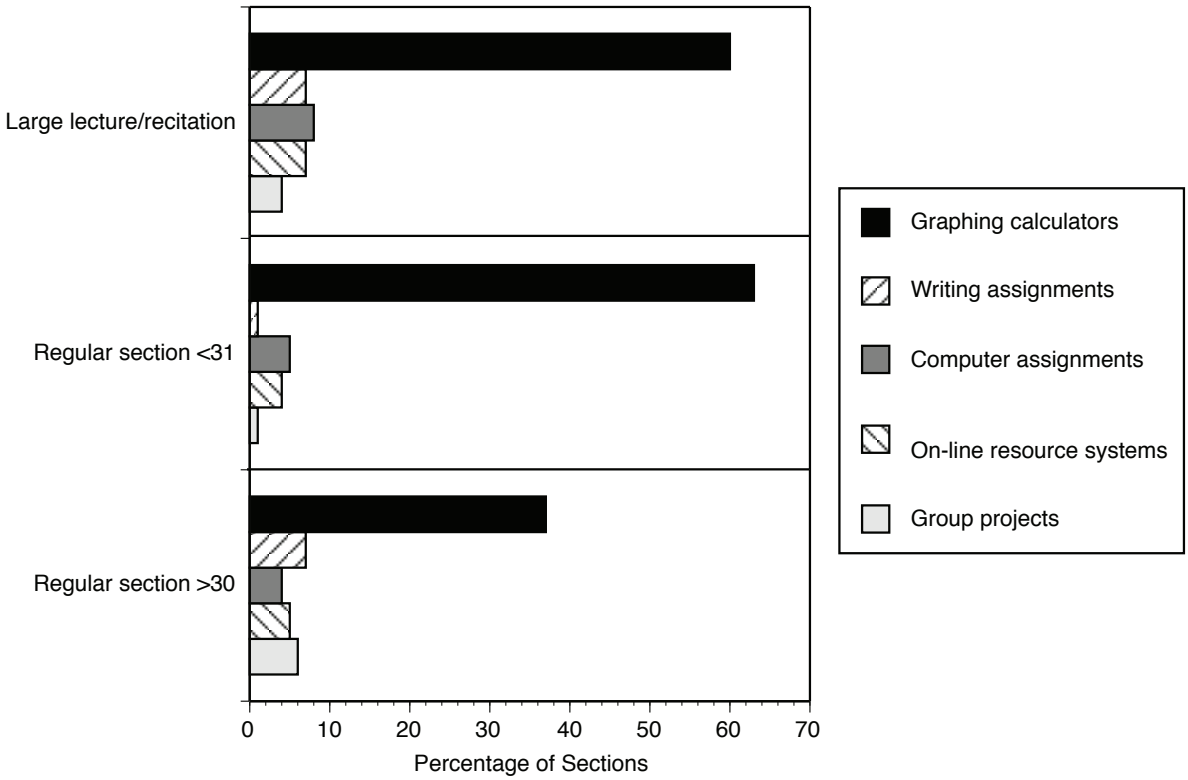

FIGURE S.12.1 Percentage of sections in Non-Mainstream Calculus I taught using various reform methods in mathematics departments at four-year colleges and universities by size of sections in fall 2005.

TABLE S.13 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught using various reform methods in mathematics and statistics departments in four-year colleges and universities, and percentage of sections in mathematics programs at public two-year colleges taught using various reform methods in fall 2005. Also total enrollment (in 1000s) and average section sizes. (Data from 1995,2000 show percentage of enrollments.)

	Percentage of sections taught using						
Elementary Statistics	Graphing calculators %	Writing assignments %	Computer assignments %	On-line resource systems %	Group projects %	Enrollment in 1000s	Average section size
Mathematics Departments							
Large lecture/recitation	42	48	83	0	38	12	32
Regular section <31	30	30	56	4	19	54	24
Regular section >30	44	21	46	2	5	56	40
Course total 2005 % of sections	36	28	55	3	16	122	31
Course total (1995,2000) % of enrollment	(na,47)	(na, 39)	(51,48)	na	(na,22)	(95, 114)	(33,42)
Statistics Departments							
Large lecture/recitation	9	42	59	26	30	28	82
Regular section <31	0	19	85	30	16	1	12
Regular section >30	1	57	52	1	22	13	50
Course total 2005 % of sections	5	46	58	16	26	42	63
Course total (1995,2000) % of enrollment	(na,13)	(na,23)	(59,63)	na	(na,43)	(35,40)	(51,65)
Two-year colleges							
Course total 2005 % of sections	73	44	45	10	24	101	26
Course total (1995,2000) % of sections	(na,59)	(na,50)	(46,46)	na	(na,35)	(69,71)	(28,25)

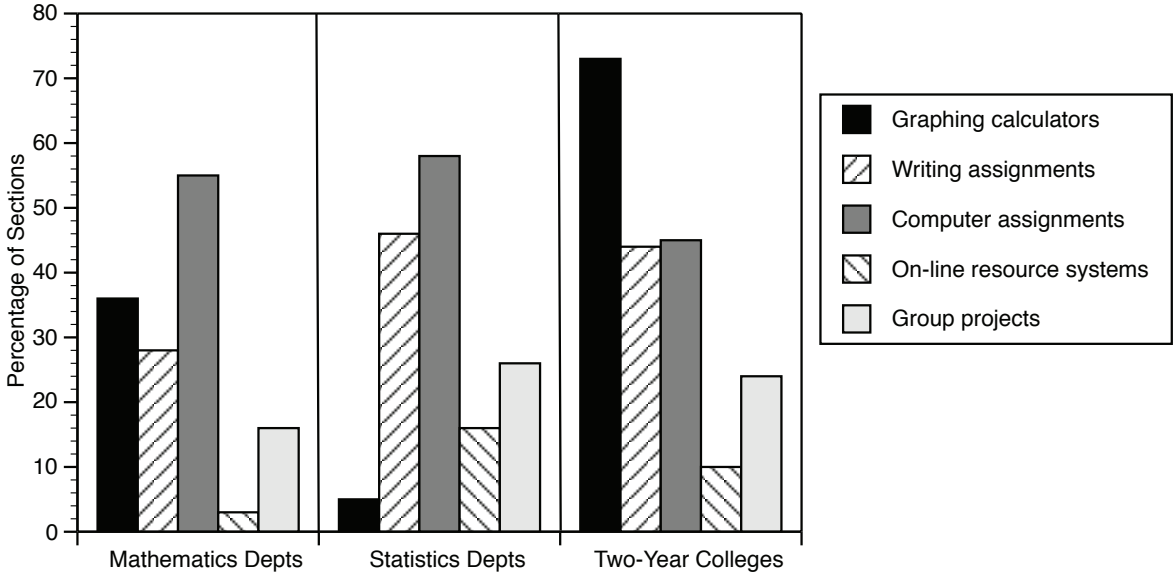

FIGURE S.13.1 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught using various reform methods in four-year colleges and universities and in two-year colleges, in fall 2005.

graphing calculators nor computer technology. Writing assignments were much more widely used in Elementary Statistics courses than in any Calculus course. Group projects, while not used in more than about one in four Elementary Statistics courses, were more widely used in that course than in Calculus. Statistics departments showed more interest in online resource systems than did either four-year mathematics departments or two-year college mathematics programs, with one in six statistics departments using such online resource systems in their Elementary Statistics courses.

Demographics of the Mathematical Sciences Faculty

The remaining tables in this chapter present a snapshot of faculty demographics in mathematics and statistics departments of four-year colleges and universities and in the mathematics programs of two-year colleges during fall 2005. Further details about four-year mathematics and statistics department faculty appear in Chapter 4, while additional information about two-year mathematics program faculty is given in Chapter 7.

Sources of demographic data

Data concerning two-year college mathematics faculty were collected, as in previous CBMS surveys, as part of the two-year-college questionnaire (see Sections D, E, F, and G of the 2005 questionnaire). In contrast, data concerning four-year college and university faculty came from a totally separate survey, conducted by the Joint Data Committee (JDC) of five professional societies (the American Mathematical Society, the American Statistical Association, the Institute of Mathematical Statistics, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics).

Since 1957, the Joint Data Committee (JDC) has carried out annual departmental surveys of four-year mathematics and statistics departments for its own purposes. In fall 2000, department chairs objected strongly to answering almost the same faculty demographics questions on two separate surveys, one for JDC and the other for CBMS2000. Consequently, CBMS2005 and JDC made an agreement to use the JDC survey in fall 2005 as the basis for demographic estimates needed for the CBMS2005 report.

Using the JDC survey to obtain faculty data for CBMS2005 simplified the lives of department chairs but had two important drawbacks in terms of the faculty demographics sections of this report. The first concerned response rates. As can be seen from Appendix II, Part II, the JDC survey had strong response rates from doctoral departments, but response rates from bachelors departments were not as strong, and standard errors for the JDC estimates for bachelors-level departments were sometimes uncomfortably large. The second major drawback of using JDC data for faculty demographics sections of CBMS2005 was that JDC surveys do not include masters-level departments of statistics. Therefore, *the faculty demographic data concerning statistics departments in this chapter and in Chapter 4 describe only doctoral statistics departments, while earlier CBMS reports presented demographic data on both masters*

and doctoral statistics departments. However, the data in Chapters 2, 3, and 5 on enrollments and curricular issues do include both masters and doctoral-level statistics departments.

In an attempt to make sure that historical data on faculty demographics in this report are internally consistent, *historical data on faculty demographics in CBMS2005 are taken from JDC data from previous years, rather than from earlier CBMS reports.* Therefore, historical faculty data in CBMS2005 may appear somewhat different from faculty data published in earlier CBMS reports.

Readers who compare CBMS2005 faculty demographic data on doctoral statistics departments with Joint Data Committee publications will see a difference between CBMS2005 data for doctoral statistics departments and what JDC publications call "Group IV." JDC's Group IV consists of doctoral statistics, biostatistics, and biometrics departments, some of which do not offer any undergraduate programs or courses. To make the faculty demographic data in this report fit into a study of the nation's undergraduate programs, only a subset of Group IV was used. This subset consisted of only those doctoral statistics departments with undergraduate programs, and excluded biometrics and biostatistics departments.

TABLE S.14 Number of full-time and part-time faculty in mathematics departments at four-year colleges and universities, in doctoral statistics departments at universities, and in mathematics programs at two-year colleges in fall 1995, 2000, and 2005. (Two-year college data for 2005 include only public two-year colleges.)

	1995	2000	2005
Four-Year Colleges & Universities			
Mathematics Departments			
Full-time faculty	19572	19779	21885
Part-time faculty	5399	7301	6536
Statistics Departments			
Full-time faculty	840	808	946
Part-time faculty	125	102	112
Two-Year College Mathematics Programs			
Full-time faculty	7742	7921	9403
Part-time faculty [1]	14266	14887	18227

[1] Paid by two-year colleges. In fall 2000, there were an additional 776 part-time faculty in two-year colleges who were paid by a third party (e.g., by a school district, in a dual-enrollment course) and in 2005 the number paid by a third party was 1915.

Note on data sources: Data on four-year mathematics and statistics departments in Table S.14 are taken from annual reports of the Joint Data Committee of AMS/ASA/IMS/MAA/SIAM, published in fall issues of the *Notices of the American Mathematical Society.* Combined data for statistics and biostatistics departments with Ph.D. programs are reported as Group IV data in those reports, and the figures reported in Table S.14 for statistics departments were obtained by removing all departments that do not have undergraduate programs from the Group IV totals.

The number of mathematical sciences faculty members (Table S.14)

Table S.14 shows that between fall 1995 and fall 2005 there were substantial increases in the number of full-time and part-time faculty in four-year mathematics departments. Over the decade there was a 12% increase in the number of full-time faculty in four-year mathematics departments, with almost all of that growth in the last half of the decade. The number of part-time faculty in four-year mathematics departments, which had grown by more than a third between 1995 and 2000, actually declined between fall 2000 and fall 2005 as four-year colleges increased their full-time staff, but part-time numbers still rose by nearly 21% over the decade 1995–2005. For comparison, recall that during the same period, total four-year college and university enrollments grew by 21% (see Table S.1) and enrollments in mathematics and statistics departments increased by about 8% (see Table S.2).

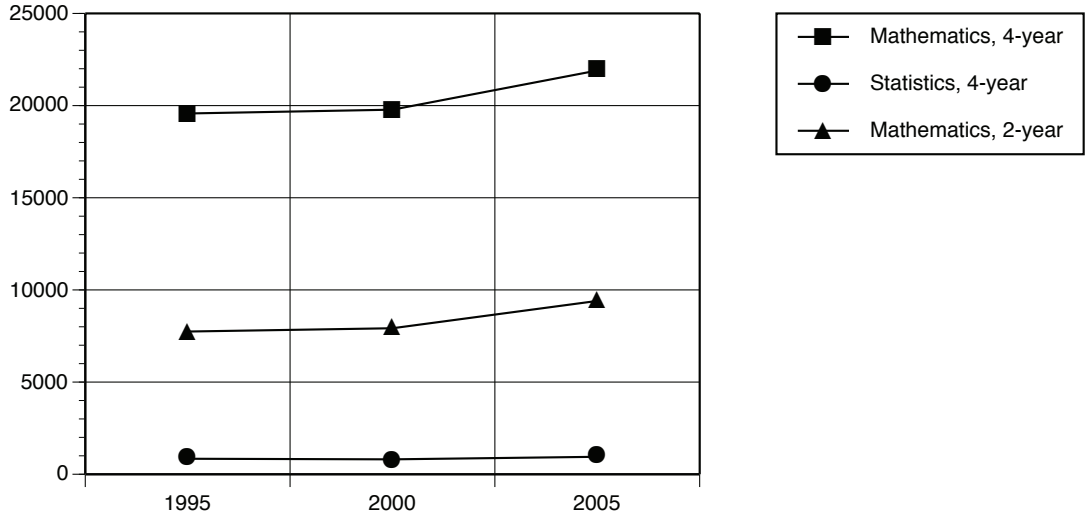

FIGURE S.14.1. Number of full-time faculty in mathematics departments of four-year colleges and universities, in doctoral statistics departments, and in mathematics programs at two-year colleges in fall 1995, 2000, and 2005.

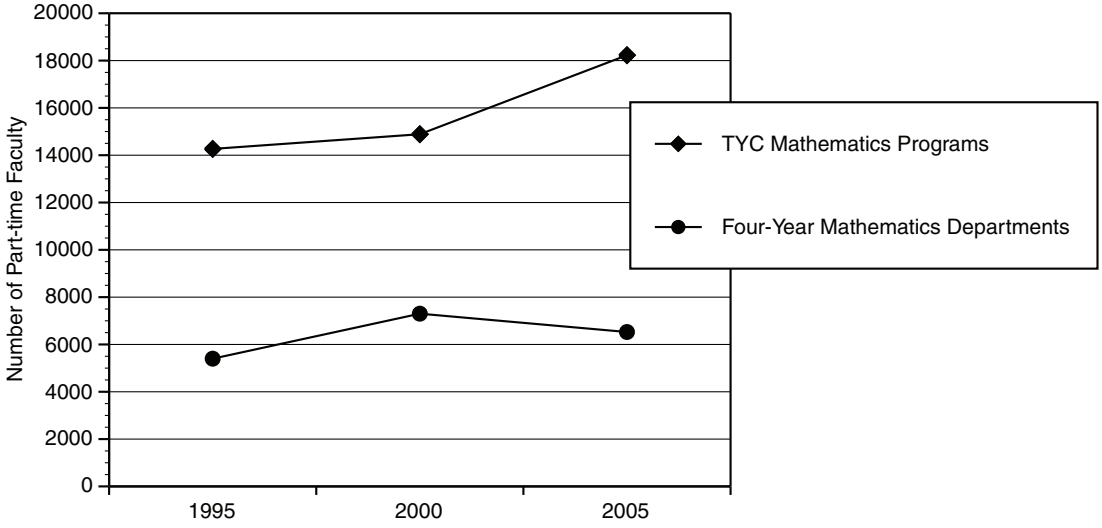

FIGURE S.14.2 Number of part-time faculty in mathematics departments at four-year colleges and universities and in mathematics programs at two-year colleges (TYCs) in fall 1995, 2000, and 2005.

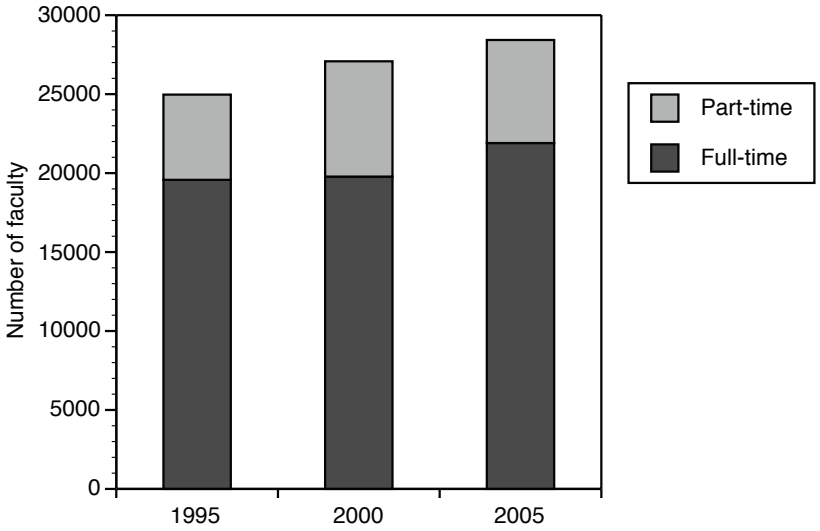

FIGURE S.14.3 Number of full-time and part-time faculty in mathematics departments of four-year colleges and universities in fall 1995, 2000, and 2005.

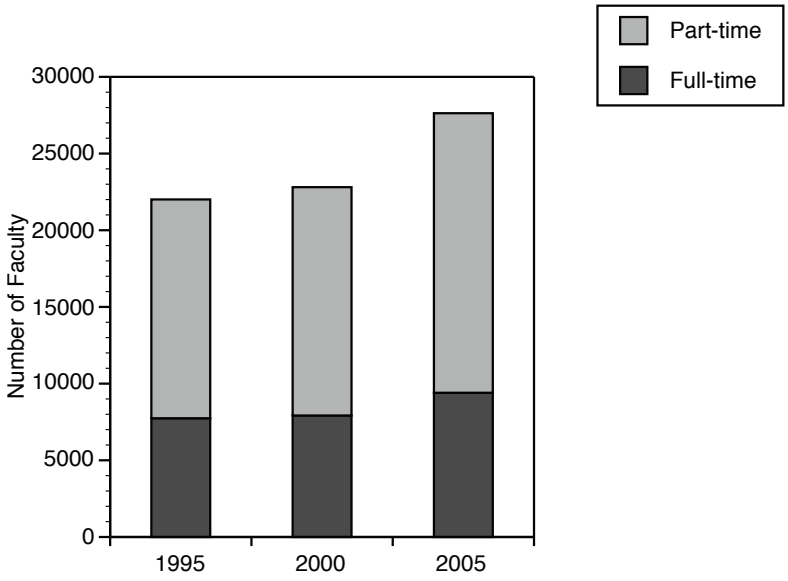

FIGURE S.14.4 Number of full-time and part-time faculty in mathematics programs at two-year colleges in fall 1995, 2000, and 2005.

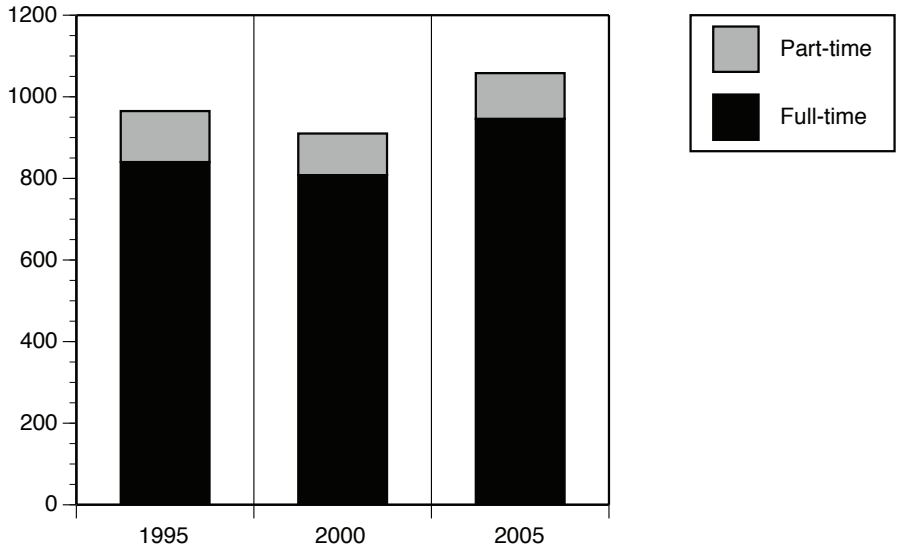

FIGURE S.14.5 Number of full-time and part-time faculty in doctoral statistics departments in fall 1995, 2000, and 2005.

The number of full-time faculty in doctoral statistics departments, which dropped between 1995 and 2000, rebounded substantially between 2000 and 2005, recording a roughly 13% growth during the 1995–2005 decade. The number of part-time faculty in doctoral statistics departments declined by about 10% during that same ten-year period. To compare faculty growth with enrollment growth in doctoral statistics departments, one needs to use Table E.2 of Chapter 3 rather than Table S.2. Table E.2 shows that undergraduate enrollments in doctoral statistics departments stood at 62,000 in fall 1995, and at 62,000 in fall 2005. The ten-year undergraduate enrollment growth in statistics departments that appears in Table S.2 was all in masters-level departments.

Two-year college mathematics programs saw a roughly 21% increase in full-time faculty between 1995 and 2005, an increase that matches the 21% growth in total TYC enrollment and also the 21% mathematics and statistics enrollment growth in TYCs that was mentioned earlier in this chapter.

The roughly 10% decline between fall 2000 and fall 2005 in the number of part-time faculty in four-year mathematics departments stands in contrast to the Table S.6 finding that the percentage of sections taught by part-time faculty in four-year mathematics departments held steady between fall 2000 and fall 2005, suggesting that the typical part-time faculty member in fall 2005 was teaching a larger number of courses than in fall 2000. CBMS2005 does not have data on the average teaching assignment of part-time faculty, but Table 22 of [NCES2] shows that the average part-time faculty member in natural science departments of four-year institutions spent about 6.7 hours per week in the classroom in fall 2003.

Part-time faculty comprised about 23% of all faculty in four-year mathematics departments in fall 2005. Compared with other disciplines, the 23% figure for part-time faculty is not particularly large. Federal data published by NCES in fall 2006 [NCES2] showed that, across all disciplines in four-year institutions, the percentage of part-time faculty among all faculty was about 43% in 2003, a figure that has held steady since at least 1992. Within the natural sciences, the category into which the NCES report places mathematics and statistics, the percentage of part-time faculty among all faculty was 23.5% in 2003.

Appointment type and degree status of the faculty (Tables S.15 and S.16)

The approximately 11% growth (see Table S.14) in the total number of full-time faculty in four-year mathematics departments between fall 2000 and fall 2005 consisted of a roughly 6% growth in tenured and tenure-eligible (TTE) faculty, coupled with a 31% growth in the number of full-time mathematics faculty who are outside of the TTE stream. Starting in 2003, the Joint Data Committee (JDC) of the mathematical sciences professional societies began collecting data on the number of postdoctoral (PD) faculty, a subsection of the OFT category, and this CBMS2005 report will present parallel data on the entire OFT category and on the subcategory of PD faculty.

Starting in 2003, the term "postdoctoral appointment" had a standard definition in JDC surveys. A postdoctoral (PD) appointment is a full-time, temporary position that is primarily intended to provide an opportunity to extend graduate training or to further research. Consequently, a department's sabbatical replacements, its senior visiting faculty, and its non-TTE instructors are not counted as PD appointees. CBMS2005 used the JDC definition.

Anecdotal evidence suggests that there was substantial growth in the number of postdoctoral appointments in mathematical sciences departments between 1995 and 2005, in large part due to the NSF VIGRE program. Table S.15 shows that in fall 2005, about one in six members of the combined OFT category in four-year mathematics departments were postdoctoral appointees.

TABLE S.15 Number of full-time faculty who are tenured and tenure-eligible (TTE), postdocs, and other full-time (OFT) in mathematics and doctoral statistics departments of four-year colleges and universities, and in mathematics programs at two-year colleges, in fall 2000 and fall 2005. (Postdocs are included in the Other full-time category.)

Four-Year Colleges and Universities	Fall 2000				Fall 2005			
	Total	TTE	Other full-time	Postdoc	Total	TTE	Other full-time	Posdoc
Mathematics Departments								
Full-time faculty	**19779**	**16245**	**3533**	**na**	**21885**	**17256**	**4629**	**819**
Having doctoral degree	16640	14978	1662	na	18071	15906	2165	813
Having other degree	3139	1267	1872	na	3814	1350	2464	6
Doctoral Statistics Departments								
Full-time faculty	**808**	**709**	**99**	**na**	**946**	**783**	**163**	**51**
Having doctoral degree	794	707	87	na	915	781	133	51
Having other degree	14	2	12	na	31	2	30	0
Total Math & Stat Depts	**20587**	**16954**	**3632**	**na**	**22831**	**18039**	**4792**	**870**
Two-Year College Mathematics	Total full-time faculty	Full-time permanent	Full-time temporary		Total full-time faculty	Full-time permanent	Full-time temporary	
Full-time faculty	**7921**	**6960**	**961**		**9403**	**8793**	**610**	
Grand Total	**28508**	**23914**	**4593**	**na**	**32234**	**26832**	**5402**	**870**

Note: Round-off may make marginal totals seem inaccurate.

Full-time faculty numbers in doctoral statistics departments fell between fall 1995 and fall 2000, and then rose by about 17% between fall 2000 and fall 2005. The number of OFT faculty in doctoral statistics departments rose by almost 65% between 2000 and 2005, while the number of TTE faculty grew by about 10%. Postdoctoral positions are more common in doctoral statistics than in mathematics departments; of the OFT faculty in doctoral statistics departments in fall 2005, almost one in three held postdoctoral appointments.

Two-year colleges usually do not have tenured and tenure-eligible faculty, and yet they make a distinction between faculty who are "permanent full-time" and "temporary full-time." The number of permanent full-time faculty in two-year college mathematics programs grew by about 26% between fall 2000 and fall 2005. That increase more than wiped out the 8% decline between fall 1995 and fall 2000 and resulted in a net increase in permanent full-time faculty of about 16% during the 1995–2005 decade (cf. Tables SF.6 in CBMS1995 and CBMS2000). The number of temporary full-time faculty in two-year college mathematics programs declined by about a third from the levels of fall 2000, but still almost quadrupled between 1995 and 2005.

In four-year mathematics departments, the percentage of TTE faculty holding doctorates rose from 90% in fall 1995 to 92% in fall 2000 and remained at the 92% level in fall 2005. The percentage of TTE faculty holding doctoral degrees varies considerably by the highest degree offered by the department, and the data on percentage of doctoral degrees by type of department appears in Chapter 4 of this report.

Table S.15 shows that in doctoral statistics departments, the percentage of Ph.D.-holding faculty among all TTE faculty was above 99% in fall 2000 and fall 2005. Table SF.6 of CBMS1995 presents data showing that about 91% of TTE faculty in statistics departments held doctoral degrees in 1995, but it is important to remember that CBMS1995 data included masters-level as well as doctoral statistics departments.

The percentage of doctoral faculty in the OFT category is understandably far lower than in the TTE category. Table SF.5 of CBMS1995 shows that in four-year mathematics departments the percentage was 43% in fall 1995, and the JDC data presented in Table S.15 of this report shows that the percentage remained steady at 47% in fall 2000 and fall 2005. Table S.15 of this report shows that among the OFT faculty in doctoral statistics departments, the percentage of Ph.D.-holding faculty actually declined between fall 2000 and fall 2005, in spite of the fact that in fall 2005, almost one out of three members of the OFT group were postdoctoral appointees. Perhaps this decline represented the addition of many masters-level full-time instructors in doctoral statistics departments.

Table S.16 shows the percentage of mathematics program permanent faculty in two-year colleges who are at various degree levels. There was not much variation between the percentages reported in 1990 and in 2005. The percentage of two-year college mathematics faculty holding doctorates held steady at the 16 to 17 percent level, and masters-degree faculty have slowly replaced bachelors-degree faculty in mathematics programs. Table S.16 contains an anomaly that will reappear many times in this report. CBMS studies before 2005 included both public and some private two-year colleges while CBMS2005 does not include any private two-year colleges. NCES data on enrollments in public and private two-year colleges can sometimes be used to estimate public two-year college numbers, as in the discussion of Table S.1 above, but the resulting estimates are rough, at best.

TABLE S.16 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by highest degree in Fall 1990, 1995, 2000, and 2005. (Data for 2005 include only public two-year colleges.)

Highest degree of TYC permanent mathematics faculty	Percentage of full-time permanent faculty			
	1990 %	1995 %	2000 %	2005 %
Doctorate	17	17	16	16
Masters	79	82	81	82
Bachelors	4	1	3	2
Number of full-time permanent faculty	7222	7578	6960	8793

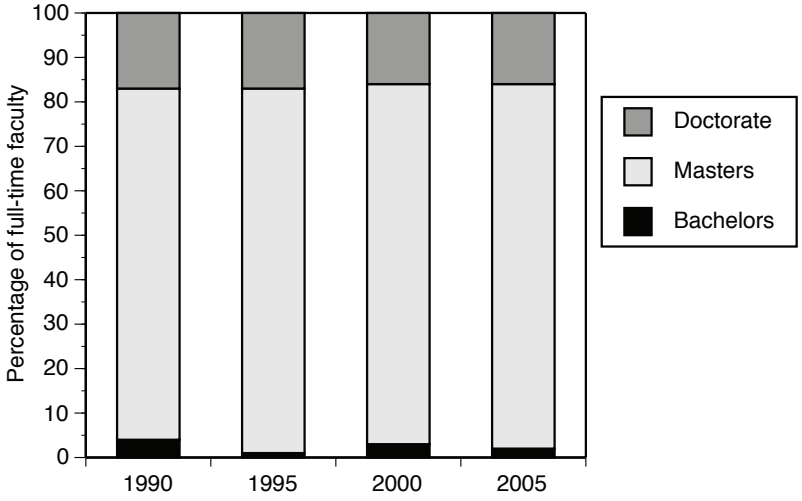

FIGURE S.16.1 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by highest degree in fall 1990, 1995, 2000, and 2005. Data for 2005 include only public two-year colleges.

Gender, Age, and Ethnicity Among the Mathematical Sciences Faculty (Tables S.17 to S.23)

JDC surveys show that the percentage of women in mathematical sciences departments has been rising for many years, and Table S.17 shows that the percentage of women in the nation's mathematics and statistics faculty rose again between fall 2000 and fall 2005.

In four-year mathematics departments, 15% of the tenured faculty were women in fall 2000, a figure that rose to 18% in fall 2005. The percentage of women among tenure-eligible mathematics department faculty was 29% in both fall 2000 and fall 2005, and in the OFT category, the percentage of women rose by three points, to 44%. Because women held only 23% of the PD positions in mathematics departments in fall 2005, that three percentage point increase must have been concentrated in the non-postdoctoral OFT category. In estimating future trends, the fact that women received 30% of mathematics and statistics doctorates between 2000 and 2005 suggests that the percentage of women among mathematics department faculty will continue to rise.

The figures in Table S.17 do not tell the whole story about the percentage of women among mathematics department faculty in the U.S. Tables in Chapter 4 present this data on the basis of the highest degree offered by the department, and show considerable variation in the percentage of women faculty between, for example, doctoral mathematics departments and mathematics departments that offer only bachelors degrees. For example, Table F.1 of Chapter 4 shows that between fall 2000 and fall 2005, the percentage of women among tenured faculty in doctoral mathematics departments rose from about 7% to about 9%, percentages that are only half as large as the corresponding percentages for all mathematics departments in Table S.17.

Doctoral statistics departments also saw an increase in the percentage of women faculty between fall 2000 and fall 2005. In fall 2000, 9% of tenured faculty in doctoral statistics departments were women, while in fall 2005 the percentage was 13%. The percentage of women in tenure-eligible positions also rose, from 34% to 37%, and 31% of postdoctoral faculty in doctoral statistics departments were women.

In recent years, women have held a greater proportion of positions in mathematics programs at two-year colleges than in mathematics departments of four-year colleges and universities. In fall 2000, women held 49% of mathematics program positions in two-year colleges, and by fall 2005 that percentage had risen to 50%.

Tables S.18 and S.19 present data on the age of tenured and tenure-eligible mathematical sciences faculty members, by gender. The average age data for fall 2000 is taken from the CBMS2000 report, and data for fall 2005 about four-year mathematics and statistics departments come from surveys by the JDC. Information about age distribution among two-year college mathematics faculty was collected as part of the CBMS2005 survey.

In four-year mathematics departments, the average age of tenured men and women rose between fall 2000 and fall 2005, presumably because senior faculty are delaying retirement. The average age of tenure-eligible-but-not-tenured men and women also increased, possibly reflecting the fact that many new Ph.D.s spent time in postdoctoral positions or other visiting positions before entering their first tenure-

TABLE S.17 Gender among full-time faculty in mathematics and doctoral statistics departments of four-year colleges and universities by type of appointment, and among permanent full-time faculty in mathematics programs at two-year colleges in fall 2000 and fall 2005. Also gender among doctoral and masters degree recipients. (Postdocs are included in the Other full-time category.)

Four-Year Colleges and Universities	Fall 2000					Fall 2005				
Mathematics Departments	Total	Tenured	Tenure-eligible	Other full-time	Postdoc	Total	Tenured	Tenure-eligible	Other full-time	Postdoc
Full-time faculty	19779	12959	3287	3533	na	21885	12874	4382	4629	819
Number of women	4346 (22%)	1941 (15%)	954 (29%)	1450 (41%)	na	5641 (26%)	2332 (18%)	1250 (29%)	2059 (44%)	191 (23%)
Doctoral Statistics Departments										
Full-time faculty	808	572	137	99	na	946	604	179	163	51
Number of women	140 (17%)	51 (9%)	47 (34%)	42 (42%)	na	211 (22%)	79 (13%)	66 (37%)	66 (40%)	16 (31%)

	July 1, 1980-June 30, 2005	July 1, 2000-June 30, 2005
Number of PhDs from US Math & Stat Depts [1]	25019	5365
Number of women among new PhDs [1]	5702 (23%)	1607 (30%)

Two-Year College Mathematics Programs	Total full-time	Full-time age<40	Total full-time	Full-time age<40
Full-time faculty	6960	1392	8793	2326
Number of women	3423 (49%)	626 (45%)	4387 (50%)	1148 (49%)

Masters degrees in mathematics and statistics granted in the U.S. in 2003-04 [2]	4191
Number of women among new masters recipients [2]	1889 (45%)

[1] Second Annual Reports of the AMS-ASA-IMA-MAA-SIAM Joint Data Committee, Tables 3-E through 3-G, AMS Notices, 1980-2005.

[2] 2005 Digest of Educational Statistics, NCES, Table 262, available at http://nces.ed.gov/programs/digest/d05/tables/dt05_252.asp

FIGURE S.17.1 Percentage of women in tenured and tenure-eligible(TE) categories in mathematics departments of four-year colleges and universities and doctoral statistics departments, in fall 2000 and 2005.

TABLE S.18 Percentage of all tenured and tenure-eligible faculty in mathematics departments of four-year colleges and universities in various age groups, and average age, by gender in fall 2005. Percentage full-time permanent faculty in mathematics programs at public two-year colleges, by age, and average ages in fall 2005. Also, historical data from fall 2000.

Four-Year College & University	Percentage of tenured/tenure-eligible faculty										Average age 2000	Average age 2005
Mathematics Departments	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
Tenured men	0%	1%	4%	8%	9%	10%	11%	11%	5%	2%	52.4	53.7
Tenured women	0	0	1	3	2	3	2	1	0	0	49.6	50.2
Tenure-eligible men	1	6	5	3	1	1	1	0	0	0	36.6	38.9
Tenure-eligible women	1	2	2	1	1	0	0	0	0	0	37.8	38.6
Total tenured & tenure-eligible faculty	**2**	**9**	**13**	**14**	**13**	**14**	**14**	**13**	**6**	**2**		

	Percentage of permanent full-time faculty									
Two-Year College Mathematics Programs	<30	30-34	35-39	40-44	45-49	50-54	55-59	>59		
Full-time permanent faculty	**5**	**8**	**12**	**13**	**15**	**18**	**17**	**11**	47.6	47.8

Note: 0 means less than half of 1%. Round-off may cause some marginal totals to appear inaccurate.

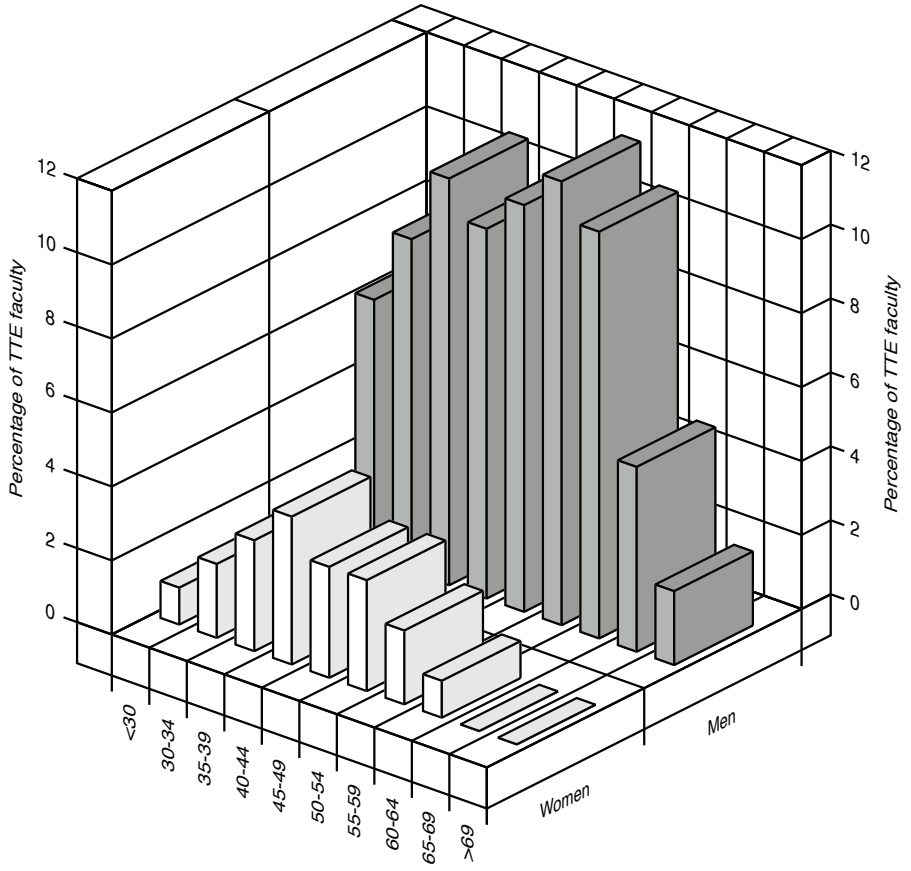

FIGURE S.18.1 Percentage of all tenured and tenure-eligible (TTE) faculty in mathematics departments at four-year colleges and universities belonging to various age groups, by gender, in fall 2005.

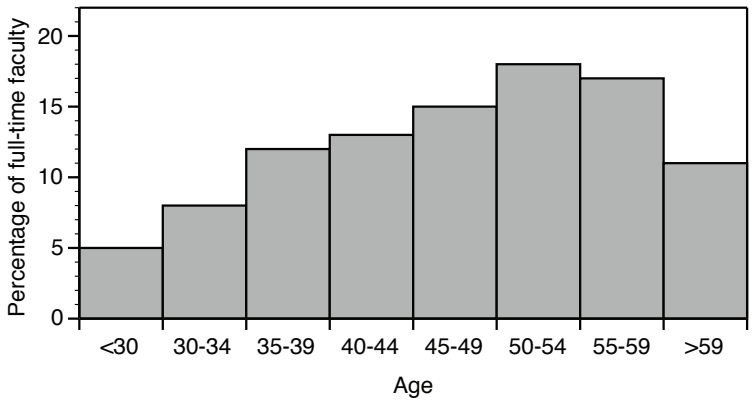

FIGURE S.18.2 Percentage of permanent full-time faculty in various age groups in mathematics programs at public two-year colleges in fall 2005.

TABLE S.19 Percentage of tenured and tenure-eligible faculty belonging to various age groups in doctoral statistics departments at universities by gender, and average ages in fall 2005. Also average ages for doctoral and masters statistics departments (combined) in fall 2000.

Doctoral Statistics Departments	Percentage of tenured/tenure-eligible faculty										Average age 2000[1]	Average age 2005
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
Tenured men	0%	1%	6%	8%	10%	11%	11%	9%	6%	2%	52.6	52.7
Tenured women	0	1	2	3	2	1	1	1	0	0	48.3	45.6
Tenure-eligible men	2	8	5	1	0	0	0	0	0	0	34.4	33.7
Tenure-eligible women	2	4	2	0	0	0	0	0	0	0	38.0	33.2
Total tenured & tenure-eligible faculty	**5**	**15**	**15**	**12**	**12**	**12**	**12**	**9**	**6**	**2**		

Note: 0 means less than half of 1%. Roundoff may cause some marginal totals to appear inaccurate.

[1]Average ages for fall 2000 from CBMS2000 Table F.5.

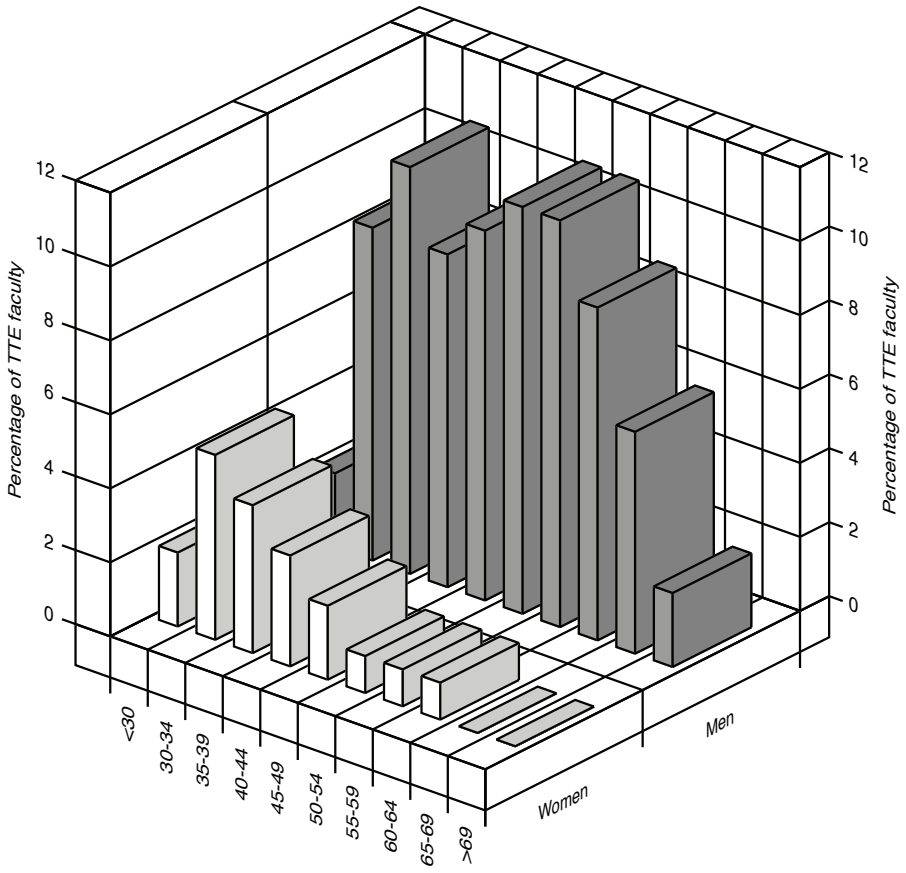

FIGURE S.19.1 Percentage of tenured and tenure-eligible faculty in various age groups, by gender, in doctoral statistics departments in fall 2005.

eligible positions. Table S.19 shows similar increases in average ages in doctoral statistics departments, with the exception of tenure-eligible-but-not-tenured women faculty, whose average age actually declined slightly between fall 2000 and fall 2005. The average ages of faculty in two-year college mathematics programs also increased between fall 2000 and fall 2005, but only marginally.

For some reason, the average ages of each of the four faculty groups studied in Tables S.18 and S.19 are lower in doctoral statistics departments than in mathematics departments. Table F.4 in Chapter 4 shows that this average age difference persists even if doctoral statistics departments are compared with doctoral mathematics departments rather than with all mathematics departments.

For a study of the age distribution of mathematics program faculty in two-year colleges, see Tables TYF.16 and TYF.17 in Chapter 7 of this report.

Data on the ages of faculty is becoming difficult to obtain from departmental surveys, and some departments reported that they were prohibited by university policy from obtaining such data. There may be federal sources for this age-distribution data.

Table S.20 presents the distribution of all full-time mathematical sciences faculty among various ethnic groups. The CBMS2005 questionnaires used the ethnic categories and descriptions that appear in contemporary federal surveys. Because the percentage of mathematical sciences faculty in several of the federal categories rounded to zero, Tables S.20 and S.21 combine some of the smaller categories into a column titled “unknown/other”.

Comparisons of Table S.20 with fall 2000 data in CBMS2000 Table SF.11 show that the percentage of four-year mathematics department faculty listed as “White, not Hispanic” declined from 84% in fall 2000 to 80% in fall 2005. The percentage of Asians among

TABLE S.20 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral, and other full-time faculty in mathematics departments of four-year colleges and universities in fall 2005.

Mathematics Departments	Asian	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known/ other
Tenured men	5%	1%	1%	39%	1%
Tenured women	1	0	0	9	0
Tenure-eligible men	2	0	0	11	0
Tenure-eligible women	1	0	0	4	0
Postdoctoral men	1	0	0	2	0
Postdoctoral women	0	0	0	1	0
Full-time men not included above	1	0	0	7	1
Full-time women not included above	1	0	0	7	0
Total full-time men	9	2	2	59	2
Total full-time women	3	1	1	21	1

Note: 0 means less than half of 1% and this may cause apparent column sum inconsistencies.

Note: The "Not known/other" category includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

the four-year mathematics faculty grew from 10% in fall 2000 to 12% in fall 2005. The percentage of faculty classified as "Black, not Hispanic" and "Mexican American, Puerto Rican, or Other Hispanic" did not change much between 2000 and 2005.

Table S.21 shows the distribution of doctoral statistics faculty among various ethnic groups. Consequently, the table should be compared with Table F.7 of Chapter 4 in the CBMS2000 report, rather than with any Chapter 1 table from CBMS2000. The percentage of doctoral statistics department faculty listed as "White, not Hispanic" declined from 75% in fall 2000 to 71% in fall 2005 while the percentage listed as "Asian" rose from 21% in fall 2000 to 25% in fall 2005.

The distribution of mathematics program faculty in public two-year colleges among various ethnic groups is studied in Tables TYF.10 through TYF.15 of Chapter 7 of this report.

TABLE S.21 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral, and other full-time faculty in doctoral statistics departments at universities in fall 2005.

Doctoral Statistics Departments	Asian	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known/ other
Tenured men	10%	0%	1%	41%	1%
Tenured women	2	0	0	6	0
Tenure-eligible men	6	0	0	7	0
Tenure-eligible women	3	0	0	4	0
Postdoctoral men	1	0	0	2	1
Postdoctoral women	1	0	0	1	0
Full-time men, not included above	1	0	0	5	0
Full-time women, not included above	0	0	0	4	0
Total full-time men	18	1	1	55	2
Total full-time women	7	1	0	16	1

Note: 0 means less than half of 1%; roundoff causes apparent column sum inconsistencies.

Note: The column "Not known/other" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Table S.22 summarizes data on faculty members who left mathematical sciences departments due to death or retirement between September 1, 2004 and August 31, 2005. Historical comparisons can be based on Tables SF.15 in the CBMS1995 and CBMS2000 reports. Four-year mathematics departments lost 2.7%, 3.0%, and 2.9% of their TTE faculty to deaths and retirements in the 1994–1995, 1999–2000, and 2004–2005 academic years respectively, while mathematics programs at two-year colleges lost 3.6%, 2.3%, and 3.3% of permanent full-time faculty during those same academic years. Statistics departments lost 3.6%, 1.8%, and 1.8% of their TTE faculty in those three academic years, but when comparing those three percentages, readers must keep in mind that the tables in CBMS1995 and CBMS2000 present data on all statistics departments, while CBMS2005 presents data on doctoral statistics departments only.

TABLE S.22 Number of deaths and retirements of tenured/tenure-eligible faculty from mathematics departments and from doctoral statistics departments by type of school, and of full-time permanent faculty from mathematics programs at two-year colleges between September 1, 2004 and August 31, 2005. Historical data is included when available. (Two-year college data for 2005 includes only public two-year college data. Historical data on statistics departments includes both masters and doctoral statistics departments.)

Four-Year College & University	1989-1990	1994-1995	1999-2000	2004-2005	Number of tenured/ tenure-eligible faculty 2005
Mathematics Departments					
Univ(PhD)	135	172	174	139	5652
Univ(MA)	68	132	165	140	3563
Coll(BA)	119	137	123	219	8041
Total deaths and retirements in all Mathematics Departments	322	441	462	499	17256
Doctoral Statistics Departments:Total deaths and retirements	17	33	16	14	783
Two-Year College Mathematics Programs					Number of full-time permanent faculty 2005
Total deaths and retirements in all TYC Mathematics Programs	na	274	163	292	8793

Table S.23 summarizes CBMS2005 findings about teaching assignments in four-year mathematical sciences departments of various types. The CBMS2000 table with comparable data for four-year colleges and university mathematics departments is Table SF.16. For data on teaching assignments in the mathematics programs of two-year colleges, see Table TYF.2 in Chapter 7 of this report, and for historical comparisons of two-year college teaching assignments, see Table TYR.18 of CBMS2000.

Among doctoral mathematics departments, about two-thirds had typical fall-term teaching assignments of at most six contact hours while 91% had typical teaching assignments of at most eight contact hours. Slightly more than half of all masters-level mathematics departments had typical fall-term teaching assignments of at most eleven contact hours, while almost all masters-level departments assigned at most twelve contact hours. Among bachelors-level

TABLE S.23 Percentage of four-year college and university mathematics and statistics departments having various weekly teaching assignments in classroom contact hours for tenured and tenure-eligible faculty in spring 2005 and fall 2005, by type of department. Also average assignment by type of department.

	< 6 hrs %	6 hrs %	7–8 hrs %	9–11 hrs %	12 hrs %	>12 hrs %	Average assignment
Mathematics Departments							
Univ (PhD) Fall	24	42	25	5	2	2	6.3
Univ (PhD) Spring	26	40	26	4	2	2	6.2
Univ (MA) Fall	0	4	5	44	48	0	10.3
Univ (MA) Spring	0	7	2	40	51	0	10.3
College (BA) Fall	0	0	3	30	53	14	11.3
College (BA) Spring	0	0	3	28	53	16	11.5
Statistics Departments							
Univ (PhD) Fall	48	45	4	0	4	0	5.3
Univ (PhD) Spring	50	40	4	2	4	0	5.3

departments, the majority reported teaching assignments of twelve contact hours per term.

Anecdotal evidence suggested that teaching assignments in four-year college and university mathematics departments declined between 2000 and 2005. Comparing Table S.23 with CBMS2000 Table SF.16 shows that, on the national scale, any teaching assignment changes between 2000 and 2005 were marginal.

CBMS also investigated spring-term teaching assignments by asking departments to report their average teaching assignments for spring 2005 as well as for fall 2005. The actual differences detected were minor. For example, consider doctoral mathematics departments. Twenty-four percent of doctoral mathematics departments reported average fall-term teaching assignments of less than six contact hours, while 26% of those departments reported average spring-term teaching assignments of less than six contact hours. Sixty-six percent of doctoral mathematics departments reported fall-term teaching assignments less than or equal to six contact hours, and the corresponding spring-term percentage was also 66%. Among bachelors-level departments, there appears to be a marginal increase in spring-term teaching assignments when compared to fall. These conclusions are reflected in the "Average assignment" column of Table S.23.

Among doctoral statistics departments, just less than half reported typical fall-term teaching assignments of at most six contact hours, while essentially all reported typical fall teaching assignments of at most eight contact hours. For comparison, in CBMS2000 only 34% of doctoral statistics departments reported average fall-term teaching assignments less than or equal to six contact hours, a percentage that rose to 48% in CBMS2005. In both CBMS2000 and CBMS2005, almost all doctoral statistics departments reported typical teaching assignments of at most eight contact hours. As was the case in mathematics departments, there was no major difference between fall- and spring-term teaching assignments in doctoral statistics departments.

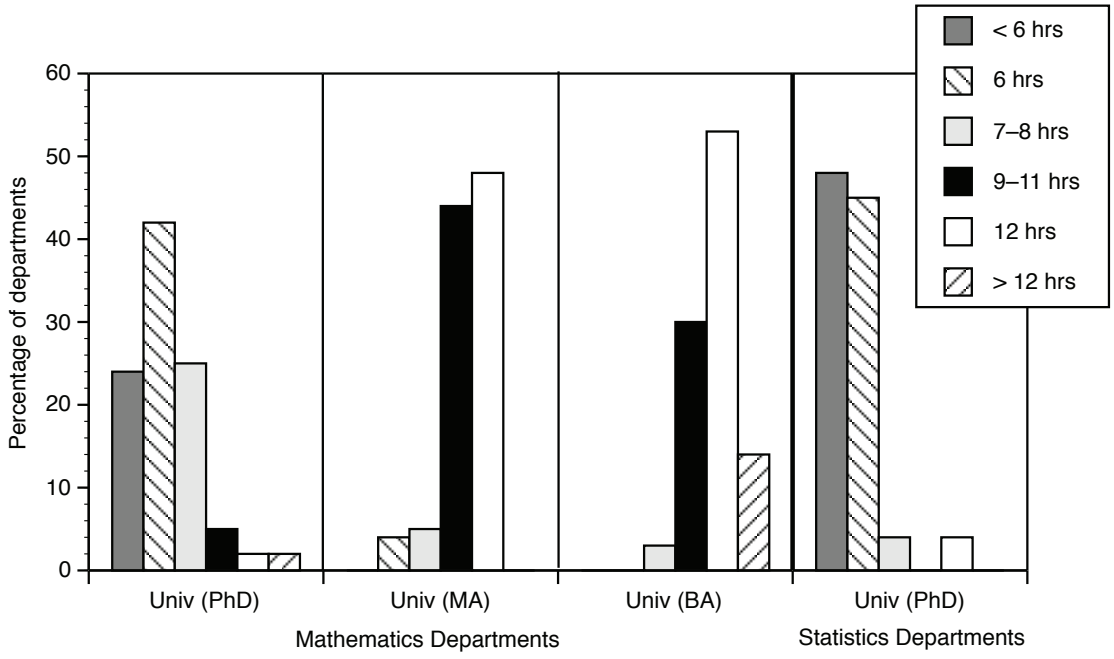

FIGURE S.23.1 Percentage of mathematics departments and doctoral statistics departments in four-year colleges and universities having various weekly teaching assignments (in classroom contact hours) for tenured and tenure-eligible faculty, by type of department, in fall 2005.