Chapter 1

Summary of CBMS2010 Report

Highlights of Chapter 1

A. Enrollments

- Between fall 1995 and fall 2010, four-year college and university enrollments grew by about 43%, while enrollments in those institutions' mathematics and statistics departments grew by about 36%. See Table S.1.
- Between fall 1995 and fall 2010, public two-year college enrollments (excluding computer science) grew by about 30%, while enrollments in those institutions' mathematics programs (excluding computer science courses) grew by about 41%. See Table S.1.
- Between fall 2005 and fall 2010, four-year college and university enrollments grew by about 13%, while enrollments in those institutions' mathematics and statistics departments grew by about 26%. Fall 2010 enrollments increased over fall 2005 in all major course categories at four-year mathematics and statistics departments except upper-level statistics enrollments in mathematics departments, which declined about 6%. See Tables S.1 and S.2.
- Between fall 2005 and fall 2010, public two-year college enrollments grew by 11%, while enrollments in these institutions' mathematics programs grew by about 19% (21% including dual enrollments). The increases in enrollment occurred in all course categories. See Tables S.1 and S.2.
- Between fall 2005 and fall 2010, enrollments in precollege-level courses at four-year mathematics departments increased 4%, but they were still 6% below the precollege-level mathematics enrollments in 1995. See Table S.2.
- Between fall 2005 and fall 2010, enrollments in introductory-level mathematics courses (including precalculus courses) at four-year college and university mathematics departments increased 22%, and they were 41% above the introductory-level enrollments in 1995. See Table S.2.
- In fall 2010, enrollments in calculus-level courses (including linear algebra, differential equations, discrete mathematics and various calculus courses) in mathematics departments at four-year institutions were about 27% higher than in 2005, and about 40% higher than in 1995. See Table S.2.
- In fall 2010, enrollments in advanced-level mathematics courses at four-year college and university mathematics departments were about 34% higher than in 2005, and about 56% higher than in 1995. See Table S.2.
- In four-year college and university mathematics departments, elementary-level statistics enrollments in fall 2010 exceeded the levels of fall 2005 by about 56%, and have more than doubled since fall 1995. Upper-level statistics enrollments declined about 6% between 2005 and 2010, but were about 14% above the 1995 level. These changes may be due in part to the addition of a new course to the list of lower-level courses. See Table S.2.
- In four-year college and university statistics departments, elementary-level statistics enrollments in fall 2010 exceeded fall 2005 levels by 50%, and were about 65% larger than in fall 1995. Upper-level statistics enrollments increased about 13% between 2005 and 2010, and were about 69% above the 1995 level. See Table S.2.
- In public two-year colleges, enrollments increased in 2010 over 2005 by 19% in precollege-level mathematics, 15% in introductory-level mathematics and Precalculus, 28% in calculus-level mathematics, and 17% in elementary statistics and probability courses. See Table S.2.
- Computer science enrollments in mathematics departments of four-year colleges and universities, which had dropped by 55% from 2000 to 2005, increased 35% from 2005 to 2010, but remained 37% below the 2000 level. 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 very slightly (less than 0.3%) between the 2004-2005 and the 2009-2010 academic years, and about 13% fewer bachelors degrees were awarded by mathematics and statistics departments in 2009-2010 than in 1989-1990. If degrees in computer science are excluded from the count, then the number of bachelors degrees awarded in mathematics and statistics in 2009-2010 was 2% above the total in 2004-2005, and less than 1% below the total in 1989-1990. See Table S.3.

- The number of bachelors degrees in computer science awarded through mathematics and statistics departments decreased by 18% from 2004-2005 to 2009-2010, and by 58% from 1989-1990 to 2009-2010, but is still a significant source of computer science majors compared to the number of computer science bachelors degrees awarded by doctoral computer science departments. See Table S.3.
- The number of mathematics education bachelors degrees granted through mathematics departments increased by about 7% between 2004-2005 and 2009-2010, and decreased by about 28% when compared with 1999-2000 (when it was the highest percentage in the last five CBMS studies). See Table S.3.
- The percentage of bachelors degrees awarded to women through U.S. mathematics and statistics departments rose from 40.4% in 2004-2005 to 42.5% in 2009-2010 (it was 43.4% in 1999-2000). If computer science degrees are excluded, then the percentage of degrees awarded to women through U.S. mathematics and statistics departments rose from 43.5% in 2004-2005 to 45.2% in 2009-2010 (it was 46.7% in 1999-2000). See Table S.3.

C. Appointment type of instructors of undergraduate mathematics and statistics courses

- The percentage of undergraduate sections in mathematics departments of four-year colleges and universities taught by tenured, tenure-eligible or permanent faculty increased between fall 2005 and fall 2010 from 48% to 49%, and from 47% to 49% in statistics departments. In public two-year colleges, the percentage of mathematics and statistics sections taught by full-time faculty declined from 56% in fall 2005 to 54% in fall 2010. See Tables S.4 and S.5.

D. Pedagogical methods used in teaching undergraduate mathematics and statistics courses

- In public two-year colleges in fall 2010, Mainstream Calculus I was taught "mostly by lecture" in 66% of the sections. For Calculus II, the percentage jumped to 85% (and Non-Mainstream Calculus I and II had comparable percentages); for Elementary Statistics, the percentage was 81%. See Tables S.10, S.11, and S.12.
- The 2010 CBMS survey of four-year mathematics departments included a special study of pedagogy in teaching College Algebra and Introductory Statistics, and in statistics departments on teaching Introductory Statistics (in both cases the statistics course had no calculus prerequisite). In the survey of mathematics departments, 65% characterized their College Algebra courses as "primarily using a traditional approach". Methods of teaching Introductory Statistics in mathematics and statistics departments in fall 2010 can be compared using the 2010 survey data, which shows greater use of real data and technology in courses taught in statistics departments and slightly greater use of additional assignments (such as projects, oral presentations or written reports) in mathematics departments. See Tables S.13A and S.13B.

E. The number of faculty

- The total size of mathematics faculties (including both full-time and part-time) in four-year colleges and universities remained roughly the same in fall 2010 as in fall 2005, and the number of full-time faculty increased by about 2% from fall 2005 to fall 2010. From 1995 to 2010, the number of full-time mathematics faculty in four-year departments grew by 14%, while mathematics departments' total course enrollments grew by 35%. In statistics departments with doctoral programs (which were the only statistics departments in which faculty demographics were gathered in 2005), the total number of full-time plus part-time statistics faculty increased 5% from 2005, while the number of full-time doctoral-level statistics faculty increased 6% from 2005. Doctoral statistics department enrollments have more than doubled since 1995, but are up only 11% from fall 2000. See Table S.14.
- In public two-year college mathematics programs, the number of full-time (permanent and temporary) faculty increased by 16% from fall 2005 to fall 2010, and by 40% from 1995 to 2010. Public two-year college mathematics program enrollments (excluding computer science courses) rose 41% from 1995 to 2010. See Table S.14.
- The number of part-time mathematics faculty at four-year departments continued a trend of slow decline, decreasing by 7% over 2005, and the number of part-time statistics faculty at doctoral statistics departments decreased 6% from 2005. See Table S.14.
- The number of part-time faculty in mathematics programs at public two-year colleges increased by 29% from 2005 to 2010. Total public two-year mathematics faculty has grown by 56% from 1995 to 2010. The 2010 CBMS survey is the first CBMS survey to report a larger number of total mathematics faculty (full-time plus part-time) at two-year departments than at four-year departments. See Table S.14.
- There was a 5% decrease in the sum of tenured plus tenure-eligible (TTE) appointments in four-year mathematics departments from 2005 to 2010, while the category of other full-time faculty increased by 28%; most of the decline in the numbers of

TTE faculty was in tenure-eligible appointments. In doctoral-level statistics departments, from 2005 to 2010, the total number of tenured plus tenure-eligible statistics faculty grew very slightly, and the number of other full-time statistics faculty increased by 32%. In public two-year college mathematics programs, the number of full-time permanent faculty grew by 11%. See Table S.15.

F. Gender and ethnicity in the mathematical sciences faculty

- In fall 2010, in four-year college and university mathematics departments, women comprised 29% of all full-time faculty, 21% of all tenured faculty, and 34% of all tenure-eligible faculty; each of these percentages was up several percentage points from 2005. In doctoral statistics departments in fall 2010, women were 26% of all full-time faculty, 16% of tenured faculty, and 40% of tenure-eligible faculty, and all of these percentages were larger than in 2005. In public two-year college mathematics programs in fall 2010, women comprised 50% of the full-time faculty positions (the same as in 2005), and 54% of the full-time faculty of age less than 40 were female (up from 49% in 2005). See Table S.16.
- Very little change in the distribution of ethnicities of mathematics and statistics departments faculty in four-year colleges and universities occurred between fall 2005 and fall 2010. In mathematics departments, the percentage of full-time White male faculty dropped from 59% to 56% (with a corresponding 2% point gain in the percentage of White female faculty). Statistics departments (masters-level and doctoral-level combined) showed White male full-time faculty dropping from 55% to 49% and some gains in the percentage of Asian faculty. The percentages of Black and Hispanic faculty remained small in both mathematics and statistics departments. See Tables S.19 and S.20.
- Comparable tables for distribution of ethnicities in mathematics programs at two-year colleges can be found in Chapter 7, Tables TYF.10-13. In fall 2010, 16% of the full-time permanent faculty in mathematics programs were from ethnic minorities, a total of 1,566 faculty, up from 14% in 2005. The majority of the ethnic groups represented were Asian/Pacific Islander or Black (non-Hispanic).

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

- Table S.21 shows that 360 deaths and retirements of mathematics department faculty from four-year colleges and universities occurred during 2009-2010, compared with 499 in 2004-2005 and 462 in 1999-2000. Furthermore, Table S.17 shows that the percentage of tenured and tenure-eligible mathematics faculty 65 and older increased from 8% in 2005 to 12% in 2010. Both facts suggest that some senior faculty may have postponed retirement, perhaps because of problems in the nation's economy. This data was not collected in two-year colleges in 2010. See Tables S.17 and S.21.

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

Between fall 2005 and fall 2010, enrollments in mathematical sciences courses at four-year colleges and universities grew at a rate that was twice the growth rate in total undergraduate enrollment. This mathematical sciences course enrollment growth helped to reverse the decline in mathematical sciences course enrollments, compared to general institutional enrollments, which had occurred over the previous decade. A particularly disturbing trend noted in the 2005 CBMS report was that enrollments in mathematics and statistics from fall 2000 to fall 2005 had actually declined, while enrollments in four-year colleges and universities rose by 13%.

We begin by noting the kinds of enrollment that were collected in the 2010 CBMS survey (for more details, consult the survey questionnaires, which are in Appendix IV). Departments were asked first about "dual enrollments"; dual-enrollment courses are defined as "courses conducted on a high school campus and taught by high school teachers, for which high school students may receive high school credit and, simultaneously, college credit". Dual enrollments, which are discussed in Chapter 2, are not counted as enrollments in CBMS enrollment tables, unless the table specifically indicates that they are included. On the 2010 CBMS survey questionnaires, departments were asked to break out distance-learning enrollments from other enrollments, except in advanced-level courses in four-year departments. Distance-learning courses are defined to be "courses in which the majority of instruction occurs with the student and instructor separated in time and space (e.g. courses in which the majority of instruction is taught online or by computer software or by correspondence)". Tables indicate if distance-learning enrollments are included; Appendix I presents enrollments for courses on the four-year departments survey questionnaires both with, and without, distance-learning enrollments included (prior CBMS survey Appendices give enrollments with distance learning included).

Table S.1 gives an overall historical view of enrollments in courses taught in mathematics and statistics departments of four-year U.S. colleges and universities, and in mathematics programs of public two-year colleges. The table also presents estimates of institutional enrollments, so that one can compare changes in mathematical sciences course enrollments with

overall changes in institutional enrollments. The table presents combined enrollments (including distance-learning enrollments but not dual enrollments) in four-year mathematics and statistics departments in fall 1995, 2000, 2005, and 2010, for mathematics, statistics, and computer science courses, with the 2010 enrollment broken down into mathematics department enrollment and statistics department enrollment; the enrollments for mathematics programs in two-year colleges are also presented. This enrollment data was obtained from the CBMS surveys from those years. The estimates of the total enrollment in four-year colleges and universities, and in two-year colleges, came from the National Center for Educational Statistics (NCES) and are based on data that post-secondary education institutions must submit to the Integrated Post-secondary Educational Data System (IPEDS). Most national data cited in this report are drawn from the NCES report *Projections of Education Statistics to 2019*, which is available at http://nces.ed.gov/programs/projections/projections2019/tables/asp.

From Table S.1 we see that between fall 1995 and fall 2010, four-year college and university enrollments grew by about 43%, while enrollments in those institutions' mathematics and statistics departments grew by about 36%, and much of the growth in mathematical sciences enrollments occurred between fall 2005 and fall 2010. Figure S.1.1 shows the growth in enrollments in mathematical sciences courses taught in mathematics and statistics departments of four-year colleges and universities, and in two-year colleges, in fall 1990, 1995, 2000, 2005, and 2010.

At public two-year college mathematics programs, the mathematical sciences course enrollments continued to rise faster than the total enrollments of two-year colleges. NCES data show that total enrollments in the nation's public two-year colleges (TYCs) increased by about 30% between fall 1995 and fall 2010 (11% from 2005 to 2010). CBMS survey data suggest that the same fifteen-year period saw a roughly 41% growth in the mathematics and statistics enrollments in the mathematics departments and programs of the nation's public TYCs (19% from 2005 to 2010). We note that the estimate of 41% was computed by removing computer science enrollments from the 1995 total enrollment data of Table S.1 (since the CBMS surveys no longer gather computer science enrollments from two-year college mathematics programs), and using 99% of those course enrollments (since the sample frame in 2005 and following years includes only public two-year colleges, and NCES noted in 2002 that public two-year colleges accounted for over 99% of the total two-year college enrollment), and hence estimating the 1995 total public two-year college mathematics enrollment at 1,440,450. Additional information can be found in Chapter 6, Tables TYE.1 and TYE.2.

Table S.2 begins the process of breaking the total mathematical sciences course enrollment down into its component parts. Among four-year college and university mathematics departments, the enrollment course categories used were precollege-level courses, introductory-level courses, calculus-level courses, and advanced-level courses. In the 2010 CBMS survey, the precollege courses (e.g. arithmetic, pre-algebra, elementary algebra, intermediate algebra) were treated as one block and not itemized as they had been in previous CBMS surveys. The intermediate-level course list was essentially unchanged from the previous CBMS survey, and included courses in liberal arts mathematics, mathematics for K-8 mathematics teachers, and a cluster of courses with names such as College Algebra, Precalculus, and Trigonometry. The calculus-level courses included linear algebra, differential equations, discrete mathematics, and various calculus courses; from the individual course enrollments, which are included in Appendix I, we see that calculus courses accounted for 79% of the non-distance-learning enrollments in calculus-level courses. We note, again, that Tables S.1 and S.2 include distance-learning enrollments, and that Appendix I contains enrollments both with, and without, distance-learning enrollments included. Statistics courses, offered in either mathematics or statistics departments, were broken into elementary-level and upper-level, and computer science courses were broken into three levels. In 2010 for the first time, enrollments in computer science courses offered through statistics departments were not gathered in the CBMS survey, but they were gathered, as was done previously, from mathematics departments at four-year institutions.

Table S.2 also shows enrollments in various course categories in public two-year college mathematics programs. Direct comparisons between courses-categories in two-year and four-year departments are problematic because the course-categories (which can be seen by looking at the actual questionnaires that are reproduced in Appendix IV) sometimes contain different courses (e.g. linear algebra and differential equations are not calculus-level courses in the two-year college instrument).

In four-year college and university mathematics departments, the total of all course enrollments rose from 1,845,000 in 2005 to 2,310,000 in 2010, according to Table S.2, a 25% increase in total enrollment. All categories of courses, except upper-level statistics courses, showed increased enrollments in fall 2010 over fall 2005, and all categories of courses, except precollege-level courses and computer science courses, had enrollments in fall 2010 that were larger than those in fall 1995. The course-category for the four-year mathematics departments that had the largest enrollment growth from fall 2005 to fall 2010

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 1995, 2000, 2005, and 2010. NCES data includes both public and private four-year colleges and universities, and includes only public two-year colleges. Enrollments include distance-learning enrollments but not dual enrollments.

	Four-Year College & University Mathematics & Statistics Departments						Two Year College Mathematics Programs[4]			
	Fall				2010 by Dept		Fall			
	1995	2000	2005	2010	Math	Stat	1995	2000	2005	2010
Mathematics	1471[1]	1614	1607	1971	1971	--	1384	1273	1580	1887
Statistics	208	245	260	371	262	109	72	74	117	137
Computer Science	100	124	59	77 [2]	77	-- [2]	43[2]	39[2]	--[2]	--[2]
Total	1779	1984	1925	2419	2310	109	1498	1386	1697	2024
NCES Total Fall Undergraduate Enrollments[3]	6739	7207	8476	9613			5278	5697	6184	6870

[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, and starting in 2010, no computer science courses were included in the statistics survey.

[3] Data for 1995, 2000, 2005, and projections for 2010 are derived from Tables 24, 26, and 27 of the NCES publication "*Projections of Education Statistics to 2019*" at http://nces.ed.gov/programs/projections/projections2019/tables.asp.

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

was the category of elementary statistics courses, up 56% over 2005; among mathematics course-categories, the largest growth occurred in advanced-level mathematics courses, where enrollments were about 34% higher in fall 2010 than in fall 2005, and about 56% higher in fall 2010 than in fall 1995. The category with the next largest enrollment growth was calculus-level courses, where enrollments were about 27% higher in 2010 than in 2005, and 39% higher than calculus-level enrollments in 1995. Close behind calculus-level course enrollment growth was the growth in introductory-level course enrollments, which increased 22% in 2010 over 2005, and were 41% above the introductory-level enrollments in 1995. Precollege-level enrollments increased only 4% in 2010 over 2005, and they were still 6% below the precollege-level enrollments in 1995; precollege-level enrollments have remained relatively flat over the past fifteen years. The total number of all mathematics course enrollments in four-year college and university mathematics departments increased by about 34% over the fifteen-year period of 1995-2010, and all enrollments (including computer science and statistics) were up 35% over this time period.

Table S.2 shows that mathematics programs at public two-year colleges also had enrollment growth in all categories of courses. The largest growth from fall 2005 to fall 2010 occurred in the category of calculus-level courses, up 28% in fall 2010 over fall 2005, but only 7% over fall 1995. The next largest enrollment growth in two-year college mathematics program enrollments occurred in the category of "other" courses, up 24% in 2010 over 2005, and 44% over 1995. The enrollment growth in precollege-level courses was next, up 19% in 2010 over 2005, and 44% over 1995. Within precollege-level courses, enrollments in Arithmetic and Basic Mathematics increased 40% between 2005 and 2010 and 65% in Pre-algebra (see Table TYE.3). Introductory-level course enrollments (including Precalculus) were up 15% in 2010 over 2005, and 25% over 1995. The total enrollment in all mathematics and statistics courses taught in public two-year mathematics programs increased by 41% over the fifteen-year period of 1995-2010.

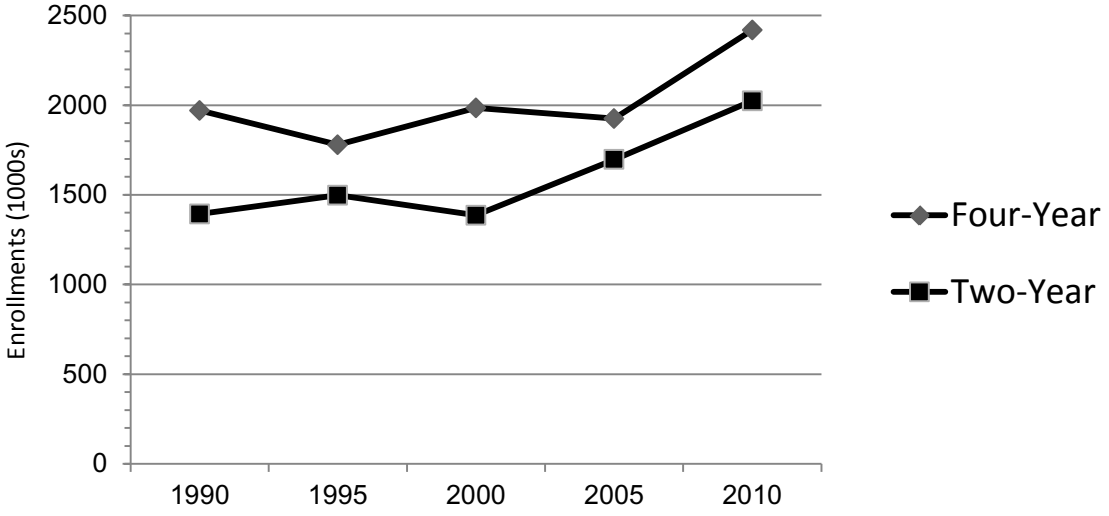

FIGURE S.1.1 Combined enrollment (in 1000s) in undergraduate mathematics, statistics, and computer science courses at four-year colleges and universities within mathematics departments and statistics departments, and within mathematics programs of two-year colleges: Fall 1995, 2000, 2005, and 2010. Data for 2005 include only public two-year colleges.

Note: 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, and starting in 2010, no computer science data were included in the survey of statistics departments.

Moreover, in fall 2010, the total course enrollments in public two-year college mathematics programs were 46% of the total mathematics and statistics enrollments of all the combined mathematical sciences programs (i.e. the two-year mathematics programs, four-year mathematics departments, and statistics departments combined).

Between 2005 and 2010, the nation's undergraduate statistics courses continued a trend of long-term enrollment growth in courses taught in mathematics departments of four-year and two-year colleges, as well as in statistics departments of four-year institutions. Some changes were made to the list of statistics courses in the CBMS 2010 survey questionnaires for four-year mathematics and the four-year statistics departments, following the suggestions of the CBMS steering committee representatives from the American Statistical Association (ASA). An elementary-level course (for non-majors) that had a calculus prerequisite was added to both instruments; it is possible that such courses existed in earlier surveys and that these enrollments were included in some departments' upper-level course enrollments, so that the growth in enrollments in elementary-level statistics courses, as well as the decline of enrollments in upper-level courses, may not be as great as the 2010 survey reports. Elementary statistics enrollments in four-year mathematics departments were up 56% in fall 2010 over fall 2005, and they have more than doubled since 1995; upper-level statistics enrollments in mathematics departments declined by roughly 2,000 students (a 6% decline) from fall 2005 to fall 2010. As has been noted, the addition of the new calculus-based elementary-level course (which contributed a non-distance-learning enrollment of roughly 23,000 students (see Table S.8)) may have contributed to the decline in upper-level statistics course enrollments in mathematics departments. Enrollments in introductory courses taught in statistics departments grew 50% from 2005 to 2010, and 65% from 1995 to 2010; upper-level statistics courses taught in statistics departments had an enrollment growth of 13% from 2005 to 2010, and 69% from 1995 to 2010. A number of changes were made to the four-year statistics department questionnaire, including changes to a couple of the upper-level courses, as well as the addition of the elementary-level course with a calculus prerequisite (see Table S.9 for non-distance-learning enrollments in all of the courses classified as elementary-level on the four-year statistics department

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 1995, 2000, 2005, and 2010. (Beginning in 2005, two-year college data include only public two-year colleges and do not include any computer science. Beginning in 2010, statistics department data do not include computer science.)

	Mathematics Departments				Statistics Departments				Two-Year College Mathematics Programs			
Course level	1995	2000	2005	2010	1995	2000	2005	2010	1995	2000	2005	2010
Mathematics courses												
Precollege level	222	219	201	209	--	--	--	--	800	763	965	1150
Introductory level (including Precalculus)	613	723	706	863	--	--	--	--	295	274	321	368
Calculus level	538	570	587	748	--	--	--	--	129	106	108	138
Advanced level	96	102	112	150	--	--	--	--	0	0	0	0
Other (2-year)	--	--	--	--	--	--	--	--	160	130	187	231
Total Mathematics courses	1469	1614	1607	1971	--	--	--	--	1384	1273	1580	1887
Probability and Statistics courses												
Elementary level	115	136	148	231	49	54	54	81	72	74	117	137
Upper level	28	35	34	32	16	20	24	27	0	0	0	0
Total Probability and Statistics courses	143	171	182	262	65 [2]	74	78	108	72	74	117	137
Computer Science courses [1]												
Lower level	74	90	44	56	1	1	2	--	43	39	--	--
Middle level	13	17	8	12	0	0	0	--	0	0	--	--
Upper level	12	16	5	10	0	0	0	--	0	0	--	--
Total Computer Science courses [1]	99	123	57	77	1	1	2	--	43	39	--	--
Grand Total	1711	1908	1845	2310	66 [2]	75	80	108	1499	1386	1697	2024

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

[1] Beginning in 1995, computer science enrollment included only courses taught in mathematics programs. Beginning in 2005, computer science courses were no longer included in the two-year college survey. Beginning in 2010, computer science courses were no longer included in the statistics survey.

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

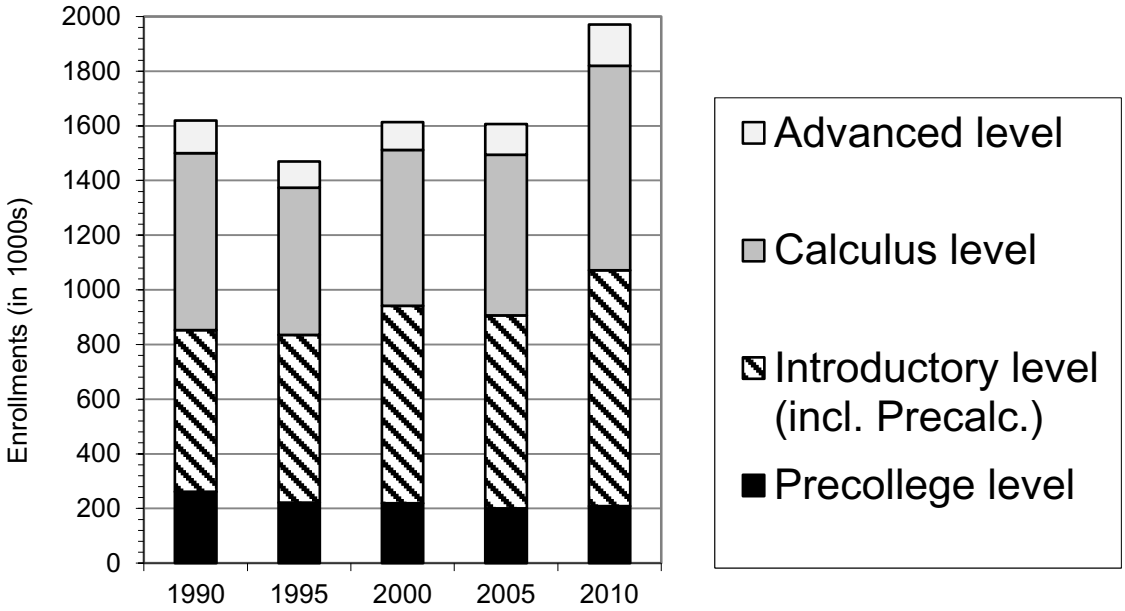

FIGURE S.2.1 Enrollments (in 1000s) in undergraduate mathematics courses in mathematics departments of four-year colleges and universities by level of course in fall of 1995, 2000, 2005, and 2010.

questionnaire). Statistics enrollments in courses taught in mathematics programs at two-year colleges were up 17% in 2010 over 2005, and they nearly doubled from 1995 to 2010. Elementary statistics enrollments in four-year mathematics departments were nearly three times greater than those in statistics departments, and elementary statistics enrollments in statistics departments were slightly less than 60% of those in two-year college mathematics programs.

Computer science enrollments have been declining within mathematics departments at four-year and two-year institutions, as well as in statistics departments. However, computer science enrollments in four-year mathematics departments, which had declined by a little more than 50% from fall 2000 to fall 2005, were up 35% from fall 2005 to fall 2010, though still 37% below the fall 2000 level. The CBMS surveys ceased collecting computer science enrollments in two-year college mathematics programs with the 2005 survey, and in statistics departments of four-year institutions with the 2010 survey. Although well below the levels of the previous decade, enrollments in computer science courses offered in mathematics departments are still a significant source of mathematical sciences enrollments.

Tables with finer breakdowns of enrollments in four-year mathematics and statistics departments (including breakdown by the level (bachelors, masters, doctoral) of the department) are found in Chapters 3 and 5, and individual course enrollments are presented in Appendix I. Additional details on mathematics and statistics course enrollments in two-year colleges are found in Chapter 6.

Academic year enrollments

CBMS surveys follow the NCES pattern and focus only on fall enrollments. However, CBMS surveys also have asked departments to provide the enrollment for the previous academic year, and for the fall term. Using this data, the ratio of full-year enrollment to fall enrollment can be estimated. In 1990, 1995, 2000, 2005, and 2010 these ratios were, respectively, 2, 2, 1.85 (SE=0.03), 1.75 (SE=0.03), and 1.8 (SE=0.04). As noted in the CBMS 2005 survey, this decline in the ratio is likely due to the decline in the quarter system (as shown in Table S.3 of CBMS2005; this data was not gathered in 2010).

Bachelors degrees in the mathematical sciences (Table S.3)

Table S.3 presents the total number of bachelors degrees awarded through the nation's four-year mathematics and statistics departments (combined) in the academic years 1989-1990, 1994-1995, 1999-2000, 2004-2005, and 2009-2010. As in past surveys, the survey instructions specified that double majors

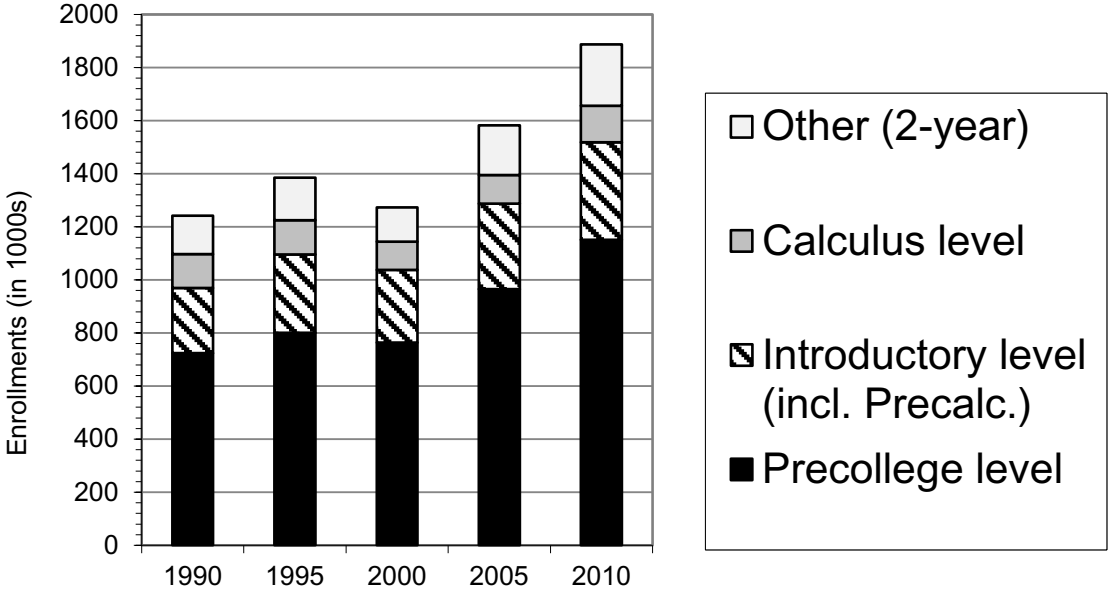

FIGURE S.2.2 Enrollments (in 1000s) in undergraduate mathematics courses in two-year college mathematics programs by level of course in the fall of 1990, 1995, 2000, 2005, and 2010.

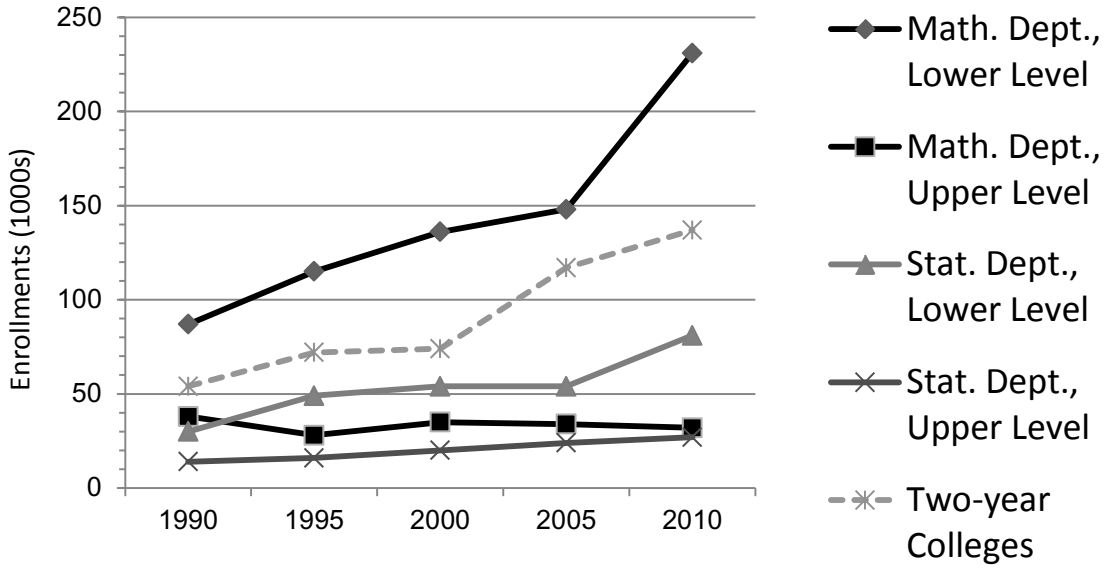

FIGURE S.2.3 Enrollments (in 1000s) in statistics courses in two-year college mathematics programs, and in mathematics departments and in statistics departments of four-year colleges and universities in fall 1990, 1995, 2000, 2005, 2010.

TABLE S.3 Combined total of all bachelors degrees in mathematics and statistics departments at four-year colleges and universities between July 1 and June 30 in 1989-90, 1994-95, 1999-2000, 2004-2005, and 2009-10 by selected majors and gender. The comparable table in CBMS2005 is S.4, p. 10.

Major	89-90	94-95	99-00	04-05	09-10
Mathematics (except as reported below)	13303	12456	10759	12316	12468
Mathematics Education	3116	4829	4991	3369	3614
Statistics (except Actuarial Science)	618	1031	502	527	856
Actuarial Mathematics	245	620	425	499	849
All Joint Majors (combined) [1]	--	--	--	--	1222
Joint Mathematics & Computer Science	960	453	876	719	--
Joint Mathematics & Statistics	124	188	196	203	--
Joint Math/Stat & Business or Economics	na	na	na	214	--
Other (includes Operations Research prior to 2010) [2]	1014	577	1550	985	231
Total Mathematics, Statistics & Joint degrees	19380	20154	19299	18833	19241
Number of women	8847	9061	9017	8192	8692
Computer Science degrees	5075	2741	3315	2603	2137
Number of women	1584	532	808	465	394
Total degrees	24455	22895	22614	21437	21377
Number of women	10431	9593	9825	8656	9086

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

[1] Beginning in 2010, the survey asked for the total number of all joint majors.

[2] Prior to 2010, Operations Research was a separate category. Beginning in 2010, Operations Research is included in other Mathematics.

should be included in the count of degrees awarded. The degrees awarded are categorized as degrees in mathematics, mathematics education, statistics, computer science, actuarial mathematics, joint majors (to be defined below), or "other". Surveys of four-year mathematics departments conducted before 2010 contained the additional option of a major in operations research, and the numbers of operations research majors from those previous years have been added to the "other" category in Table S.3; furthermore, prior surveys broke down the category of joint majors into different subcategories, while the 2010 survey considered all joint majors as one category. Computer science degrees are counted only in mathematics departments. Table E.1 in Chapter 3 gives further breakdowns of the degrees awarded, including by the level (bachelors, masters, or doctoral) of the department awarding the undergraduate degree.

Table S.3 shows that the total number of bachelors degrees awarded by mathematics and statistics departments (combined) declined very slightly (less than 0.3%) between the 2004-2005 and the 2009-2010 academic years, and about 13% fewer bachelors degrees were awarded by mathematics and statistics departments in 2009-2010 than in 1989-1990. The table shows that the number of degrees given by mathematics and statistics departments in computer science has been declining; in 1989-1990 there were 5,075 degrees awarded, and in 2009-2010, this number had dropped to 2,137. It is likely that much of this decline is due to the creation of separate departments of computer science. If degrees in computer science are excluded from the count, then the number

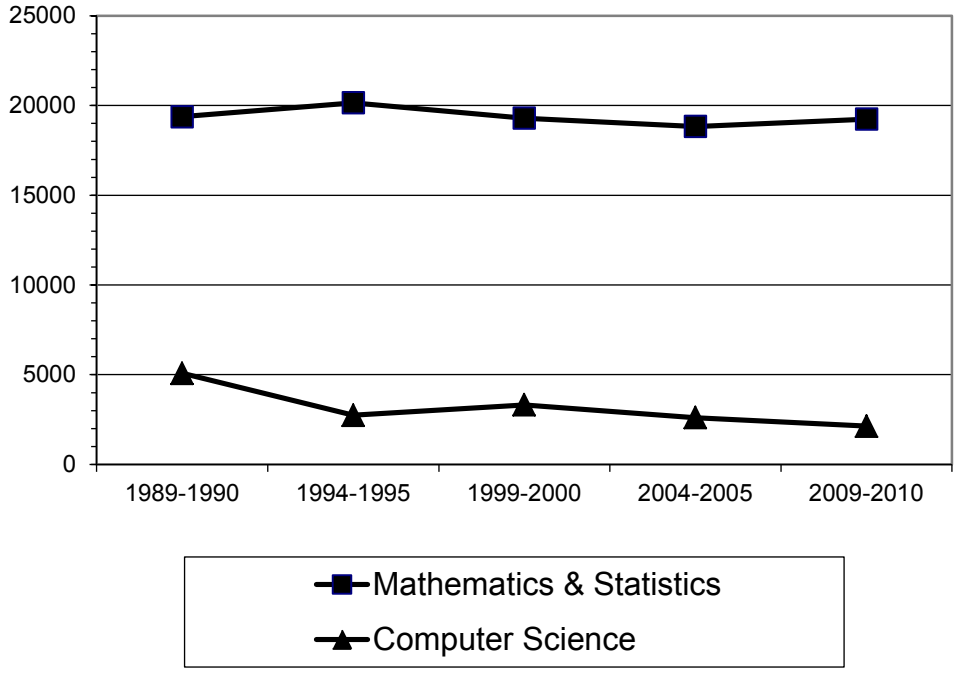

FIGURE S.3.1 Number of bachelors degrees in mathematics and statistics, and in computer science, granted through mathematics and statistics departments in academic years 1989-1990, 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

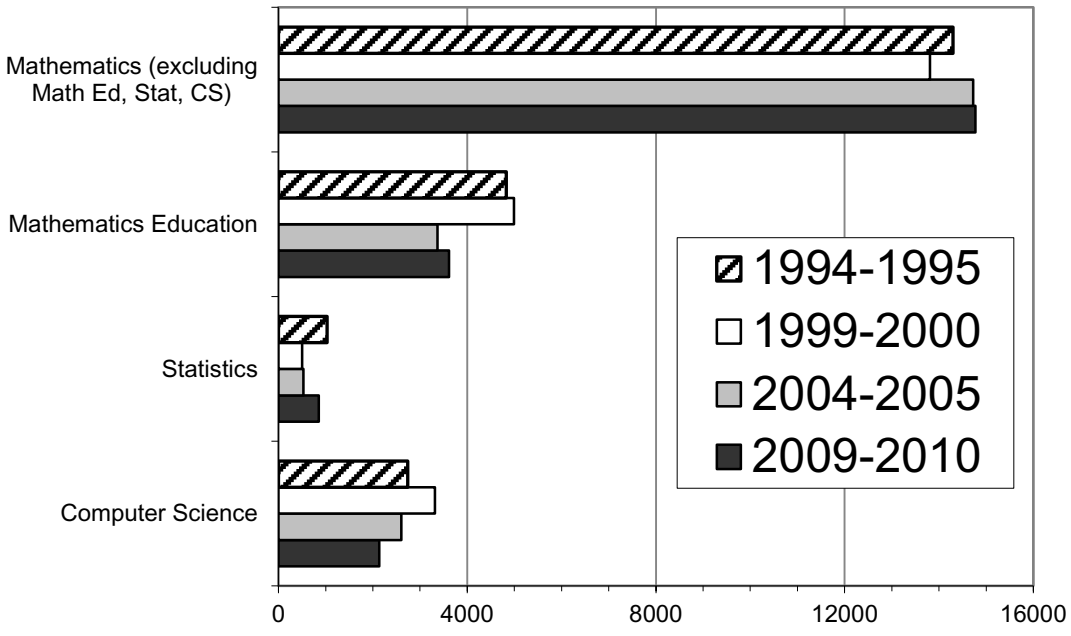

FIGURE S.3.2 Number of bachelors degrees awarded by mathematics and statistics departments (combined) at four-year colleges and universities between July 1 and June 30 in 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

of bachelors degrees awarded in mathematics and statistics in 2009-2010 was 2% above the total in 2004-2005, and almost the same as in 1989-1990, and thus has remained relatively constant over the past twenty-five years (see Figure S.3.1). The standard error in the 2010 CBMS survey estimate of 19,241 degrees awarded in mathematics, statistics, and joint degrees in 2009-2010 is about 1,100 degrees.

Table S.3 and Figure S.3.2 show the breakdown of bachelors degrees awarded into the different categories of majors over the last three CBMS surveys. The number of degrees in mathematics education is up 7% from 2004-2005 to 2009-2010, but is still 28% below the 1999-2000 level. The number of degrees awarded in statistics has increased 62% since 2004-2005, and the number of degrees awarded in actuarial mathematics has increased even more, an astonishing 70% over 2004-2005 (however, the total number of actuarial science degrees remains quite small). The number of degrees awarded in computer science, while declining, is still a significant number, e.g. in 2009-2010 it is greater than the sum of degrees awarded in statistics and degrees awarded in actuarial mathematics.

The 2009-2010 Taulbee Survey ([CRA] available at http://cra.org/resources/taulbee/—click on "Past Survey Results"), an annual survey of doctoral-level computer science departments, published by the Computing Research Association, reports in its Table 11a that 7,836 undergraduate degrees in computer science were awarded by U.S. doctoral-level computer science departments in 2009-2010 (11,204 when degrees in computer engineering and information are added). Table 9a of that report shows that of the 8,838 U.S. and Canadian citizens who were awarded undergraduate degrees in computer science in 2009-2010 by doctoral computer science departments, and for whom the gender is known, 14% of the degree recipients were women (13% when computer engineering and information are added). These statistics on bachelors degrees produced by only doctoral-level computer science departments can be compared to CBMS data on computer science bachelors degrees awarded by mathematics departments. The 2,137 degrees in computer science awarded by mathematics departments in 2009-2010 are equivalent to 27% of the 7,836 computer science degree recipients produced by doctoral-level computer science departments in 2009-2010, so they are a significant contribution to the nation's computer scientists. Moreover, women comprised 18% of the computer science bachelors degrees awarded from mathematics departments in 2009-2010, as opposed to the 14% of bachelors degrees awarded to women that was reported for doctoral-level computer science departments in 2009-2010. When, in Chapter 3, Table E.1, the computer science degrees produced by mathematics departments are broken down by the level of department awarding the degree, it will be evident that in 2009-2010 these computer science degrees were given most frequently by the bachelors-level mathematics departments.

The CBMS 2010 survey defined a "joint major" 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 is the sum of the credit hours required by the separate majors". "Double majors", students who complete two separate majors, were counted in the CBMS survey according to the category of mathematics or statistics major they complete. The CBMS 2010 survey grouped all joint mathematics majors into one category of "joint majors", rather than breaking them down into possible kinds of joint majors, which had been the past CBMS survey practice. In 2010, the category of joint majors was 8% higher than the sum of the individual kinds of joint majors described in the 2005 survey. The category of degrees in "other" areas dropped to almost one-quarter of its 2004-2005 level; one can only speculate about what "other" might include – possibly operations research or some other kind of degree in statistics.

Table S.3 also shows that the percentage of bachelors degrees awarded to women through U.S. mathematics and statistics departments rose from 40.4% in 2004-2005 to 42.5% in 2009-2010 (it was 43.4% in 1999-2000). If computer science degrees are excluded, then the percentage of degrees awarded to women through U.S. mathematics and statistics departments rose from 43.5% in 2004-2005 to 45.2% in 2009-2010 (it was 46.7% in 1999-2000). Table E.1 in Chapter 3 shows that these percentages vary across levels of mathematics and statistics departments.

NCES also provides data on the numbers of degrees awarded [NCES2] (available at http://nces.ed.gov/programs/digest/d11/tables/dt11_327.asp); these data come from the IPEDS data submitted by a college or university office, while the CBMS survey data come from the department chairs. The NCES data and the CBMS data are not identical. For example, IPEDS reported 16,030 undergraduate degrees awarded in mathematics and statistics during the 2009-2010 academic year, while CBMS2010 reported 19,241 degrees (Table S.3). Unlike the CBMS data, the NCES data do not always include double majors or mathematics education majors, and the NCES data do not include computer science majors given in a mathematics department in the totals of mathematics degrees awarded. NCES data is census data, while CBMS data are estimates based upon a stratified random sample. NCES data showed an increase of 1,679 degrees (12%) from the 2004-2005 academic year to the 2009-2010 academic year, while CBMS2010 data showed an

increase of 408 degrees, though some of the change observed in the NCES data may be due to changing practices regarding the reporting of double and joint majors.

Appointment type of instructors in undergraduate mathematics and statistics courses (Tables S.4 through S.9)

CBMS2010 Tables S.4 through S.9 provide information about who was teaching undergraduate mathematics and statistics courses in four-year and two-year colleges and universities. For the CBMS 2010 survey, faculty at four-year institutions were broken into four categories: tenured, tenure-eligible, and permanent faculty (TTE), other full-time faculty (OFT) who were full-time but not TTE, part-time faculty, and graduate teaching assistants (GTAs). A course was to be reported as being taught by a GTA if and only if the GTA 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 category. For two-year colleges, which typically do not have a tenure system, faculty were classified as full-time faculty or part-time faculty. These tables are broken down further, by courses and by the level of the department, in tables in Chapters 3, 5, and 6.

In past CBMS surveys, the TTE category was labeled "tenured/ tenure-eligible" on the survey questionnaire, without the word "permanent", but the instructions for the questionnaire told departments at institutions that did not recognize tenure (12% of all four-year mathematics departments in the CBMS 2010 survey and 5% in 2005) to place permanent faculty in the TTE category. In the 2010 survey the label "permanent" was added to the description of the TTE category on the questionnaire, and this change may have added to the TTE category other instructors who had teaching positions that were regarded as permanent, although these faculty did not have tenure and were not eligible for tenure, even if their institution recognized tenure. The instructions did not define "permanent" beyond the situation where the institution did not recognize tenure, but it seems quite possible that some depart-

TABLE S.4 Percentage of sections (excluding distance-learning and dual-enrollment 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 2010. Also total enrollments (in 1000s), excluding distance-learning and dual-enrollment enrollments. The comparable table in CBMS2005 is S.5, p. 13.

	Percentage of sections taught by					
Four-Year College & University	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Departments						
Mathematics courses 2010	47	16	20	6	11	1928
Statistics courses 2010	60	9	14	3	13	250
Computer Science courses 2010	60	17	21	1	2	73
All mathematics department courses 2010	49	15	19	6	11	2251
Statistics Departments						
All statistics department courses 2010	49	11	8	10	22	105
Two-Year College Mathematics Programs	Full- time		Part- time			Enrollment in 1000s
All TYC mathematics program courses 2010	54	--	46	--	--	1836

Sums of percentages across rows do not always total 100% due to rounding.

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010. (See discussion of Tables S.4 - S.9.)

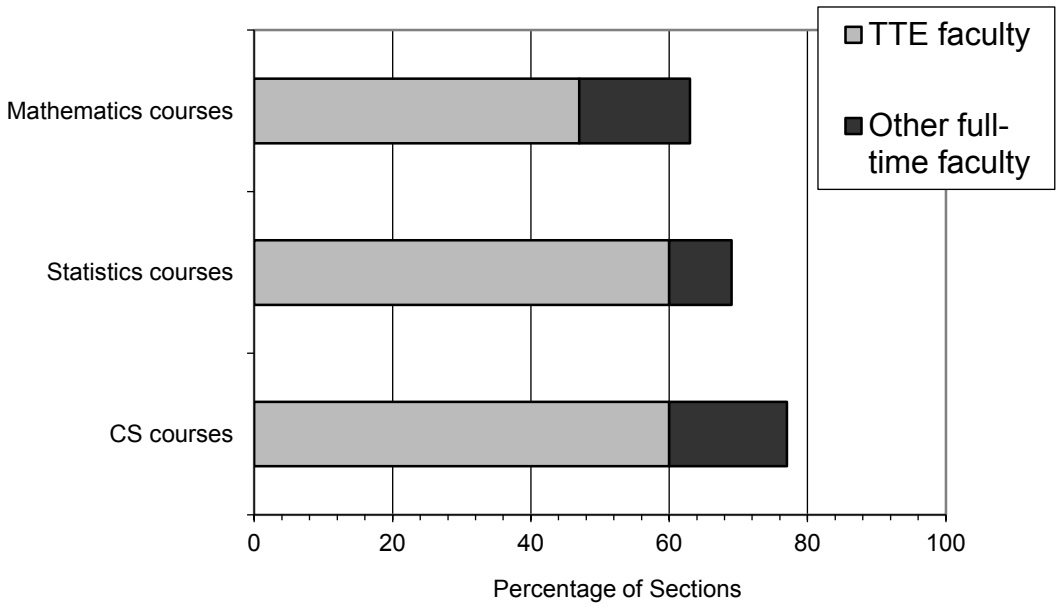

FIGURE S.4.1 Percentage of sections in four-year college and university mathematics departments taught by tenured/tenure-eligible/permanent (TTE) faculty and by other full-time (OFT) faculty in fall 2010, by type of course. Deficits from 100% represent courses taught by part-time faculty, graduate teaching assistants, and unknown faculty.

ments interpreted "permanent faculty" to have this additional meaning, and some of the data suggest that this was the case. Hence, the addition of the word "permanent" may mean that in 2010, faculty who might be classified as "teaching faculty", who had renewable contracts, but were not tenured or tenure-eligible, may have been added to the TTE category, even if the institution recognized tenure. As a consequence of this change, in 2010 the other full-time (OFT) category may consist primarily of postdocs and other temporary academic visitors.

The 2010 CBMS survey followed the practice established in the 2005 survey of presenting findings in terms of percentages of "sections" offered. In analyzing the 2010 survey data, it seemed that the notion of "section" varied somewhat among different departments, particularly for lower-level classes that may be taught with a laboratory component. A further, and possibly related, problem experienced in the 2010 survey was the inconsistent numbers of faculty and sections reported by some departments; this problem had occurred in past surveys and was resolved by creating the category of "unknown" instructors. The percentage of "unknown" faculty in the 2010 CBMS survey was generally higher than in past surveys, making it difficult to draw conclusions about changes in the percentages of the various ranks of instructors teaching specific courses. When comparing data from the CBMS 2000 and earlier surveys, one must keep in mind the change made in 2005. In some cases the CBMS 2000 and earlier surveys presented data on who taught the course in terms of percentages of enrollments, rather than percentages of sections.

Table S.4 gives a macroscopic view of the faculty who taught undergraduate courses in mathematics and statistics departments of four-year colleges and universities and in the mathematics programs at two-year colleges in the fall of 2010. Chapter 3, Table E.5 breaks down the data on four-year departments in Table S.4 by the level (bachelors, masters, doctoral) of the mathematics and statistics department, revealing important trends in the data. Table S.4 shows that slightly fewer than half (49%) of the sections of all courses offered in mathematics departments of four-year colleges and universities in fall 2010 were taught by tenured, tenure-eligible, or permanent faculty, up slightly from the 48% reported in fall 2005. As we have noted, the word "permanent" was not included in the 2005 survey, and the percentage of unknown instructors rose from 5% in 2005 to 11% in 2010, both factors qualifying any conclusions that are drawn from the data. However, it is likely that increases in percentages indicate some increase in that category, though it may be that the additional faculty counted in the TTE category in 2010 were permanent faculty who were counted as other full-time faculty in 2005, and hence, even with an increasing percentage, there may be no real change in TTE faculty from 2005 to 2010.

TABLE S.5 Percentage of fall 2010 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 2010, with data for fall 2005 from CBMS2005 Table S.6 and data for 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/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Department courses						
Mathematics courses						
Precollege level 2010	18	20	44	9	9	201
Precollege level 2005	9	25	46	14	5	199
Precollege level 2000	20	18	43	10	10	219
Introductory level 2010	32	22	27	8	10	834
Introductory level 2005	31	25	28	10	6	695
Introductory level 2000	35	21	28	10	6	723
Calculus level 2010	59	15	12	7	8	743
Calculus level 2005	61	17	9	7	6	583
Calculus level 2000	64	14	10	6	5	570
Upper level 2010	78*				23*	150
Upper level 2005	84*				16*	112
Statistics courses						
Elementary level 2010	48	14	22	4	12	218
Elementary level 2005	49	16	28	3	3	145
Elementary level 2000	47	16	24	5	8	136
Upper level 2010 sections	77*				23*	32
Upper level 2005 sections	59*				41*	34
Computer Science courses						
Lower level 2010	50	17	29	1	3	52
Lower level 2005	63	12	17	1	8	43
Lower level 2000	42	19	28	0	11	90
Statistics Department Courses						
Elementary level 2010	33	17	12	15	23	81
Elementary level 2005	25	21	13	20	21	53
Elementary level 2000	27	14	20	29	10	54
Upper level 2010	79*				21*	27
Upper level 2005	74*				26*	23
Two-Year College Mathematics Programs	Full-time		Part-time			
All 2010 sections	54		46			1836
All 2005 sections	56		44			1616
All 2000 sections	54		46			1347

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

* Beginning in 2005, the CBMS survey 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."

Some rows do not sum to 100% due to round-off. Note: zero means less than one-half of one percent.

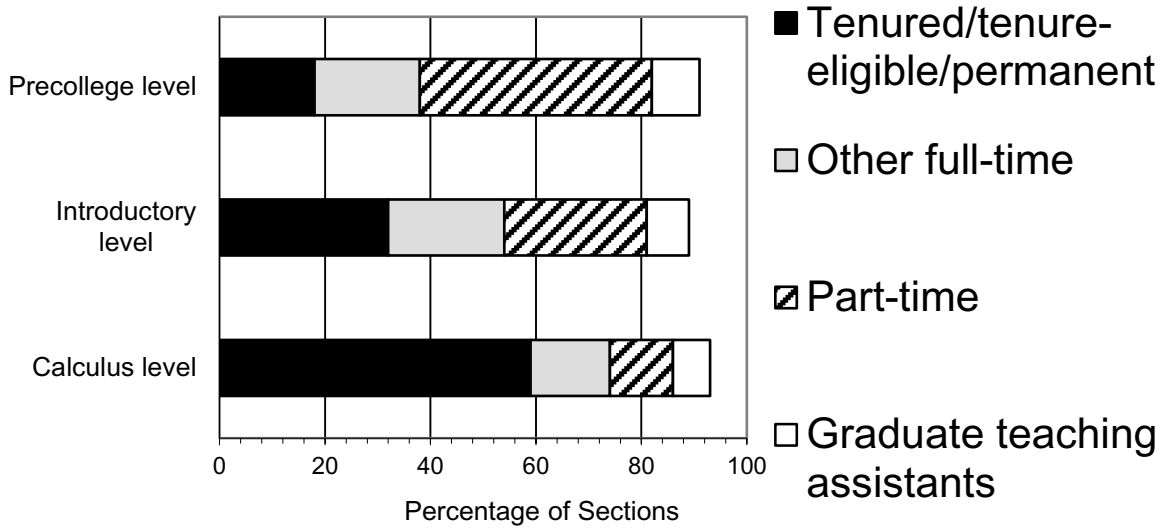

FIGURE S.5.1 Percentage of sections in lower-division undergraduate mathematics courses in mathematics departments at four-year colleges and universities by level of course and type of instructor in fall 2010. Deficits from 100% represent unknown instructors.

Table S.5 presents the percentages of sections taught by faculty of the various appointment types, broken down by the level of the courses, and includes the history from the past three surveys for courses offered in four-year mathematics and statistics departments, and in public two-year college mathematics programs. Mathematics courses at four-year departments were divided into the four categories of precollege-level, introductory-level, calculus-level, and upper-level (upper-level percentages were not gathered in the 2000 survey, and when gathered in 2005 and 2010 they have been broken into only the TTE and unknown categories). Statistics courses were classified as either elementary-level or upper-level, and only the lower-level computer science courses taught in mathematics departments are presented in Table S.5. Total enrollments (without distance-learning enrollments) for each of these course categories are also given. Chapter 3, Tables E.6-E.12 give the number of sections of precollege-level mathematics, introductory-level mathematics, calculus-level mathematics, elementary statistics, lower-level computer science, middle-level computer science, and advanced-level mathematics and statistics courses (respectively) taught by each rank of faculty, broken down by the level (bachelors, masters, doctoral) of the mathematics department in fall 2010. Tables E.9 and E.12 also present this data for elementary-level and advanced-level statistics courses taught in statistics departments, broken down by the level (masters or doctoral) of the statistics department. Further detail for courses taken by beginning students at four-year colleges and universities is given in Chapter 5, Tables FY.1, FY.3, FY.5, FY.6, and FY.9. Chapter 6, Table TYE.9 presents the number of sections and percentage of sections taught by part-time faculty in public two-year colleges in fall 2010 broken down by specific courses.

Table S.5 shows an increase in the percentage of sections of courses at the precollege-level and introductory-level taught by TTE mathematics faculty and a declining number of these sections taught by other full-time mathematics faculty; it is likely that mathematics courses at these lower levels might be taught by faculty who are permanent "teaching faculty", who were not tenured or tenure-eligible, supporting the notion that some of the growth in the TTE percentages is due to the inclusion of the word "permanent" in the description of these faculty. More detail on who taught specific introductory-level mathematics courses at the various levels of departments is contained in Chapter 5, Table FY.1.

Figure S.4.1 displays the percentages of sections taught by TTE and OFT faculty in mathematics departments in four-year colleges and universities, broken down by the subject areas of mathematics courses, statistics courses, and computer science courses. It is interesting to note that, as was the case in fall 2005, as shown in Figure S.4.1, the percentage of sections of statistics and computer science courses taught by TTE faculty in four-year mathematics departments was higher than for mathematics courses, though Table S.5 shows that the percentage of TTE faculty in calculus-level courses was nearly 60%, equal to the overall percentage for statistics and computer science courses. Figure S.5.1 displays the percentages of precollege-level, introductory-level, and calculus-level

mathematics classes taught by the various ranks of instructors, and, not surprisingly, shows that the percentage of TTE faculty rose as the course level rose.

There has been some concern in previous CBMS studies, as well as in studies made by the American Mathematical Society [LM], about the apparently growing use of part-time instructors in four-year mathematics departments. Table S.4 shows that in fall 2010, within mathematics departments at four-year institutions, the percentage of sections of mathematics courses taught by part-time faculty remained at 20%, as it was in 2005, the percentage of sections of statistics courses taught by part-time mathematics faculty decreased from 19% in 2005 to 14% in 2010, and the percentage of sections of computer science courses taught by part-time faculty almost doubled (increasing from 11% in 2005 to 21% in 2010), perhaps to compensate for the increased enrollment in computer science courses taught in mathematics departments that was noted earlier. From Table S.5 we see that the percentage of part-time instructors is highest for precollege-level courses (44%) and is only 12% for calculus-level courses. When faculty demographics are discussed later in this chapter, we will note that the number of part-time faculty declined 7% from fall 2005 to 2010 (see Table S.14).

According to Table S.4, in the statistics departments of four-year colleges and universities, the percentage of unknown instructors rose from 13% in 2005 to 22% in 2010, and the percentages of the various ranks of faculty teaching statistics courses were about the same, except for the other full-time category, which decreased from 23% to 11%. It is interesting to note that the percentage of sections taught by part-time instructors in four-year statistics departments was less than half that in mathematics departments, a trend that held in 2005, as well. The percentage of sections in two-year college mathematics programs taught by full-time faculty decreased from 56% in fall 2005 to 54% in fall 2010, returning to the fall 2000 level (see Table TYE.9).

Calculus courses are important for the mathematics major as well as for many other STEM (science, technology, engineering, and mathematics) majors, and hence CBMS surveys have paid particular attention to calculus courses. The 2010 survey made the same simplifying assumptions about calculus courses that were made in recent CBMS surveys. First, the CBMS survey divided all calculus courses into two components: "Mainstream Calculus" and "Non-Mainstream Calculus". "Mainstream Calculus" consists of the calculus courses that are prerequisites for upper-level mathematics courses as well as courses required in the physical sciences and in engineering, while "Non-Mainstream Calculus" means all of the other calculus courses (often with titles such as "Calculus for Business and Social Science" or "Calculus for the Life Sciences"). The second assumption made in the recent CBMS surveys of four-year mathematics departments is that calculus (and also elementary statistics) courses are generally taught either in large lecture sections that are broken into smaller recitation, discussion, or laboratory sections (typically with a graduate teaching assistant leading these sections) or in "regular classes" that always meet with the same instructor and students. CBMS surveys have further divided "regular classes" into those with enrollments of 30 or less, and those with larger enrollments (the number 30 was chosen because it was the maximum section size recommended by the Mathematical Association of America [MAA Guidelines]). The CBMS four-year mathematics questionnaire asks departments for enrollments, number of sections, and ranks of instructors for each of these three typical modes of instruction. The data showed that in 2010 there were other kinds of arrangements and/or the survey instructions were too complicated to follow, a situation that became particularly evident from data from departments reporting a smaller total number of recitation sections than lecture sections and/or the number of instructors reported bore little relation to the number of sections reported. With the creation of mathematics tutoring centers, perhaps recitation sections are becoming less necessary, and required calculus lab assignments may not always be completed in a "section" of a course, so sometimes there actually were fewer recitation sections than lecture sections. With some follow-up correspondence with a number of departments, the survey directors did their best to fit the data into our calculus course structure.

Table S.6 presents the percentages of the various rank instructors for Mainstream Calculus I and II for each of the three kinds of section structures: large lecture/recitation sections, regular sections of size less than or equal to 30, and regular sections of size larger than 30, in mathematics departments of four-year colleges and universities in fall 2010. This table also gives the total enrollment and average section size for each of these three kinds of sections in calculus courses in four-year mathematics departments, not including any distance-learning sections. It presents some comparison data from the 2000 and 2005 CBMS surveys. Chapter 5, Table FY.3 breaks these percentages down by the level of department, revealing further trends in Mainstream Calculus instruction. Figure S.6.1 displays the percentages of the various ranks of instructors for the three kinds of sections of Mainstream Calculus I in four-year mathematics departments. Table S.6 gives further data, including the percentage of sections of Mainstream Calculus I and II taught by full-time faculty in public two-year colleges as well as the total enrollments and the average section sizes. Table S.7 gives the analogous percentages for Non-Mainstream Calculus I and II,

TABLE S.6 Percentage of fall 2010 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 fall 2005 data from CBMS2005 Table S.7. Percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2005 and 2010. Also total enrollments (in 1000s) and average section sizes.

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Mainstream Calculus I							
Large lecture/recitation	46	19	20	9	7	107	50
Regular section <31	65	18	11	3	4	49	21
Regular section >30	48	16	14	9	12	78	36
Course total 2010	**53**	**18**	**15**	**7**	**8**	**234**	**35**
Course total 2005	63	17	7	8	5	201	32
Mainstream Calculus II							
Large lecture/recitation	50	15	27	4	4	61	51
Regular section <31	76	9	5	4	6	22	19
Regular section >30	52	17	5	13	13	45	37
Course total 2010	**59**	**14**	**12**	**7**	**8**	**128**	**36**
Course total 2005	66	15	6	8	5	85	33
Total Mainstream Calculus I & II 2010	**55**	**16**	**14**	**7**	**8**	**362**	**35**
Total Mainstream Calculus I & II 2005	64	16	7	8	5	286	32
Two-Year Colleges	Full-time %		Part-time %				
Mainstream Calculus I 2010	**90**		**10**			**63**	**20**
Mainstream Calculus I 2005	88		12			49	22
Mainstream Calculus II 2010	**86**		**14**			**29**	**24**
Mainstream Calculus II 2005	87		13			19	18
Total Mainstream Calculus I & II 2010	**89**		**11**			**93**	**21**
Total Mainstream Calculus I & II 2005	87		13			68	21

Percentage sums across rows may differ from 100% due to round-off.

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

and Chapter 5, Table FY.5 breaks these percentages down by the level of department for four-year mathematics departments.

From Table S.6 we see that the percentage of sections of Mainstream Calculus I taught by TTE faculty decreased from 63% in 2005 to 53% in 2010 (recall the possible addition of permanent faculty to TTE in 2010 and, here, 8% unknown faculty), and the percentage of sections taught by part-time faculty more than doubled, from 7% in 2005 to 15% in 2010. The type of section with the largest percentage of sections taught by TTE faculty was the regular sections with 30 or fewer students. The average size of Mainstream Calculus I sections increased from 32

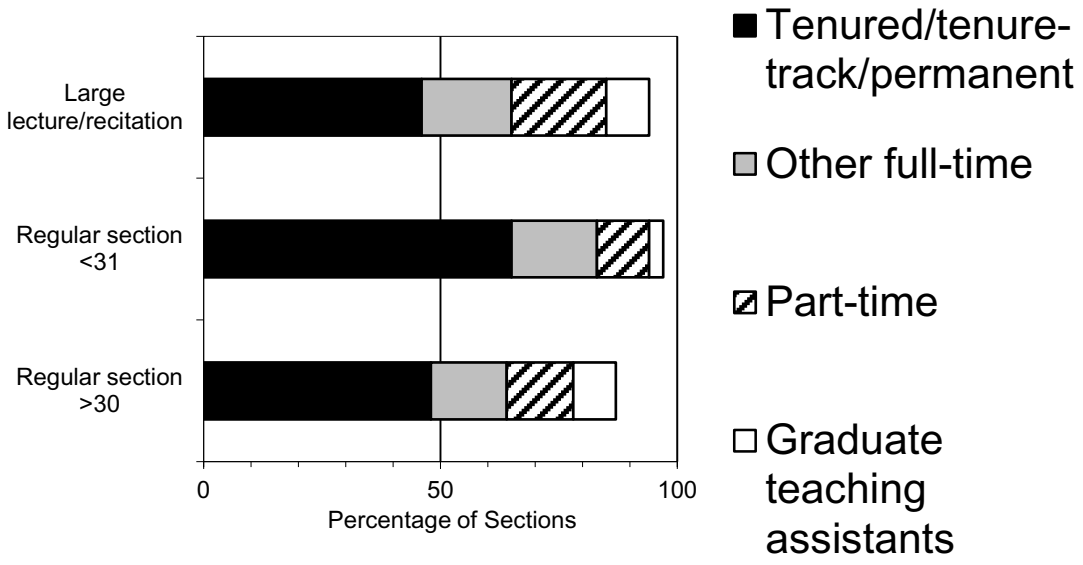

FIGURE S.6.1 Percentage of sections in Mainstream Calculus I taught by tenured/tenure-eligible/permanent, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2010. Deficits from 100% represent unknown instructors.

students in 2005 to 35 students in 2010. Looking at the three different kinds of sections of Mainstream Calculus I, we see that enrollments in the large lecture/recitation sections and enrollments in regular sections with more than 30 students both increased from 2005 to 2010, while the enrollment in regular sections with 30 or fewer students declined. Notice that Mainstream Calculus I enrollment increased from 201,000 in 2005 to 234,000 in 2010, an increase of 16%. Similar trends occurred in Mainstream Calculus II, where the percentage of sections taught by TTE faculty decreased from 64% in 2005 to 55% in 2010, the percentage of sections taught by part-time faculty doubled, from 6% in 2005 to 12% in 2010, and the enrollment both in large lecture/recitation sections and in regular sections with more than 30 students increased from 2005 to 2010, while the enrollment in regular sections with 30 or fewer students declined. Enrollment in Mainstream Calculus II grew faster than Mainstream Calculus I (perhaps due to increasing numbers of students taking Calculus I in high school) with Mainstream Calculus II enrollments rising 51% in 2010 over 2005. As calculus enrollments are up and the number of TTE faculty is down (Table S.14), it is not surprising that a smaller percentage of Mainstream Calculus sections are taught by TTE faculty, and that Mainstream Calculus average section size is rising.

In public two-year colleges, Table S.6 shows that the percentage of sections of Mainstream Calculus I taught by full-time faculty increased from 88% in 2005 to 90% in 2010, and the average section size decreased from 22 students in 2005 to 20 students in 2010. In Mainstream Calculus II at two-year colleges, the percentage of sections taught by full-time faculty decreased from 87% in 2005 to 86% in 2010, and the average section size increased from 18 students in 2005 to 24 students in 2010 (see Tables TYE.8 and TYE.9 in Chapter 6).

Table S.7 presents analogous data for all levels of Non-Mainstream Calculus (combined). First note that the percentage of TTE faculty teaching Non-Mainstream Calculus I was 31%, a little more than half the percentage of TTE faculty teaching Mainstream Calculus I, and the percentage of part-time faculty teaching Non-Mainstream Calculus I was 23%, compared to 15% for Mainstream Calculus I. For Non-Mainstream Calculus II and above, the CBMS questionnaire asked only about the course, without distinguishing the three possible section structures that were used for the other calculus sections. Analysis of the data for Non-Mainstream Calculus II and above is complicated by an error in the four-year mathematics department questionnaire. The entry that followed Non-Mainstream Calculus I in the four-year mathematics department questionnaire should have read: "Non-Mainstream Calculus II, III, etc.", but said instead: "Non-Mainstream Calculus I, II, III, etc.". While the instructions indicated that a course should be entered only once, some data for this entry

TABLE S.7 Percentage of sections in Non-Mainstream Calculus I and II, III, etc. taught by various kinds of instructors 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 2010. 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 2000, percentage of sections in 2005.) The comparable table in CBMS2005 is S.8, p. 19.

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Non-Mainstream Calculus I							
Large lecture/recitation	35	30	20	9	7	34	56
Regular section <31	33	18	23	15	11	17	24
Regular section >30	27	24	24	11	14	48	45
Course total 2010	31	24	23	12	11	99	42
(2000, 2005) [2]	(44,35)	(21,23)	(19,21)	(12,13)	(4,9)	(105,108)	(40,37)
Non-Mainstream Calculus II, III, etc. [3]							
Course total 2010	34	15	17	11	22	22	29
(2000, 2005) [2]	(53,33)	(10,26)	(22,23)	(15,17)	(1,1)	(10,10)	(40,46)
Total Non-Mnstrm Calculus I & II, III, etc.	31	22	21	12	14	121	39
(2000, 2005) [2]	(44,35)	(20,23)	(19,21)	(12,13)	(5,8)	(115,118)	(40,38)
Two-Year Colleges	Full-time %		Part-time %				
Non-Mainstream Calculus I	75		25			19	21
(2000, 2005)	(74,73)		(26,27)			(16,20)	(22,23)
Non-Mainstream Calculus II	50		50			2	27
(2000, 2005)	(92,66)		(8,34)			(1,1)	(20,21)
Total Non-Mnstrm Calculus I & II	73		27			21	21
(2000, 2005)	(76,72)		(24,28)			(17,21)	(22,23)

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

[2] For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, of sections in 2005.

[3] The 2010 survey asked for "Non-Mainstream Cal I, II, and III, etc". -- the data here are our best estimate for Calculus II, III, etc. Previous surveys asked only for Non-Mainstream Calculus II.

Sums of percentages across rows may differ from 100% due to round-off.

included data for Non-Mainstream Calculus I. Using the additional data on faculty, and with some follow-up correspondence to some departments, the survey directors interpreted the data as best they could. With that caveat, the percentage of TTE faculty teaching Non-Mainstream Calculus II, III, etc. increased from 2005 to 2010 (but with 22% unknown instructors in 2010), the enrollment more than doubled over 2005 (note that it included Non-Mainstream Calculus III, etc. in 2010 but not in 2000 or 2005), and the average section size in 2010 was about two-thirds of what it was in 2000 or 2005.

TABLE S.8 Percentage of sections in elementary probability and statistics courses taught by various types of instructors 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 2010; comparable data for (2000, 2005) when available. Also total enrollments (in 1000s) and average section sizes. Distance-learning enrollments are not included. (For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, percentage of sections in 2005.) The comparable table in CBMS2005 is S.9, p. 20.

	Percentage of sections taught by						
Four-Year Colleges & Universities Mathematics Departments	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Introductory Statistics (F1) [4] (no calculus prerequisite) [3]							
Large lecture/recitation	46	6	27	2	19	47	33
Regular section <31	46	17	26	2	9	54	22
Regular section >30	46	18	17	8	12	74	45
Course total (F1)	46	15	24	4	12	174	31
(2000, 2005) [2]	(45,51)	(13,16)	(24,27)	(7,3)	(11,4)	(114,122)	(42,31)
Introductory Statistics (F2) (calculus prerequisite) (not for majors)							
Large lecture/recitation	59	21	8	2	9	8	25
Regular section <31	70	8	12	3	7	6	15
Regular section >30	49	23	10	19	0	9	38
Course total (F2)	61	16	10	7	6	23	24
Probability & Statistics (F3) (no calculus prerequisite)							
Course total (F3)	41	8	26	9	16	18	32
(2000, 2005) [2]	(50,29)	(28,24)	(23,44)	(0,1)	(0,2)	(13,18)	(25,30)
Other elementary level Probability & Statistics courses (F4)							
Course total (F4)	71	12	0	6	12	3	27
Total All Elem. Probability & Statistics courses							
Course total (F1+F2+F3+F4)	48	14	22	4	12	218	30
(F1 + F3 totals, 2000, 2005) [2]	(46,48)	(14,17)	(24,29)	(6,3)	(10,3)	(127,140)	(25,31)
Two-Year Colleges	Full-time %		Part-time %				
Total All Elementary Probability and Statistics Courses	61		39			114	28
(2000, 2005)	(66,65)		(34,35)			(71,101)	(25,26)

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

[2] For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, of sections in 2005.

[3] This course was called "Elementary Statistics" in previous CBMS surveys.

[4] F1 is the statistics course number on the four-year mathematics survey form.

Sums of percentages across rows may differ from 100% due to round-off. Note: 0 means less than one half of 1%.

In public two-year college mathematics programs, Non-Mainstream Calculus I enrollment was down slightly, approximately 1000 students (5%), in 2010 over 2005. Furthermore, the average class size was also down slightly to 21 students, and the percentage of sections taught by full-time faculty was up from 73% in 2005 to 75% in 2010. Non-Mainstream Calculus II enrollment doubled in 2010 over 2005 at two-year mathematics programs, growing from about 1,000 in 2005 to 2,000 in 2010. Average class size grew to 27, and the percentage of full-time faculty teaching it dropped from 66% in 2005 to 50% in 2010.

Elementary statistics courses are becoming important courses in mathematics and statistics departments. Their enrollments have been growing, and there is increased interest in who is teaching them and how they are taught. The data in Table S.8, regarding the courses taught in mathematics departments in four-year colleges and universities, and in two-year college mathematics programs, are considered first; next, in Table S.9, data regarding elementary statistics courses taught in statistics departments are considered.

Past CBMS surveys have studied two elementary-level statistics courses taught in mathematics departments of four-year colleges and universities, both with no calculus prerequisite: one was called "Elementary Statistics", broken down into the section structure used in gathering calculus course data, and the other course was called "Probability and Statistics", which was not broken down by section structure. In the 2010 survey, the name of the first course was changed to "Introductory Statistics", and the level was called "Introductory Level". In fall 2010, Table S.8 shows that Introductory Statistics had a total (non-distance learning) enrollment of 174,000, up 43% from fall 2005. This enrollment put Introductory Statistics enrollments almost midway between Mainstream Calculus I enrollments of 234,000 and Mainstream Calculus II enrollments of 128,000. When the "Probability and Statistics" (non-distance learning) fall 2010 enrollment of 18,000 (the same as the 2005 enrollment) is added to the Introductory Statistics enrollment, there is a total enrollment of 192,000 students in non-calculus probability and statistics courses in four-year mathematics departments in fall 2010 (up 37% from 2005). Following a request from the American Statistical Association (ASA) members of the CBMS2010 survey steering committee, the 2010 CBMS survey also inquired about other introductory probability and statistics courses, including introductory statistics courses with a calculus prerequisite. Given the growing number of students who take calculus in high school, there should be a growing market for an introductory statistics course that makes use of calculus. A course with this description had not been included in previous CBMS surveys. This new introductory-level course, "Introductory Statistics (calculus prerequisite) (for non-majors)", was broken down by the same three section structures used for calculus classes and for "Introductory Statistics (no calculus prerequisite)". As shown in Table S.8, the introductory statistics course with a calculus prerequisite enrolled roughly an additional 23,000 students, and with "other elementary probability and statistics courses" added in, the total of all introductory probability and statistics enrollment in four-year mathematics departments in fall 2010 was 218,000 students.

Table S.8 shows that in four-year mathematics departments in fall 2010, 48% of the sections of all the introductory probability and statistics courses combined were taught by TTE faculty (the same percentage as in 2005), and 22% of the sections were taught by part-time faculty (down from 29% in 2005); the average section size was 30 (it was 31 in 2005). The introductory statistics course with a calculus prerequisite had a larger percentage (61%) of instructors who were TTE faculty, and a smaller average section size (24); only 10% of the instructors were part-time faculty. Table S.8 is broken down further by the level of the four-year mathematics department in Chapter 5, Table FY.6.

Table S.8 also shows that mathematics programs at public two-year colleges enrolled 114,000 students in elementary probability and statistics courses. At two-year mathematics programs, the two courses in elementary statistics (one including probability and one without probability) saw an increase of 13% in the combined enrollment in 2010 compared with 2005. Sixty-one percent (61%) of the sections were taught by full-time faculty (down from 65% in 2005), and the average section size was 28 (up from 26 in 2005). No calculus-based elementary statistics course was included in the CBMS 2010 survey of two-year college mathematics programs.

The statistics department questionnaire inquired about "courses for non-majors or minors"; these courses included "Introductory Statistics (no calculus prerequisite)" and "Introductory Statistics (calculus prerequisite) (for non-majors)". As with these courses in four-year mathematics departments, both courses were broken down into the three kinds of sections: large lecture/recitation, regular classes with enrollment of 30 students or less, and regular classes with enrollments larger than 30; this data is given in Table S.9. Figure S.9.1 displays the percentage of the various ranks of faculty teaching the introductory statistics courses without a calculus prerequisite; this figure can be compared to Figure S.8.1, the figure for the analogous course taught in four-year mathematics departments. This is the first year that a statistics course for non-majors with a calculus prerequisite has been listed on the CBMS statistics department

questionnaire, and in fall 2010 in statistics departments it enrolled roughly 16,000 students, compared to 56,000 in the course without a calculus prerequisite. The enrollment of 56,000 in the course without a calculus prerequisite represents a 24% increase over the fall 2005 enrollment in this course. Almost half of the students enrolled in the new course that has a calculus prerequisite were enrolled in a section with the large lecture and recitation format (this was the case for 66% of the students in the course without a calculus prerequisite). The percentage of sections taught by TTE faculty in the course with a calculus prerequisite was 43% (higher than the course without a calculus prerequisite, where it was 29%), the percentage of sections taught by part-time faculty in the course with the prerequisite was 9% (lower than the course without a calculus prerequisite, where it was 14%), and the average section size in the course with a prerequisite was 37 students (lower than the course without a calculus prerequisite, where it was 47). Chapter 5, Table FY.9 breaks the data in Table S.9 down further by the level of department. There were other changes made to the course titles of the introductory and upper-level statistics courses listed on the 2010 statistics questionnaire; data for all of the introductory-level statistics courses taught in statistics departments are given in Table S.9.

Pedagogical methods used in introductory courses (Tables S.10 to S.13)

Past CBMS surveys have contained questions regarding how introductory courses are taught. The 2010 survey purposefully decided to reduce the number of these questions for several reasons: the percentages of sections taught using some of the "reform methods" were small, some of the "reform methods" had become widely used (e.g. use of graphing calculators), there was an extensive survey of calculus pedagogy running parallel to the CBMS 2010 survey, and finally, it was felt that the 2005 CBMS survey instrument needed to be simplified. For these reasons, the survey of four-year mathematics departments asked about pedagogy only in College Algebra and in Introductory Statistics with no calculus prerequisite, while the survey of statistics departments asked only about Introductory Statistics with no calculus prerequisite (using the

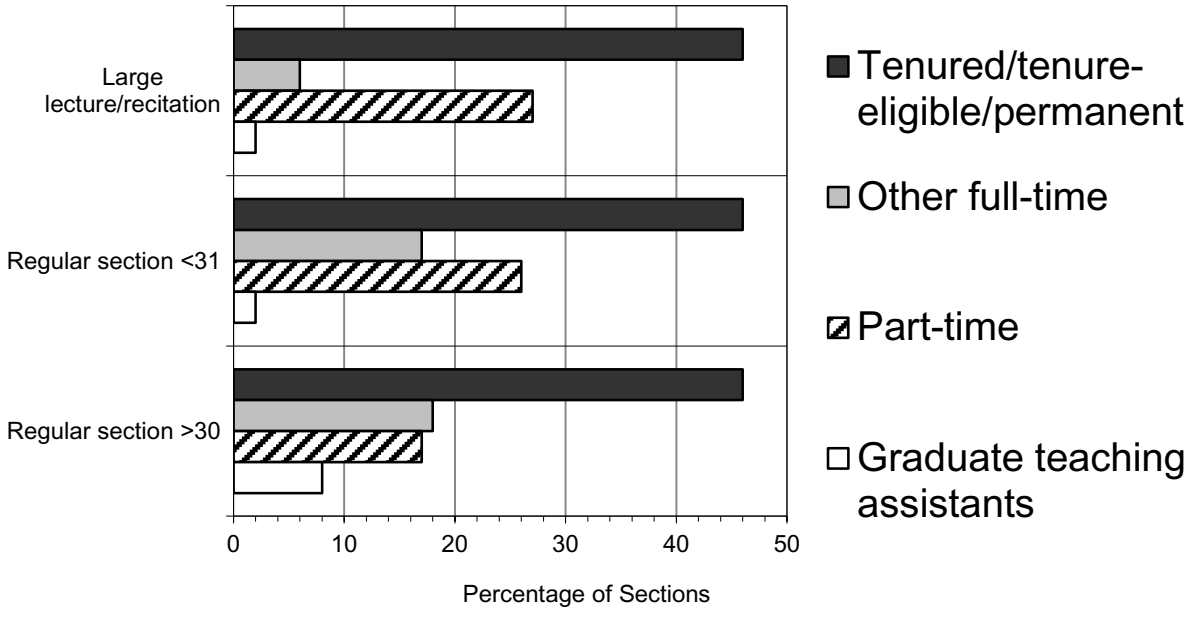

FIGURE S.8.1 Percentage of sections in Introductory Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible/permanent, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2010. Deficits from 100% represent unknown instructors.

TABLE S.9 Percentage of sections in elementary statistics for non-majors/minors (no Calculus prerequisite) and (Calculus prerequisite) taught by various kinds of instructors in statistics departments at four-year colleges and universities by size of sections in fall 2010. Also, total enrollments (in 1000s) and average section sizes. Distance-learning enrollments are not included. (Data from 2000, when available [2,] show percentage of enrollments.) The comparable table in CBMS2005 is S.10, p. 22.

	Percentage of sections taught by						
Statistics Departments	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Introductory Statistics (no calculus prerequisite) [3] (E1) [4]							
Large lecture/recitation	21	20	13	14	31	38	61
Regular section <31	44	25	20	4	7	5	23
Regular section >30	33	9	11	25	21	13	40
Course total	29	18	14	16	24	56	47
(2000, 2005) [2]	(36,26)	(17,21)	(22,16)	(19,22)	(6,15)	(40,42)	(65,63)
Introductory Statistics (calculus prerequisite) (for non-majors) (E2)							
Large lecture/recitation	35	21	9	10	25	7	46
Regular section <31	47	11	3	8	31	4	27
Regular section >30	47	13	15	14	11	5	37
Course total	43	15	9	11	23	16	37
Total of Introductory Statistics courses (E1 & E2) in 2010							
Large lecture/recitation	24	20	12	13	30	45	58
Regular section <31	45	19	13	6	16	9	25
Regular section >30	37	10	12	22	19	18	39
Course total	32	17	12	14	24	73	44

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

[2] Previous CBMS surveys gathered data for a course described as Probability and Statistics (no calculus prerequisite). Beginning in 2010, this description was replaced with Introductory Statistics (calculus prerequisite) (for non-majors).

[3] In previous CBMS surveys, this course was called "Elementary Statistics".

[4] E1 is the statistics course number on the four-year statistics survey form.

Sums of percentages across rows may differ from 100% due to round-off.

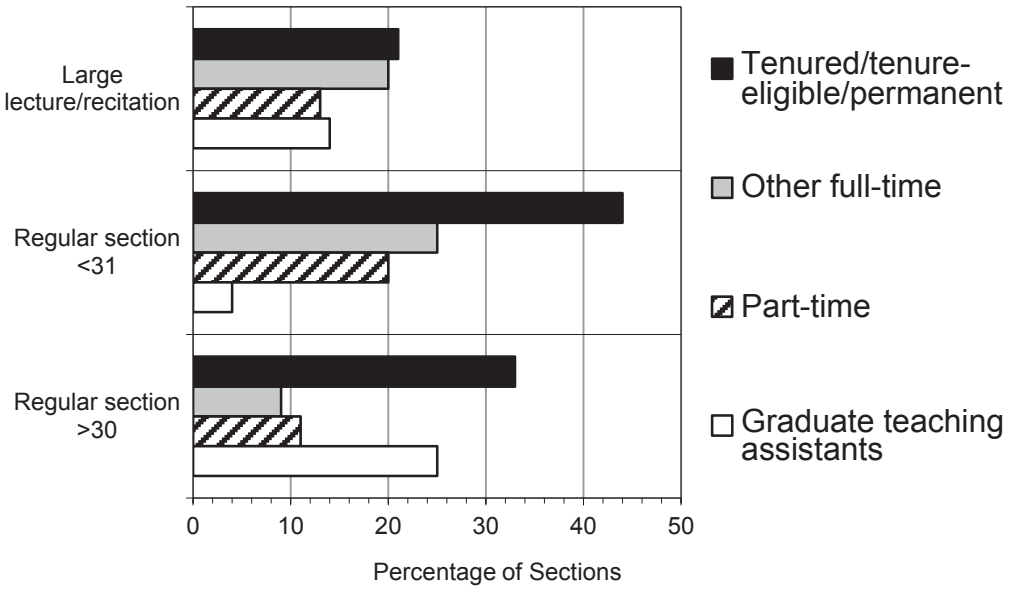

FIGURE S.9.1 Percentage of sections in Introductory Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible/permanent faculty, other full-time faculty, part-time faculty, and graduate teaching assistants in statistics departments at four-year colleges and universities by size of sections in fall 2010.

same questions as the four-year mathematics survey so that these responses could be compared). The two-year college survey asked fewer questions about a more limited set of reform methods. Hence, given the changes made to the 2010 questionnaire, the data that follows, while quite interesting, does not compare well to the data on pedagogy from previous surveys.

Tables S.10, S.11, and S.12 present data on ways Mainstream Calculus, Non-Mainstream Calculus, and Elementary Statistics courses were taught in mathematics programs at public two-year colleges. These tables show the percentages of sections taught using computer algebra systems, commercial computer packages, and those that were described as "mostly lecture"; these tables give the total enrollment (not including distance-learning enrollment) and the average section size. The corresponding Figures S.10.1, S.11.1, and S.12.1 display this data in bar graphs. The data show that, in two-year colleges, "mostly lecture" described 66% of the Mainstream Calculus I sections, 85% of the Mainstream Calculus II sections, 72% of the Non-Mainstream Calculus I sections, 84% of the Non-Mainstream Calculus II sections, and 81% of the Elementary Statistics sections. Computer algebra systems were used mostly in Mainstream Calculus I, and there was some use of commercial software, particularly in the Non-Mainstream Calculus and Elementary Statistics sections. Percentages of on-campus sections of specific mathematics courses at public two-year colleges using various instructional methods can be found in Table TYE.10 of Chapter 6.

It has been noted that introductory statistics course enrollments showed tremendous growth from 2005 to 2010, particularly at four-year mathematics departments and statistics departments, where their enrollments grew by more than 50% from 2005 to 2010. With the growth in introductory statistics course enrollments, there has been considerable interest in, and recommendations about, the pedagogy used in teaching these courses (see for example [CAUSE], [Moore], and [GAISE]). The 2010 CBMS survey developed a set of questions designed to measure the impact in mathematics and statistics departments of these and other reports regarding teaching elementary statistics in four-year colleges and universities. The first question in the pedagogy section of the four-year mathematics and statistics questionnaires asked the department to estimate the percentage of class sessions in which real data is used in most sections of its elementary statistics course; departments could choose between the percentage intervals 0-20%, 21-40%, 41-60%, 61-80%, and 81-100%. The percentage of departments that chose each of these intervals is given in Table S.13(A), broken down by mathematics/statistics departments, and Figure S.13(A).1 displays the distributions of these percentages in mathematics and statistics departments. The figure shows that mathematics departments' responses were skewed toward the lower percent-

TABLE S.10 Percentage of sections of Mainstream Calculus I and II taught using various instructional methods in mathematics programs in public two-year college mathematics programs in fall 2010. (Data for four-year colleges and universities and from two-year colleges for 1995, 2000, 2005 (with different categories) are reported in Table S.11, p. 24, of CBMS2005.) Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included.

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Mainstream Calculus I	9	12	66	63	20
Mainstream Calculus II	9	11	85	29	24
Total Mainstream Calculus I & II	9	12	71	93	21

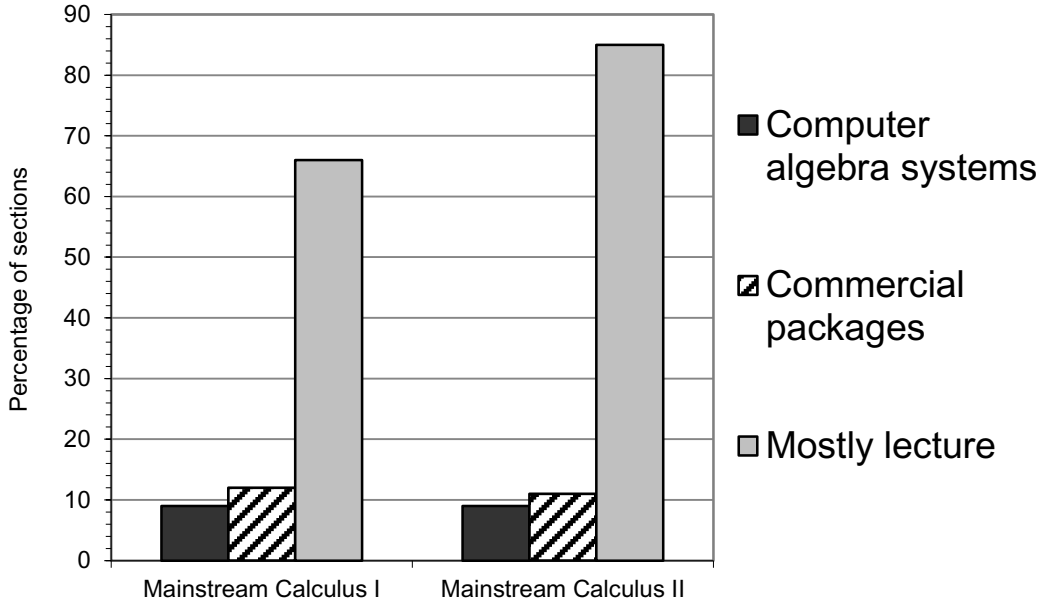

FIGURE S.10.1 Percentage of sections of Mainstream Calculus I and Mainstream Calculus II taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010.

TABLE S.11 Percentage of sections of Non-Mainstream Calculus I taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010. Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included. (Data for four-year colleges and universities, and from two-year colleges from 1995, 2000, and 2005 (with different categories) are reported in Table S.12, p. 27, of CBMS2005.)

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Non-Mainstream Calculus I	0	22	72	19	21
Non-Mainstream Calculus II	0	0	84	2	27
Total Non-Mainstream Calculus I & II	0	20	73	21	21

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

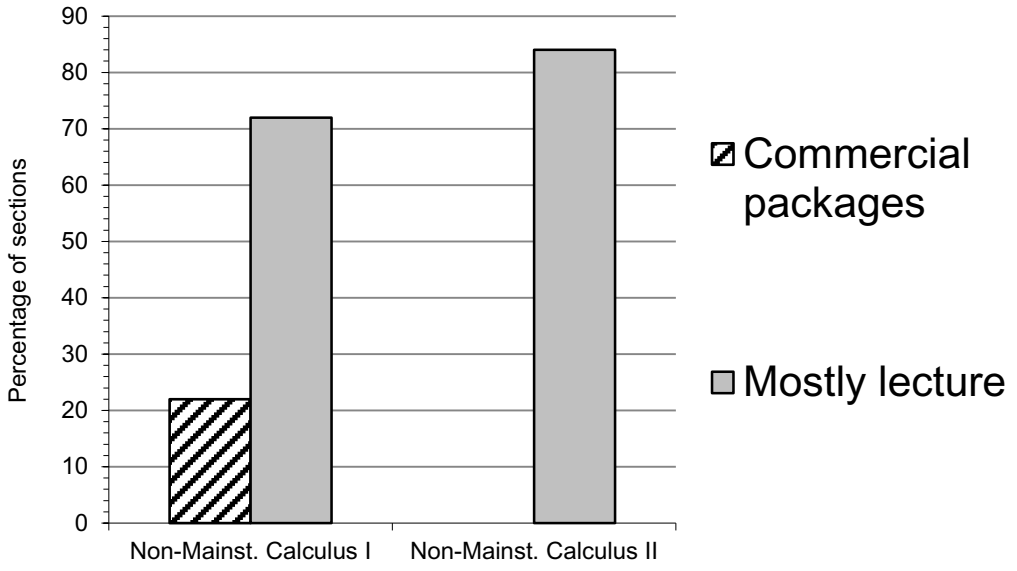

FIGURE S.11.1 Percentage of sections of Non-Mainstream Calculus I and Non-Mainstream Calculus II taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010.

TABLE S.12 Percentage of sections of Elementary Statistics at mathematics programs at public two-year colleges taught using various instructional methods in fall 2010. Also total enrollment (in 1000s) (distance-learning courses excluded) and average section sizes. (Data from mathematics and statistics departments at four-year colleges and universities, and from public two-year colleges (with different categories) from 1995, 2000, and 2005 is reported in CBMS2005, Table S.13.)

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Elementary Statistics	2	19	81	114	28

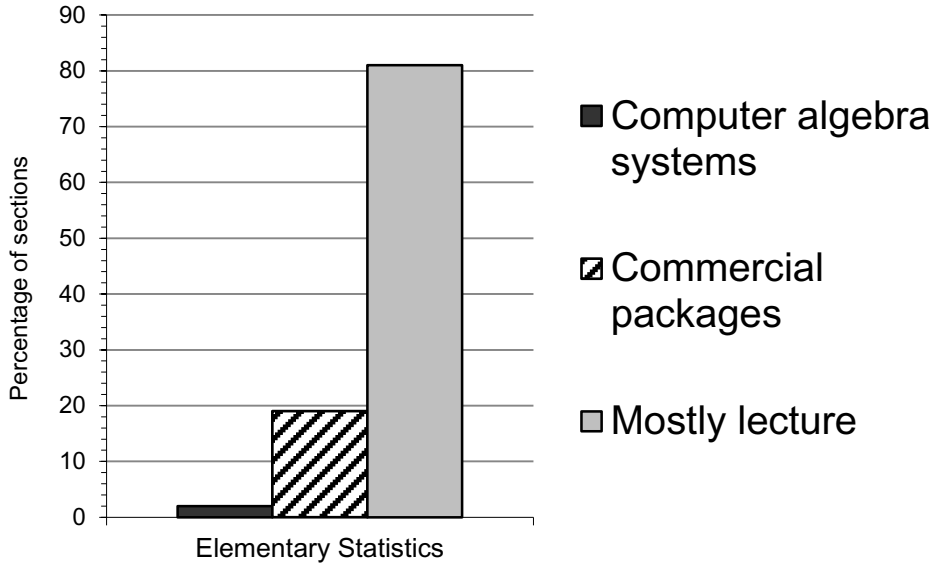

FIGURE S.12.1 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught using various reform methods in two-year colleges in fall 2010.

TABLE S.13 (A) Percentages of mathematics and statistics departments at four-year colleges and universities that use various practices to teach Introductory Statistics with no calculus prerequisite (for non-majors/minors) in the majority of the sections in fall 2010.

	% of Math Depts.	% of Stat Depts.
Offer elementary statistics course with no calculus prerequisite	84	88
Percentage of class sessions in which real data is used is:		
0-20%	18	9
21-40%	27	17
41-60%	19	16
61-80%	16	20
81-100%	20	38
Percentage of class sessions in which in-class demonstrations or problem solving activities take place is:		
0-20%	14	19
21-40%	29	22
41-60%	13	16
61-80%	25	17
81-100%	19	26
Majority of sections use the following kinds of technology:		
Graphing calculators	71	43
Statistical packages	55	87
Educational software	19	40
Applets	17	34
Spreadsheets	51	48
Web-based resources	54	74
Classroom response systems	10	29
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	45	36

ages, while the statistics departments' responses were skewed toward the higher percentages. A second question asked departments to estimate the percentage of class sessions in which in-class demonstrations and/or in-class problem solving activities or discussions took place, and presented the same percentage intervals as responses. The results are given in Table S.13(A) and displayed in Figure S.13(A).2. For this question on in-class demonstrations/problem solving activities, there was less evidence of a different trend in the responses from the two kinds of departments. The third question asked departments about the use of the following kinds of technology in most sections of its elementary statistics course: graphing calculators, statistical packages, educational software, applets, spreadsheets, web-based resources (including data sources, online texts, and data analysis routines), and classroom response systems (e.g. clickers). The percentages of mathematics and statistics departments using each of these kinds of technology are given in Table S.13(A) . The data show that less sophisticated technology, such as graphing calculators, was more popular in elementary statistics courses taught in mathematics departments, spreadsheet use was about the same in mathematics and statistics departments, but all of the other kinds of technology were said to be used in higher percentages of statistics departments', rather than in mathematics departments', elementary statistics courses. The final question on teaching elementary statistics asked each department if most sections of the course required assessments beyond homework, tests and quizzes (assessments such as projects, oral presentations, or written reports); here the statistics courses taught in mathematics departments reported a higher percentage of affirmative responses (45% of mathematics departments responded "yes", while 36% of statistics departments responded "yes"). The responses to these questions are broken down by the type of department in Chapter 5, Tables FY.7 (for elementary statistics courses taught in mathematics departments) and FY.8 (for elementary statistics courses taught in statistics departments),

CBMS2010 showed that 46% of four-year college and university mathematics department enrollments and 75% of two-year college enrollments are in precollege (arithmetic and basic mathematics) and introductory-level mathematics courses (including college algebra and precalculus courses) (see Table S.2). Professional organizations, as well as many state legislatures and federal commissions such as the Spellings Commission, have expressed concern about the large numbers of post-secondary students enrolling in remedial/developmental courses. Concern about how college algebra courses are being taught led to recommendations by the MAA Committee on the Undergraduate Program in Mathematics (CUPM) subcommittee CRAFTY (Curriculum Renewal Across the First Two Years) on the teaching of college algebra [CRAFTY] and an AMATYC initiative called "The Right Stuff" [RightStuff]. CBMS2005 data on teaching strategies showed declines over 2000 and 1995 in the use of various "reform methods" [B1], and showed the same basic patterns in college algebra as in calculus. Hence, the 2010 CBMS survey of four-year mathematics departments contained a section of questions on how college algebra courses are taught.

Table S.13(B) summarizes data on the pedagogy used in teaching college algebra in two ways. The leftmost column of Table S.13(B) presents the "overall" percentage of sections using a particular pedagogy (this percentage was computed by taking the total number of sections in the nation using the technique and dividing this number by the total number of sections of college algebra in the nation); the rightmost column presents the "mean per department" percentage (this percentage was computed by finding the average number of sections using this technique at each responding institution and then averaging these departmental percentages). The first question on college algebra pedagogy asked four-year mathematics departments to estimate the number of sections in which problem solving was taught in "a modeling sense (data => model => interpretation)". Table S.13(B) shows that over all sections of college algebra taught at four-year mathematics departments in the U.S., the percentage of sections of college algebra in which this was reportedly done was 44%, while the average of the percentages from each department was 53%. Table S.13(B) presents both the overall sections average and the average of the department averages (i.e. average of the averages computed for each department), to nine other aspects of college algebra classes taught in four-year mathematics departments. The table shows that, overall, 65% "primarily use a traditional approach", 68% use online homework, 66% use graphing calculators, 36% use small group activities, 27% use elementary data analysis, 20% use small group projects, 16% include writing assignments, 9% include class presentations, 9% use classroom response systems (clickers), and 5% use spreadsheets. The responses of departments are broken down by the level of department in Chapter 5, Table FY.2.

The status of the course titled "College Algebra" at two-year colleges is presented in Chapter 6, Table TYE.11.2. Eighty-four percent (84%) of all departments offered a course called College Algebra, with 26% using a modeling and problem-solving approach. A graphing calculator was permitted in 65% of two-year college mathematics departments, along with other technology such as spreadsheets, commercial programs, computer algebra systems, and web-based resources.

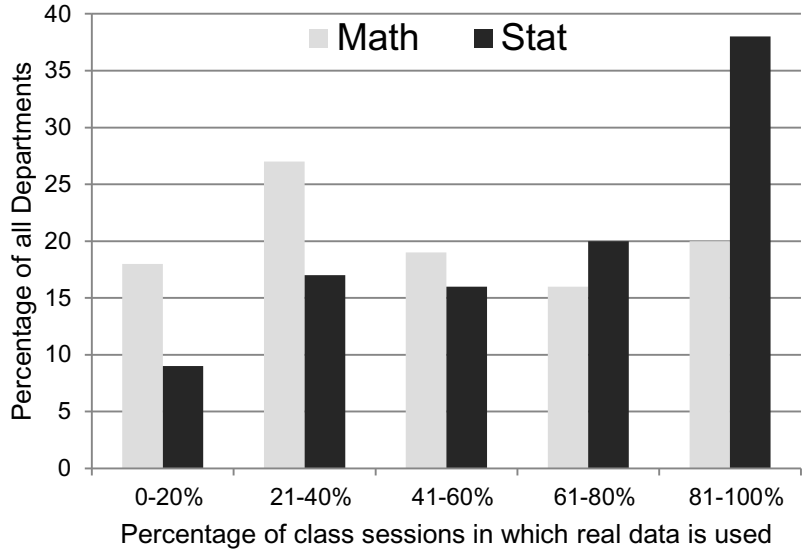

FIGURE S.13 A.1 Percentage of departments reporting the use of real data in the course *Introductory Statistics with no calculus prerequisite* by percentage of class sessions in which real data is used and by type of department.

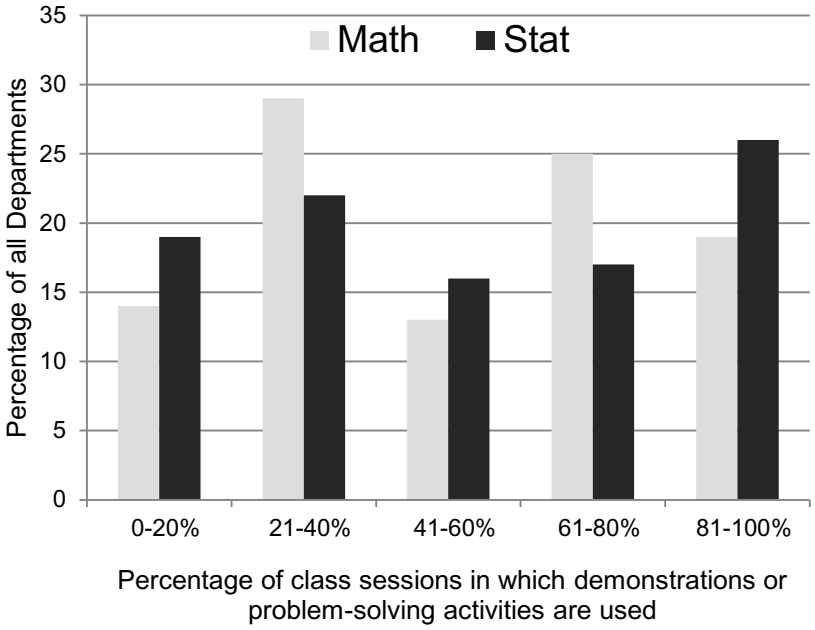

FIGURE S.13 A.2 Percentage of departments reporting in-class demonstrations or problem solving activities in the course *Introductory Statistics with no calculus prerequisite* by percentage of class sessions in which this activity takes place and by type of department.

TABLE S.13 (B) Percentage of sections of College Algebra in which various practices in teaching are used by mathematics departments at four-year colleges and universities in fall 2010.

Practices used in teaching College Algebra	Percentage of all sections, nationally	Mean of department-reported percentages
a. Emphasize problem solving in the modeling sense	44	53
b. Include elementary data analysis	27	26
c. Include writing assignments	16	23
d. Include small group activities	36	42
e. Include small group projects	20	22
f. Include class presentations	9	12
g. Use graphing calculators	66	72
h. Use spreadsheets	5	8
i. Use online homework generating and grading packages	68	58
j. Use classroom response systems (e.g., clickers)	9	8
k. Primarily use a traditional approach	65	70

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, as well as in the mathematics programs of two-year colleges during fall 2010. Further details about faculty in mathematics and statistics departments of four-year colleges and universities appear in Chapter 4, while additional information about faculty in mathematics programs of public two-year colleges is given in Chapter 7.

Source of demographic data

The demographic data on mathematics and statistics department faculty in four-year colleges and universities contained in the CBMS 2010 report was not collected using the same survey instrument as the other data, nor was the same random sample of institutions used. The demographic data was collected as part of the *Annual Survey*, a stratified randomized survey conducted each year by the American Mathematical Society and overseen by the Joint Data Committee 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. Reports on these surveys [JDC] are published each year in the Notices of the American Mathematical Society and online at http://www.ams.org/profession/data/annual-survey/annual-survey. Beginning with the CBMS survey in 2005, demographic data for the CBMS survey are collected as part of the *Annual Survey*; sampled departments were asked additional demographic questions that do not normally appear on the *Annual Survey* but are a part of the CBMS surveys.

In comparing data from the CBMS surveys to the data published in the *Annual Surveys*, one must keep in mind several differences between the two surveys. The tenured and tenure-eligible faculty (TTE) in the *Annual Surveys* do not include permanent faculty, unless the institution does not recognize tenure. The *Annual Surveys* do not include postdoctoral appointments as a part of "other full-time faculty" (OFT), while CBMS surveys do – i.e., CBMS survey tables list "other full-time faculty" (and these numbers include postdoctoral appointments), but they also break out

the number of other full-time faculty who are postdoctoral appointments. The CBMS surveys of "statistics departments" include only statistics departments that offer an undergraduate program in statistics, while the *Annual Surveys* go to all departments of statistics and biostatistics that award a Ph.D. However, the data for statistics departments that do not have an undergraduate program in statistics are not included in the tables that appear in this report. The 2005 Annual Survey did not include masters-level statistics departments, but the 2010 survey did include these departments; hence, comparisons to 2005 are made using only doctoral statistics programs, though the 2010 data for masters-level statistics programs are presented in some tables. The *Annual Surveys* use stratified random samples of bachelors-level programs, but a census of doctoral and masters-level programs. The demographic data for mathematics faculty at public two-year colleges were collected from the CBMS survey instruments and samples, as two-year colleges are not a part of the *Annual Survey*.

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

Table S.14 presents the number of faculty in mathematics and statistics departments of four-year colleges and universities, and in public two-year college mathematics programs, broken down into full-time faculty and part-time faculty in fall 1995, 2000, 2005, and 2010. Figure S.14.1 displays a graph of the numbers of full-time faculty at the three kinds of departments for each of the four years, while Figure S.14.2 shows the same information for the numbers of part-time faculty. Figures S.14.3, S.14.4, and S.14.5 display bar graphs of the numbers of full-time and part-time faculty for mathematics departments at four-year institutions, mathematics programs at two-year colleges, and statistics departments, respectively. Further details on the numbers of full and part-time

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, 2005, and 2010. (Two-year college data for 2005 and 2010 include only public two-year colleges.)

	1995	2000	2005	2010
Four-Year Colleges & Universities				
Mathematics Departments				
Full-time faculty	19572	19779	21885	22293
Part-time faculty	5399	7301	6536	6050
Statistics Departments (PhD)				
Full-time faculty	840	808	946	1004
Part-time faculty	125	102	112	105
Two-Year College Mathematics Programs				
Full-time faculty	7742	7921	9403	10873
Part-time faculty[1]	14266	14887	18227	23453

[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 for a dual-enrollment course). In 2005, the number paid by a third party was 1915, and in 2010, the number paid by a third party was 2323.

Note on data sources: Data on four-year mathematics and on Ph.D.-granting statistics departments in Table S.14 are taken from reports of the AMS's Annual Survey of the Mathematical Sciences, co-sponsored by AMS/ASA/IMS/MAA/SIAM and published each year in 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.

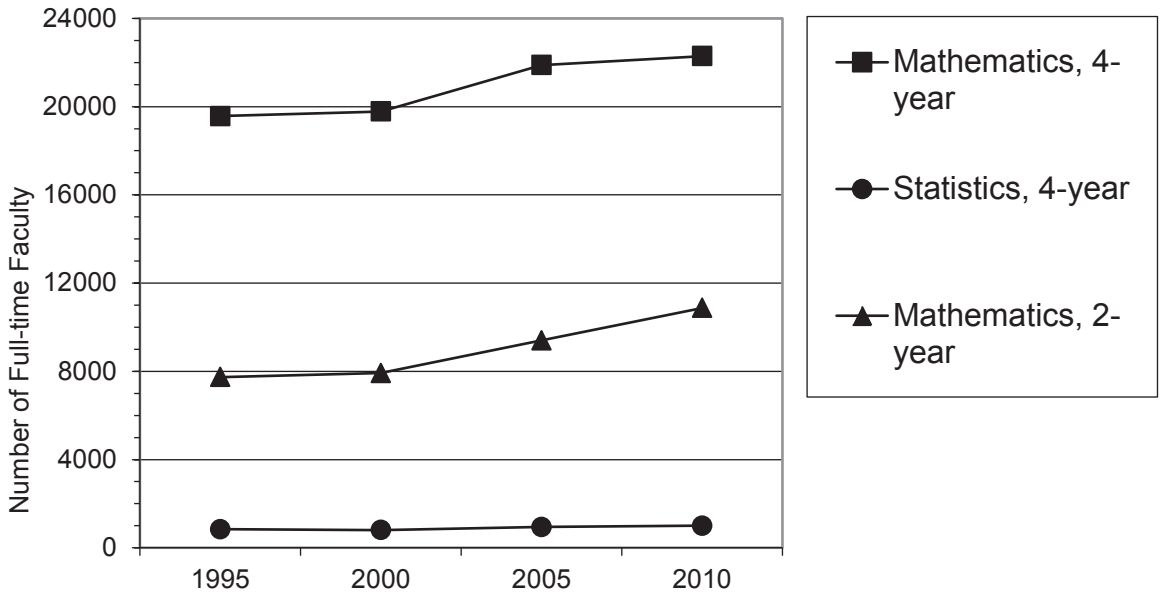

FIGURE S.14.1 Number of full-time faculty in mathematics departments of four-year colleges and universities, in doctoral statistics departments, and in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

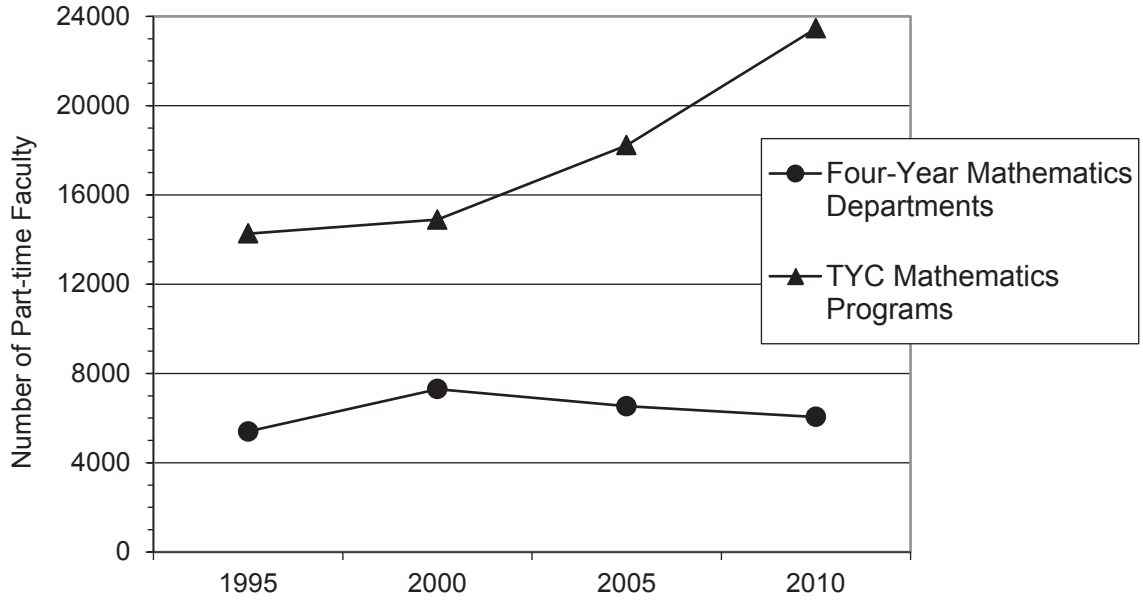

FIGURE S.14.2 Number of part-time faculty in mathematics departments at four-year colleges and universities and in mathematics programs at two-year colleges (TYCs) in fall 1995, 2000, 2005, and 2010.

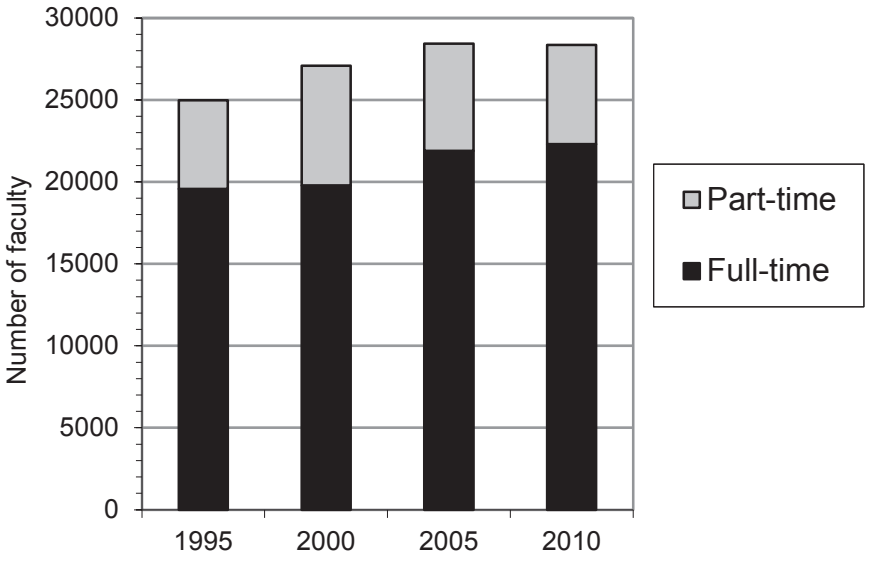

FIGURE S.14.3 Number of full-time and part-time faculty in mathematics departments of four-year colleges and universities in fall 1995, 2000, 2005, and 2010.

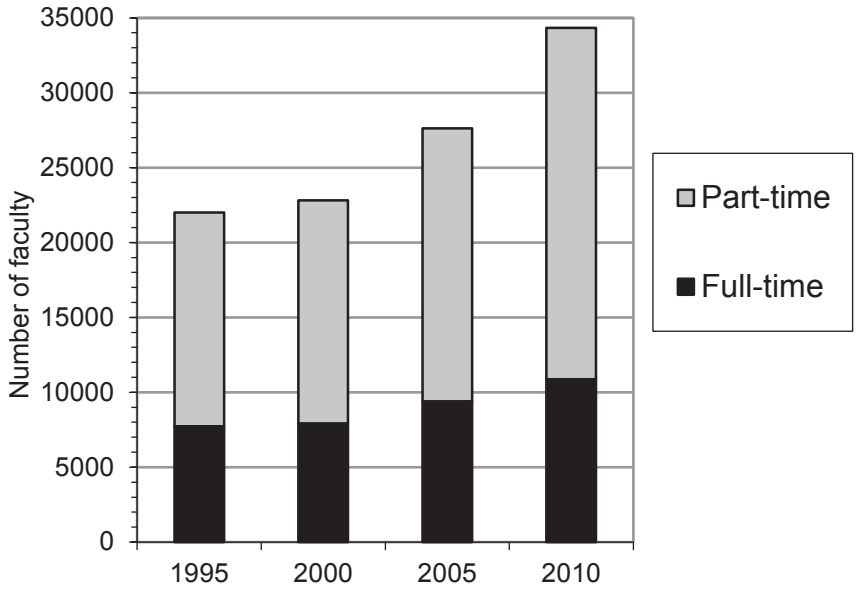

FIGURE S.14.4 Number of full-time and part-time faculty in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

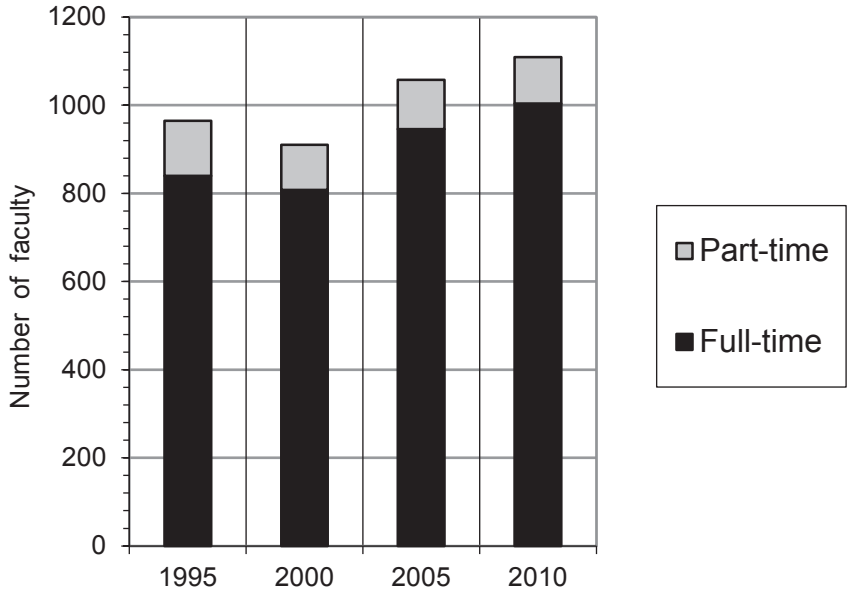

FIGURE S.14.5 Number of full-time and part-time faculty in doctoral statistics departments in fall 1995, 2000, 2005, and 2010.

faculty in four-year colleges and universities are presented in Chapter 4, Table F.1, and in Chapter 7, Table TYF.1 for two-year colleges.

Table S.14 and Figure S.14.3 indicate that, in fall 2010, the total number of full-time mathematics faculty plus part-time mathematics faculty for all levels of four-year mathematics departments combined remained about the same number as in 2005. The number of full-time mathematics faculty was up 2% from 2005 (a lower rate of increase than the 11% growth observed from 2000 to 2005), and the number of part-time mathematics faculty continued the pattern of small decline observed since 2000, and was down 7% from 2005. Table S.14 shows that, from 1995 to 2010, the number of full-time mathematics faculty in four-year departments grew by 14%, while Table S.1 shows that total course enrollments at four-year mathematics departments grew by 36%, and total four-year college enrollments grew by 43% over this same time interval, indicating that the growth in full-time faculty has not kept pace with the growth in their mathematical science course enrollments or the total undergraduate four-year college enrollments.

Table S.14 and Figure S.14.5 indicate that, in fall 2010, the total number of full-time plus part-time statistics faculty in doctoral-level statistics departments increased 5% from 2005 to 2010; the number of full-time doctoral-level statistics faculty increased by 6%, and the number of part-time doctoral-level statistics faculty decreased 6% from 2005. Table S.1 shows that doctoral statistics department enrollments have more than doubled since 1995, but they are up only 11% from fall 2000. The growth in full-time statistics faculty in doctoral departments also has not kept pace with the growth in their statistics course enrollments.

The number of public two-year college mathematics program faculty has increased at about the rate of their total course enrollments. Table S.14 shows that in two-year college mathematics programs, the number of full-time permanent and temporary faculty increased by 16% from fall 2005 to fall 2010 and by at least 40% from 1995 (the 1995 number of faculty includes faculty at private two-year colleges, while the 2010 number does not). Two-year college mathematics program enrollments rose 41% from 1995 to 2010, according to Table S.1. The 2010 CBMS survey is the first CBMS survey to report a larger number of total mathematics faculty (full-time plus part-time) at two-year departments than at four-year departments.

Appointment type and degree status of full-time faculty (Tables S.15 and S.16)

Table S.15 gives the numbers of full-time faculty in the mathematics and statistics departments of four-year colleges and universities in fall 2005 and fall 2010, broken down by their appointment type (TTE, other full-time, postdoc) and the highest degree obtained by the faculty member (doctoral degree or other degree). In this table (as in the other faculty

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 2005 and fall 2010. (Postdocs are included in the other full-time category.)

Four-Year Colleges and Universities	Fall 2005				Fall 2010			
Mathematics Departments	Total	TTE	Other full-time	Postdoc	Total	TTE	Other full-time	Postdoc
Full-time faculty	21885	17256	4629	819	22293	16364	5929	1025
Having doctoral degree	18071	15906	2165	813	18249	15646	2603	1024
Having other degree	3814	1350	2464	6	4044	717	3326	1
Doctoral Statistics Departments								
Full-time faculty	946	783	163	51	1004	789	215	71
Having doctoral degree	915	781	133	51	969	786	184	71
Having other degree	31	2	30	0	35	3	31	0
Total Math & Doc. Stat Depts	22831	18039	4792	870	23297	17153	6144	1096
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	9403	8793	610		10873	9790	1083	
Grand Total	32234	26832	5402	870	34170	26943	7227	1096

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

TABLE S.16 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 2005 and fall 2010. Also gender among doctoral and masters degree recipients. (Postdocs are included in the other full-time category.) This table can be compared to Table S.17, p. 38, in CBMS2005.

Four-Year Colleges and Universities	Fall 2005					Fall 2010				
Mathematics Departments	Total	Tenured	Tenure-eligible	Other full-time	Postdoc	Total	Tenured	Tenure-eligible	Other full-time	Postdoc
Full-time faculty	21885	12874	4382	4629	819	22293	12747	3617	5929	1025
Number of women	5641 (26%)	2332 (18%)	1250 (29%)	2059 (44%)	191 (23%)	6416 (29%)	2740 (21%)	1227 (34%)	2449 (41%)	233 (23%)
Doctoral Statistics Departments										
Full-time faculty	946	604	179	163	51	1004	580	209	215	71
Number of women	211 (22%)	79 (13%)	66 (37%)	66 (40%)	16 (31%)	261 (26%)	95 (16%)	84 (40%)	82 (38%)	18 (25%)
			July 1, 1980 - June 30, 2010			July 1, 2005 - June 30, 2010				
Number of PhD's from US Math & Stat Depts[1]			32278			7259				
Number of women among new PhDs[1]			8051 (25%)			2349 (32%)				
Two-Year College Mathematics Programs	Total full-time	Full-time age < 40				Total full-time	Full-time age < 40			
Full-time faculty	8793	2326				9790	3244			
Number of women	4373 (50%)	1148 (49%)				4924 (50%)	1764 (54%)			
Masters degrees in mathematics and statistics granted in the U.S. in 2008-09[2]						5211				
Number of women among new masters recipients[2]						2147 (41%)				

[1] Reports of the Annual Survey of the Mathematical Sciences, *Notices of the AMS*, 1980-2011. Available at http://www.ams.org/profession/data/annual-survey/annual-survey

[2] 2010 Digest of Education Statistics, NCES, Table 300, available at http://nces.ed.gov/pubs2011/2011015.pdf

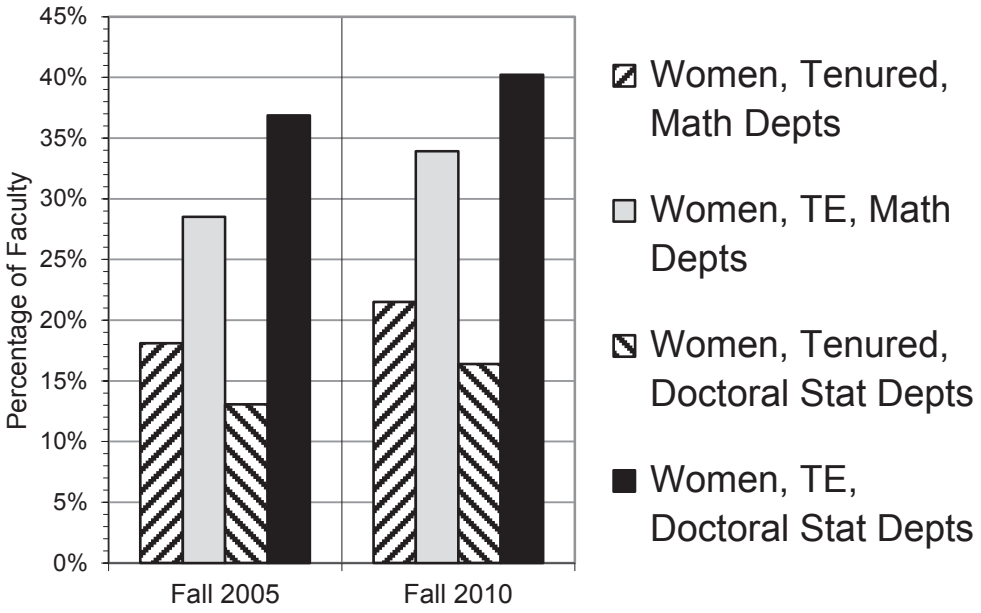

FIGURE S.16.1 Percentage of women in tenured and in tenure-eligible (TE) categories in mathematics departments of four-year colleges and universities and doctoral statistics departments in fall 2005 and 2010.

tables in this, and past, CBMS surveys), the category of other full-time faculty includes postdoctoral appointments, but the number of postdocs is also broken out of the number of other full-time faculty, so that trends in the growing category of postdoc faculty can be observed. The number of full-time faculty at two-year college mathematics programs is broken down into the categories of permanent and temporary faculty. Table S.16 considers only full-time faculty. It breaks the TTE faculty at four-year departments into tenured and tenure-eligible faculty, and it also presents the number of female faculty in each category; this table also considers the numbers of permanent faculty in public two-year college mathematics programs, broken down by gender, and it presents the numbers of those full-time permanent faculty under the age of 40. More detail on faculty at four-year mathematics and statistics departments can be found in Chapter 4, Table F.1, and on faculty in public two-year colleges in Chapter 7.

Table S.15 shows that when the 2% growth in the number of full-time mathematics faculty at four-year colleges and universities that occurred from fall 2005 to fall 2010 is broken down further, the components of this small growth in the number of full-time mathematics faculty were a 5% decline in the number of tenured plus tenure-eligible faculty and a 28% increase in the number of "other full-time faculty" (a category that includes postdoctoral appointments, a category which, by itself, increased by 25% from 2005). The 28% growth in other full-time faculty occurring between 2005 and 2010 came on top of a 31% increase in this category from 2000 to 2005. In fall 2010, postdoc appointments represented 17% of the category of other full-time faculty, almost the same as in 2005. The numbers of full-time mathematics faculty in four-year colleges and universities are also broken down by their highest degree, and Table S.15 shows that of the other full-time mathematics faculty who are not postdocs, the percentage of those with a doctoral degree decreased from 35% to 32%. Table S.16 shows that the number of tenured mathematics faculty incurred a small decline (127 faculty or 1%), while there was a larger decline (765 faculty or 17%) in the number of tenure-eligible mathematics faculty from 2005 to 2010. The decline in tenure-stream mathematics appointments, accompanied with the rise in non-tenure eligible appointments, is a concern that merits further study.

In doctoral statistics departments, Table S.15 shows that, from 2005 to 2010, the total number of tenured plus tenure-eligible statistics faculty grew by 6 faculty, the number of other full-time statistics faculty increased by 52 faculty (32% increase), and the number of postdoc statistics positions increased by 20 positions (39% increase). Table S.16 shows that, from 2005 to 2010, the number of tenured faculty decreased by 24 faculty, while the number of tenure-eligible faculty increased by 30 faculty. In fall 2000 there were 99 other full-time faculty in doctoral statistics departments, and in fall 2010 there were 215 other full-time faculty; hence, over the past ten years, this category of doctoral statistics faculty has more than doubled. Chapter 4, Table F.1 provides

TABLE S.17 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 2010. Percentage full-time permanent faculty in mathematics programs at public two-year colleges, by age, and average ages in fall 2010. Also, historical data from fall 2005 that can be found in Table S.18, p. 39, of CBMS2005.

Four-Year College & University Mathematics Departments	Percentage of tenured/tenure-eligible faculty										Average age 2005	Average age 2010
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
	%	%	%	%	%	%	%	%	%	%		
Tenured men	0	1	4	7	9	10	10	10	7	4	53.7	54.6
Tenured women	0	0	2	3	3	3	2	2	1	0	50.2	50.7
Tenure-eligible men	2	5	4	2	1	0	0	0	0	0	38.9	36.9
Tenure-eligible women	1	3	2	1	1	0	0	0	0	0	38.6	37.8
Total tenured & tenure-eligible faculty	2	9	12	12	14	13	13	12	8	4		

	Percentage of permanent full-time faculty									
Two-Year College Mathematics Program	<30	30-34	35-39	40-44	45-49	50-54	55-59	>59		
Full-time permanent faculty	8	9	12	14	15	11	13	17	47.8	46.8

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

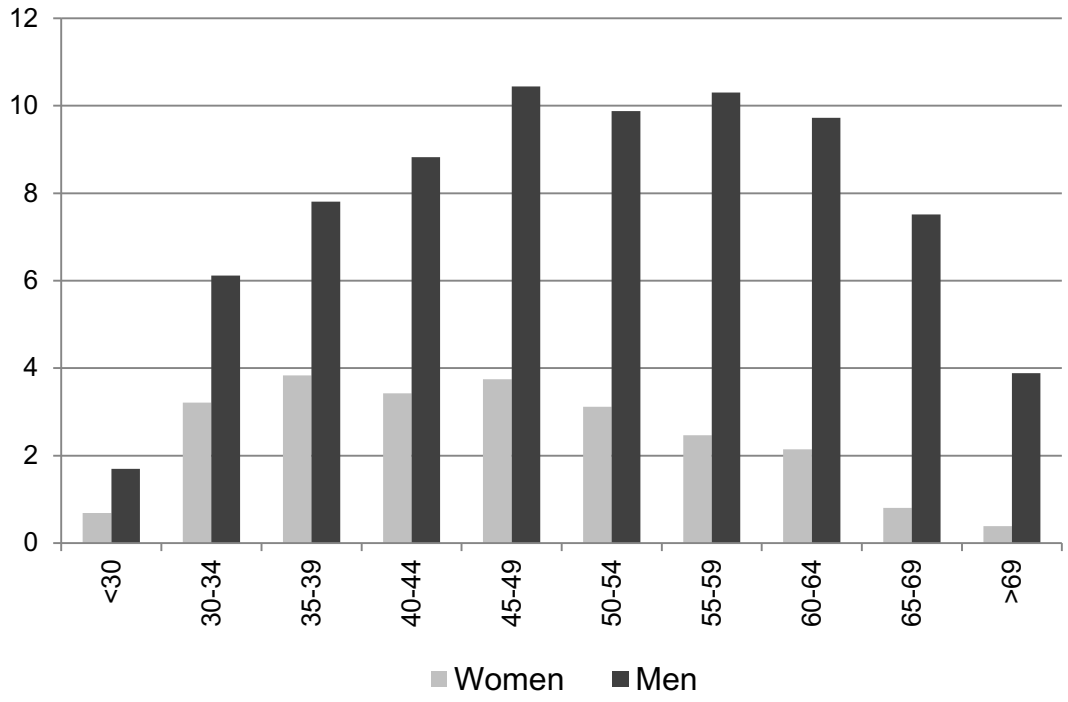

FIGURE S.17.1 Percentage of all tenured and tenure-eligible (TTE) faculty in mathematics departments at four-year colleges and universities belonging to various age groups, by gender, in fall 2010.

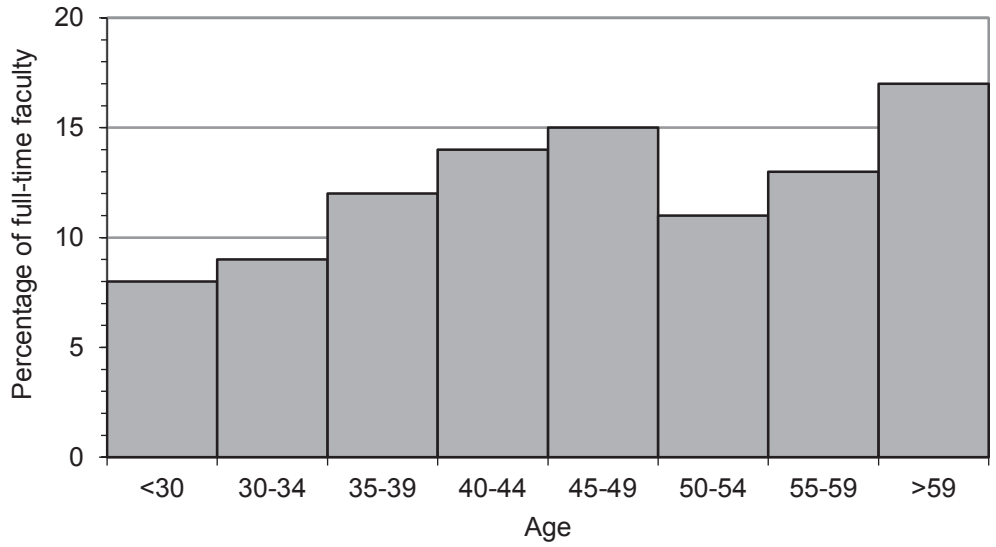

FIGURE S.17.2 Percentage of permanent full-time faculty in various age groups in mathematics programs at public two-year colleges in fall 2010.

more detail on numbers of statistics faculty, including data on masters-level statistics department faculty (data that was not gathered in 2005).

Table S.15 shows that the number of full-time permanent and temporary mathematics faculty at public two-year colleges increased from 9,403 in 2005 to 10,873 in 2010, a 16% increase, while temporary full-time faculty increased 78% from 2005 to a total of 1083 individuals in 2010 (see Table TYF.1). The number of full-time permanent mathematics faculty increased by 11%. Table S.16 shows that 30% of the full-time permanent mathematics faculty are under 40 years old. Chapter 7 gives more detail on the mathematics faculty at two-year colleges.

In fall 2010, a masters degree was the terminal degree for 83% of the full-time permanent mathematics faculty members at two-year colleges, up one percentage point from 2005. An additional 14% of full-time faculty held doctorates, and 3% held bachelors degrees. Of the total full-time permanent faculty, 68% held degrees in mathematics and 21% in mathematics education. See Tables TYF.4 and TYF.5 in Chapter 7.

Gender, age, and ethnicity among the mathematical science faculty (Tables S.16 to S.21)

According to the data from the *Annual Surveys*, the percentage of women receiving Ph.D. degrees in the mathematical sciences has remained close to 30% each year over the last ten years. Table S.16 shows that 32% of the new Ph.D.s that were awarded by mathematics and statistics departments between July 1, 2005 and June 30, 2010 went to women. The *Annual Surveys* and the CBMS surveys have shown a gradual increase in the percentage of women faculty. Table S.16, which breaks down the numbers of mathematical science faculty by gender, shows that this increasing trend in the percentages of women faculty continued from 2005 to 2010.

Table S.16 shows that in fall 2010, at all four-year mathematics departments combined, women comprised 29% of all full-time faculty, 21% of all tenured faculty, and 34% of all tenure-eligible faculty; each of these percentages is up several percentage points from 2005, even with the declining numbers of tenured and tenure-eligible mathematics faculty. In statistics departments in fall 2010, women were 26% of all full-time faculty, 16% of tenured faculty, and 40% of tenure-eligible faculty, all up from 2005. The *Annual Surveys* have shown larger percentages of Ph.D.s awarded to women in statistics than in mathematics. Figure S.16.1 displays the percentages of tenured and of tenure-eligible faculty that are women, in fall 2005 and in fall 2010, for mathematics departments and for doctoral statistics departments. In both 2005 and in 2010, mathematics departments had larger percentages of tenured women, but statistics departments had larger percentages of tenure-eligible women.

The percentage of women full-time faculty varies depending upon the highest degree offered by the department. Chapter 4, Tables F.1, F.2, and F.3 provide more detail on numbers of women faculty at four-year departments. Chapter 4, Table F.1 shows that, in 2005, women comprised 11% of the tenured and tenure-eligible faculty at doctoral-level mathematics departments, and by 2010 this percentage had risen to 14%. At bachelors-level mathematics departments, in 2005 women comprised 26% of the tenured and tenure-eligible faculty, and by 2010 this percentage had risen to 30%; in both cases the percentage of women at bachelors-level mathematics departments was more than double the percentage at doctoral-level mathematics departments.

Table S.16 shows that, in public two-year college mathematics programs in fall 2010, women comprised 50% of the full-time faculty positions (same as in 2005), and 54% of the full-time faculty of age less than 40 was female (up from 49% in 2005). More data on women faculty at two-year colleges are contained in Chapter 7 in Tables TYF.8, TYF.9, and TYF.17.

Table S.17 gives the distribution of ages among full-time mathematics faculty at four-year colleges and universities in fall 2010, broken down by tenured or tenure-eligible status and by gender. The average age of tenured men in four-year mathematics departments has been rising; it was 52.4 in 2000, 53.7 in 2005, and 54.6 in 2010. The average age of tenured women has also been rising; it was 49.6 in 2000, 50.2 in 2005, and 50.7 in 2010. For both men and women, the average ages of tenure-eligible mathematics faculty were lower in 2010 than in 2005, but the averages in 2010 were above the averages in 2000. The distribution of ages of tenured and tenure-eligible (combined) mathematics faculty in 2010 is quite similar to that in 2005, except for the increase in the percentage of mathematics faculty 65 and older, which increased from 8% in 2005 to 12% in 2010. A possible explanation for this decrease is that the downturn in the U.S. economy has led some senior faculty to postpone retirement. Figure S.17.1 shows the distribution of ages of male and female tenured and tenure-eligible mathematics faculty; one notes that the distribution of ages is shifted more toward lower ages for female faculty than for male faculty. Table S.17 is broken down by the level of the department in Chapter 4, Table F.4.

Table S.17 also gives the distribution of ages among permanent mathematics faculty at public two-year college mathematics programs. The average age of a permanent mathematics faculty member in fall 2010 is 46.8, down from 47.8 in 2005, and there are slightly higher percentages for the age categories at the two

TABLE S.18 Percentage of tenured and tenure-eligible faculty belonging to various age groups in doctoral and masters statistics departments (combined) at universities by gender, and average ages in fall 2010. Also average ages for doctoral statistics departments in fall 2005. Comparable table in the CBMS2005 report is S.19, p. 41.

All Statistics Departments	Percentage of tenured/tenure-eligible faculty										Average age 2005[1]	Average age 2010
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
	%	%	%	%	%	%	%	%	%	%		
Tenured men	0	1	5	9	8	7	11	11	5	4	52.7	53.9
Tenured women	0	1	3	2	2	2	2	1	1	0	45.6	48.4
Tenure-eligible men	2	8	5	1	0	0	0	0	0	0	33.7	34.8
Tenure-eligible women	1	4	4	1	0	0	0	0	0	0	33.2	35.6
Total tenured & tenure-eligible faculty	**3**	**14**	**17**	**13**	**10**	**9**	**12**	**12**	**6**	**4**		

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

[1]Average ages for fall 2005 from CBMS2005 Table S.19.

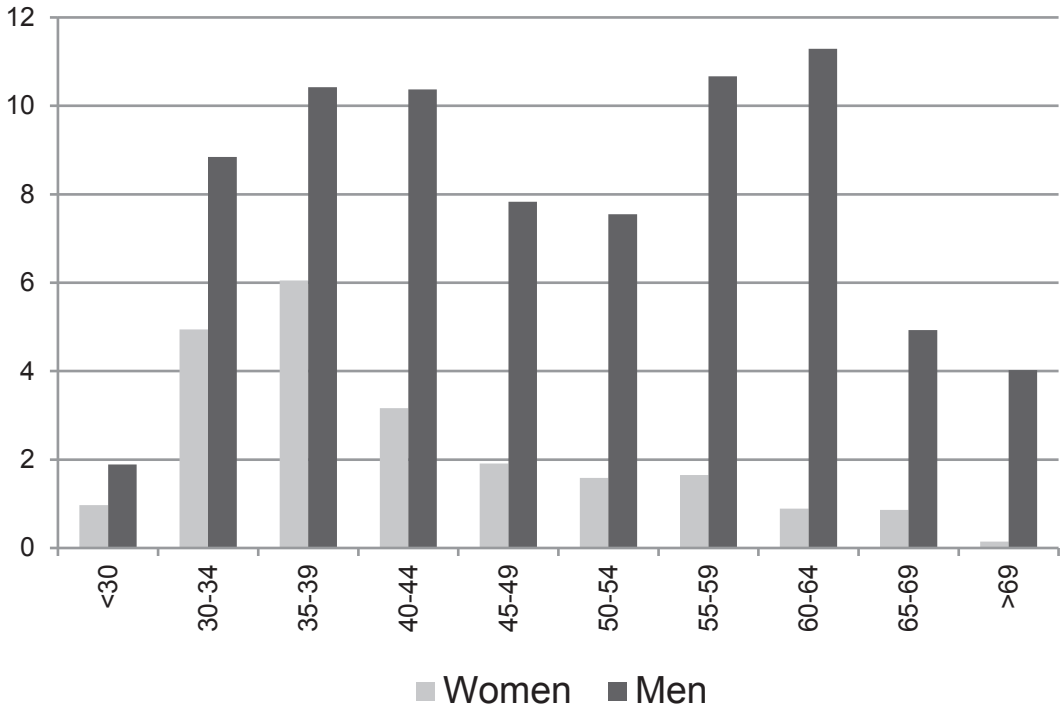

FIGURE S.18.1 Percentage of tenured and tenure-eligible faculty in various age groups, by gender, in doctoral and masters statistics departments (combined) in fall 2010.

lowest age brackets. Figure S.17.2, as well as Table TYF.16 in Chapter 7, display this distribution of ages.

Table S.18 gives the distribution of ages among full-time doctoral and masters statistics faculty (combined), broken down by tenured or tenure-eligible status and by gender. Each of the average ages was higher in 2010 than in 2005, and all averages, except those for tenure-eligible women, were higher in 2010 than in 2000. The distribution of ages for tenured and tenure-eligible women is displayed in Figure S.18.1 and, even to a greater extent than for mathematics faculty, the distribution of ages for women is skewed to lower ages than for men, reflecting the recent growth in tenured and tenure-eligible women statistics faculty.

Tables S.19 and S.20 give percentages of faculty for various racial/ethnic groups in mathematics and statistics departments at four-year colleges and universities. *Annual Surveys* follow the federal pattern for racial and ethnic classifications of faculty. However, in the text of CBMS2010, some of the more cumbersome federal classifications will be shortened. For example, "Mexican-American/Puerto Rican/other Hispanic" will be abbreviated to "Hispanic". Similarly, the federal classifications "Black, not Hispanic" and "White, not Hispanic" will be shortened to "Black" and "White", respectively, and "Native American/Alaskan Native/ Native Hawaiian/Pacific Islander" will be shortened to "Other/Unknown".

Table S.19 gives the percentages of gender and of racial/ethnic groups for tenured, tenure-eligible, postdoctoral, and other full-time four-year mathematics faculty. Comparing Table S.19 in CBMS2010 to the corresponding Table S.20 in CBMS2005, the percentages of the various racial/ethnic and gender groups look quite similar, with the most noticeable difference being a decrease from 2005 to 2010 in the percentage of White male faculty and an increase in White female faculty. The percentages of Black faculty and of Hispanic faculty, in fall 2010, remained small. Chapter 4, Table F.5 breaks these numbers down by the level of the department.

Table S.20 shows these percentages for all statistics faculty combined. Comparing Table S.20 in CBMS2010 to Table S.21 in CBMS2005, the percentage of White male faculty decreased from 2005 to 2010 by six percentage points, the percentage of White women decreased by one percentage point,

TABLE S.19 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 2010. Comparable table in CBMS2005 is S.20, p. 42.

Mathematics Departments	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
Tenured Men	6	1	1	36	1
Tenured Women	1	0	0	10	0
Tenure-eligible men	2	0	0	8	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	1	0	10	1
Full-time women not included above	1	0	0	9	1
Total full-time men	9	2	2	56	2
Total full-time women	3	1	1	23	1

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

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

TABLE S.20 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral, and other full-time faculty in doctoral and masters statistics departments (combined) at universities in fall 2010. Comparable table in CBMS2005 is S.21, p. 43.

All Statistics Departments	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
Tenured Men	11	0	1	34	2
Tenured Women	2	0	0	6	1
Tenure-eligible men	5	1	0	6	1
Tenure-eligible women	5	0	0	3	0
Postdoctoral men	3	0	0	2	0
Postdoctoral women	1	0	0	1	0
Full-time men not included above	1	0	0	6	0
Full-time women not included above	1	0	0	5	1
Total full-time men	20	1	1	49	3
Total full-time women	8	0	1	15	2

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

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

the percentage of Asian men and Asian women faculty have increased (two percentage points and one percentage point, respectively), the percentage of Black women decreased by one percentage point, and the percentage of Hispanic women increased by one percentage point. The percentages of Black faculty, and of Hispanic faculty, remained small.

Ethnic and gender breakdowns for part-time mathematics and statistics faculty at four-year colleges and universities, broken down by the level of the department for mathematics departments, is given in Chapter 4, Table F.6.

The distribution of mathematics program faculty in public two-year colleges among various ethnic groups is studied in Chapter 7. In fall 2010, sixteen percent (16%) of full-time permanent faculty members in mathematics programs were ethnic minorities, totaling 1566 faculty, up from 14% in 2005. The majority of the faculty represented in the ethnic minority groups were Asian/Pacific Islander or Black (non-Hispanic). See Tables TYF.10, TYF.11, and TYF.12. Among newly-hired full-time permanent faculty in fall 2010, 18% were ethnic minorities (Asian/Pacific Islander, Black, and Hispanic), and 47% were women. See Table TYF.20.

Table S.21 gives the number of deaths and retirements in mathematical sciences departments from the past four CBMS surveys, broken down by the level of the mathematics department. This data was not collected in 2010 for public two-year colleges. The data shows a smaller number of deaths and retirements among mathematics departments from masters and bachelors-level departments, perhaps indicating once more that some senior faculty postponed retirement.

TABLE S.21 Number of deaths and retirements of full-time faculty from mathematics departments and from doctoral statistics departments by type of department. Numbers reported prior to 2004-2005 for mathematics departments are of Tenured and Tenure-track faculty. (Data prior to 2004-2005 for statistics departments includes both masters and doctoral statistics departments.) The comparable table in CBMS2005 is S.22, p. 44.

Four-Year College & University	1994-1995	1999-2000	2004-2005	2009-2010	Number of tenured/ tenure-eligible faculty 2010
Mathematics Departments					
Univ (PhD)	172	174	139	146	5615
Univ (MA)	132	165	140	91	3209
Coll (BA)	137	123	219	123	7540
Total deaths and retirements in all Mathematics Departments	441	462	499	360	16364
Doctoral Statistics Departments: Total deaths and retirements	33	16	14	15	789