Chapter 3

Mathematical Sciences Bachelors Degrees and Enrollments in Four-Year Colleges and Universities

Mathematics and statistics departments in the nation's four-year colleges and universities offer a wide spectrum of undergraduate mathematical sciences courses and majors, sometimes including mathematics education, actuarial science, operations research, and computer science, as well as mathematics and statistics. This chapter's fifteen tables describe:

- the number of bachelors degrees awarded through the nations' mathematics and statistics departments (Table E.1),
- enrollments in mathematical sciences courses (Tables E.2-E.4),
- the ranks of instructors who teach undergraduate courses in mathematics and statistics departments (Tables E.5-E.12),
- average class sizes and average sizes of recitation sections used in lecture/recitation classes (Tables E.13-E.14), and
- the numbers of new freshmen entering with AP credit in Calculus I or Elementary Statistics (Table E.15).

These tables are broken down by level of department based on the highest degree offered. The tables in this chapter expand upon Tables S.2 and S.4 from Chapter 1, while Chapter 5 provides additional detail about enrollments in first-year courses in mathematics and statistics. The enrollment in each course listed on the four-year mathematics and statistics questionnaires (both with, and without, distance-learning enrollments) are given in Appendix I; in making comparisons to previous CBMS surveys, one should note that previous Appendix enrollments included distance-learning enrollments. Enrollment data from two-year colleges appear in Chapter 6.

Highlights:

- The total number of mathematical sciences bachelors degrees granted through the nation's mathematics and statistics departments (combined) in the 2009-2010 academic year was down very slightly from 2004-2005; if degrees in computer science are removed, there was a 2% increase. See Table E.1.
- The total number of degrees awarded by statistics departments was up 36% in 2010 over 2005, while the total number of degrees awarded by mathematics departments was down about 1% (the number of bachelors degrees awarded in statistics by mathematics departments increased by 47%). In the 2009-2010 academic year, all levels of mathematics departments combined awarded more bachelors degrees in mathematics education and statistics, and fewer degrees in mathematics and computer science, than in 2004-2005. See Table E.1.
- Continuing a trend observed in the 2005 CBMS survey, the total number of degrees in the mathematical sciences awarded by doctoral-level mathematics departments increased (up 8% over 2005), while the total number of degrees awarded by masters-level and bachelors-level departments each decreased, although bachelors-level departments, by a narrow margin, awarded the greatest number of bachelors degrees in the mathematical sciences. See Table E.1.
- The percentage of bachelors degrees in the mathematical sciences awarded to women by mathematics and statistics departments combined in the 2009-2010 academic year was 43%, up from 40% in the 2004-2005 academic year, and the same as the percentage in the 1999-2000 academic year; this percentage was up in mathematics departments and down in statistics departments over the respective percentages in 2005. See Table E.1.
- Reversing a trend reported in 2005, total fall 2010 enrollments (including distance-learning enrollments) in mathematics departments were up 25%, and in statistics departments, enrollments were up 40%; the 2005 study reported a 3% decrease in mathematics department enrollments and a 5% increase in statistics department enrollments in fall 2005 over fall 2000. Increases in enrollments occurred at almost all levels of departments and types of courses – including mathematics department computer science enrollments, which were up 35%, and mathematics department statistics enrollments, which were up 44%. In fall 2010, total enrollments in bachelors-level departments exceeded those in doctoral-level departments. See Table E.2.

- The large increase in enrollments was not due to increases at the lowest levels of mathematics courses, as enrollments in precollege and introductory-level mathematics courses (combined) were up 18%. In fact, the enrollments in precollege-level courses at four-year mathematics departments remained about the same in 2010 as in 2005. See Table E.2.
- Statistics enrollments made major increases in both mathematics and statistics departments, as enrollments in elementary statistics courses taught in mathematics departments were up 56%, and enrollments in elementary statistics courses taught in statistics departments were up 50%. Advanced-level statistics course enrollments showed slower growth. See Table E.2.
- Enrollments in calculus-level courses (which include courses in linear algebra, differential equations, and discrete mathematics, as well as calculus courses of various kinds) rose 27% in 2010 over 2005. See Table E.2.
- In mathematics departments, enrollments in advanced-level mathematics courses were up 34% and, in statistics departments, enrollments in advanced-level statistics courses were up 17% in 2010 over 2005. In mathematics departments, advanced-level statistics enrollments decreased by 6%, though some of that decline may be due to changes in the 2010 questionnaire. See Table E.2.
- Distance-learning courses were defined to be "those courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)." Enrollments in distance-learning courses were up in 2010 over 2005 for each course category reported in 2005, at each level of the four-year department, with the total distance-learning enrollments in all course categories combined nearly double that of 2005. In fall 2010, in mathematics departments of four-year departments, distance-learning enrollments represented 4% of precollege enrollments, 3% of college algebra, trigonometry and pre-calculus (combined) enrollments, 0.6% of Calculus I enrollments, and 6% of elementary statistics enrollments. In statistics departments, 5% of the elementary statistics enrollment was taught in distance-learning format. All of these percentages are increases over 2005. See Table E.4.
- Across all levels of four-year mathematics departments, the percentage of sections known to be taught by tenured, tenure-eligible, or permanent faculty was slightly up in fall 2010 over fall 2005, with the one exception of computer science courses taught within mathematics departments, where the percentage of sections taught by part-time instructors almost doubled. However, in 2010, the percentage of sections of mathematics and statistics courses taught by an instructor of unknown rank generally increased, so it is difficult to make definitive statements regarding changes in the distribution of the ranks of course instructors. See Tables E.5-E.12.
- Not much change was reported in the average size of course sections. The average size of sections of calculus increased from 32 students in fall 2005 to 34 students in fall 2010, while the average size of sections of elementary statistics classes taught in mathematics and statistics departments combined decreased from 35 students in fall 2005 to 33 students in 2010. The size of computer science classes taught in mathematics departments increased. See Table E.13.
- The size of recitation sections of calculus courses increased from fall 2005 to fall 2010, more than doubling in Mainstream Calculus II at bachelors-level departments. The average size of recitation sections in elementary statistics courses taught in mathematics and statistics departments decreased slightly except at bachelors-level mathematics departments and masters-level statistics departments, where it increased significantly from fall 2005 to fall 2010. See Table E.14.
- Across all mathematics departments, the average percentage of freshmen receiving AP credit for Calculus I was 5% (13% across doctoral-level departments). Across all statistics departments, the average percentage of freshmen receiving AP credit for Elementary Statistics was 12%. See Table E.15.

<u>Terminology</u>: The two preceding CBMS survey reports are called CBMS2000 and CBMS2005.

In the CBMS2010 survey, the term "mathematics department" included departments of mathematics, applied mathematics, mathematical sciences, and departments of mathematics and statistics. The term "statistics department" referred to departments of statistics that offered undergraduate statistics courses. The term "mathematical sciences courses" covered all courses that were taught in mathematics or statistics departments in the United States; it included courses in mathematics education, actuarial sciences, and operations research taught in a mathematics or statistics department, as well as courses in mathematics, applied mathematics, and statistics. Computer science courses (and majors) were included in CBMS2010 totals when the courses (and majors) were taught (granted through) a mathematics department (previous CBMS surveys gathered data on computer science courses/majors offered through statistics departments, but this data was not collected in 2010). CBMS2010 data did not include any courses or majors that were taught in, or granted through, separate departments of computer science, actuarial science, operations research, etc. Departments were classified by the highest degree offered. For example, the term "bachelors-level department" refers to one that did not offer masters or doctoral degrees.

Table E.1: Bachelors degrees granted between July 1, 2009 and June 30, 2010

The total number of mathematical sciences bachelors degrees granted through the nation's mathematics and statistics departments in the 2009-2010 academic year was 21,377, very slightly down from 21,437 in 2004-2005, despite the fact that overall fall enrollments rose by about 23% during that same period (see Table S.1 in Chapter 1). The previous five CBMS surveys (see Table S.3 in Chapter 1) reported a declining trend in the total number of bachelors degrees awarded by the nation's mathematics and statistics departments and, over the past 25 years, that number has decreased by 13%. However, when computer science degrees are removed from the count, the number of degrees awarded by mathematics and statistics departments has remained relatively constant: 19,380 degrees in 1989-1990 and 19,241 degrees in 2009-2010 (see Table S.3).

Table E.1 shows that in 2009-2010, the number of bachelors degrees awarded by statistics departments was up 36% over 2004-2005. During the same period, the number of bachelors degrees awarded by mathematics departments was down about 1%. Most of the increase in the number of degrees awarded by statistics departments resulted from increases in the number of degrees awarded from masters-level statistics departments. Mathematics departments award most of the degrees in the mathematical sciences, 96% in 2009-2010, so the number of degrees awarded by mathematics departments is the major component in the number of undergraduate degrees awarded in the mathematical sciences. Table E.1 breaks down the number of bachelors degrees offered by mathematics departments into the subcategories of degrees in mathematics (including actuarial science, operations research, and joint majors), mathematics education, statistics, and computer science.

As was already observed, much of the decline in the number of bachelors degrees awarded by mathematics departments can be attributed to the decline in the number of bachelors degrees awarded in computer science by mathematics departments. In 1994-1995 the CBMS study estimated that mathematics departments awarded 2,741 bachelors degrees in computer science, while Table E.1 shows that in 2009-2010 this number was 2,137, a 22% decline. Most of bachelors degrees awarded in computer science in 2009-2010 were given by the bachelors-level departments. As will be noted later, while recent CBMS surveys have reported decreasing enrollments in computer science courses taught within mathematics departments, the CBMS2010 study showed an increase in computer science enrollments in mathematics departments for fall 2010 over the fall 2005 computer science enrollments reported in CBMS2005 (see Table E.2).

Table E.1 shows that the number of bachelors degrees in mathematics awarded by mathematics departments in 2009-2010 was 14,435 degrees. Earlier CBMS studies estimated that in 2004-2005 there were 14,610 degrees, in 1999-2000 there were 13,664 degrees, and in 1994-1995 there were 14,294 degrees awarded in mathematics by mathematics departments. Hence the number of bachelors degrees in mathematics awarded by mathematics departments in 2009-2010 is above that of 1994-1995. According to Table E.1, the number of bachelors degrees in statistics awarded by mathematics departments increased from 241 degrees in 2004-2005 to 354 degrees in 2009-2010, a 47% increase.

Table E.1 also breaks down the numbers of degrees offered in each subcategory by the level of department awarding the degree. Continuing an important trend noted in the 2005 CBMS survey, most of the growth in the number of bachelors degrees awarded in mathematics occurred at the doctoral-level mathematics departments. In 2005, for the first time, the number of bachelors degrees in mathematics granted by doctoral-level departments exceeded the number granted by bachelors-level departments. In 2004-2005, doctoral-level departments awarded 44% of the bachelors degrees in mathematics; in 2009-2010, this percentage rose to 51%. The number of bachelors degrees in mathematics awarded by bachelors-level departments decreased from 5,839 in 2004-2005 to 5,167 in 2009-2010, and for the masters-level departments the number decreased from 2,377 degrees in 2004-2005 to 1,965 degrees in 2009-2010. Figure E.1.2 shows the number of bachelors degrees awarded in computer science, mathematics education, and mathematics and statistics (combined) in 1999-2000, 2004-2005, and 2009-2010, broken down by level of department. Figures E.1.3 and E.1.4 show the percentages of mathematical sciences bachelors degrees granted by mathematics and statistics departments in 1999-2000, 2004-2005, and 2009-2010, broken down by the level of department. Figure E.1.3 includes computer science degrees while Figure E.1.4 does not. Data from CBMS1995, CBMS2000, and CBMS2005 showed that bachelors-level departments consistently produced at least 40% of the non-computer science bachelors degrees granted through mathematics departments; however, the 2010 study showed that this percentage has fallen to 37% in 2009-2010. Bachelors-level departments remain

TABLE E.1 Bachelors degrees in mathematics, mathematics education, statistics, and computer science in mathematics departments and in statistics departments awarded between July 1, 2009 and June 30, 2010, by gender of degree recipient and type of department.

	Mathematics Departments				Statistics Departments			
Bachelors degrees in Math and Stat Depts	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts	Total Math & Stat Depts
Mathematics majors (including Act. Sci., Oper. Res., and joint degrees)								
Men	4735	1099	2685	8519				8519
Women	2568	866	2482	5916				5916
Percentage of women	*35%*	*44%*	*48%*	*41%*				*41%*
Total Math degrees	7303	1965	5167	14435				14435
Mathematics Education Majors								
Men	229	500	608	1337				1337
Women	341	896	1040	2277				2277
Percentage of women	*60%*	*64%*	*63%*	*63%*				*63%*
Total Math Ed degrees	570	1396	1648	3614				3614
Statistics Majors[1]								
Men	117	29	43	189	291	213	504	693
Women	99	41	25	165	190	144	334	499
Percentage of women	*46%*	*59%*	*37%*	*47%*	*40%*	*40%*	*40%*	*42%*
Total Stat degrees	216	70	68	354	481	357	838	1192
Computer Science majors								
Men	231	162	1350	1743				1743
Women	39	23	332	394				394
Percentage of women	*14%*	*12%*	*20%*	*18%*				*18%*
Total CS degrees	270	185	1682	2137				2137
Total degrees - Men	5312	1790	4686	11788	291	213	504	12291
Total degrees - Women	3047	1826	3879	8752	190	144	334	9086
Percentage of women	*36%*	*50%*	*45%*	*43%*	*40%*	*40%*	*40%*	*43%*
Total all degrees	8358	3616	8565	20540	481	357	838	21377

[1] The counts reported here include categories, such as joint majors, that are reported separately within Table S.3.

Note: Round-off may make row and column sums seem inaccurate.

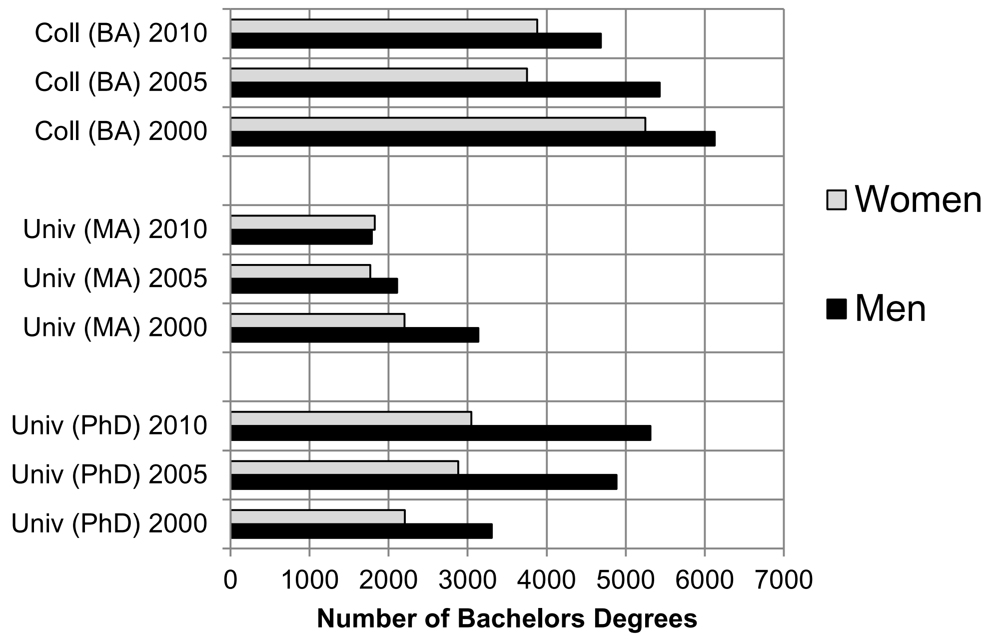

FIGURE E.1.1 Bachelors degrees in mathematics departments awarded between July 1 and June 30 in the academic years 1999-2000, 2004-2005, and 2009-2010, by gender and type of department.

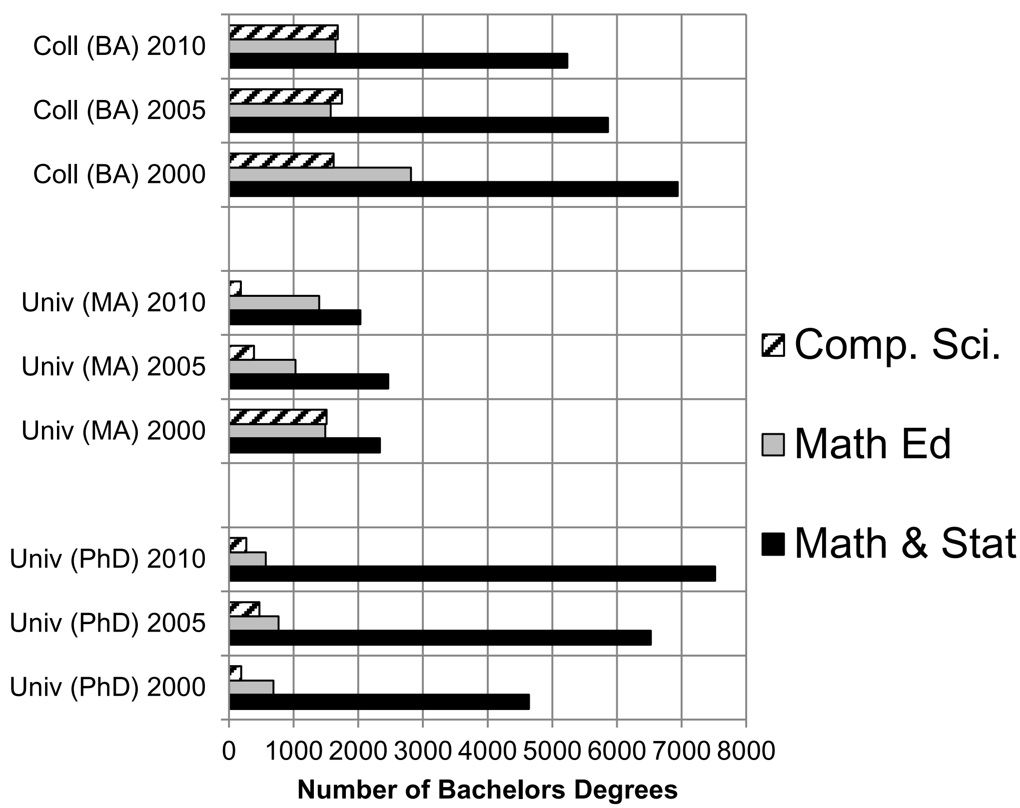

FIGURE E.1.2 Number of bachelors degrees granted in academic years 1999-2000, 2004-2005, and 2009-2010 by type of major and type of department.

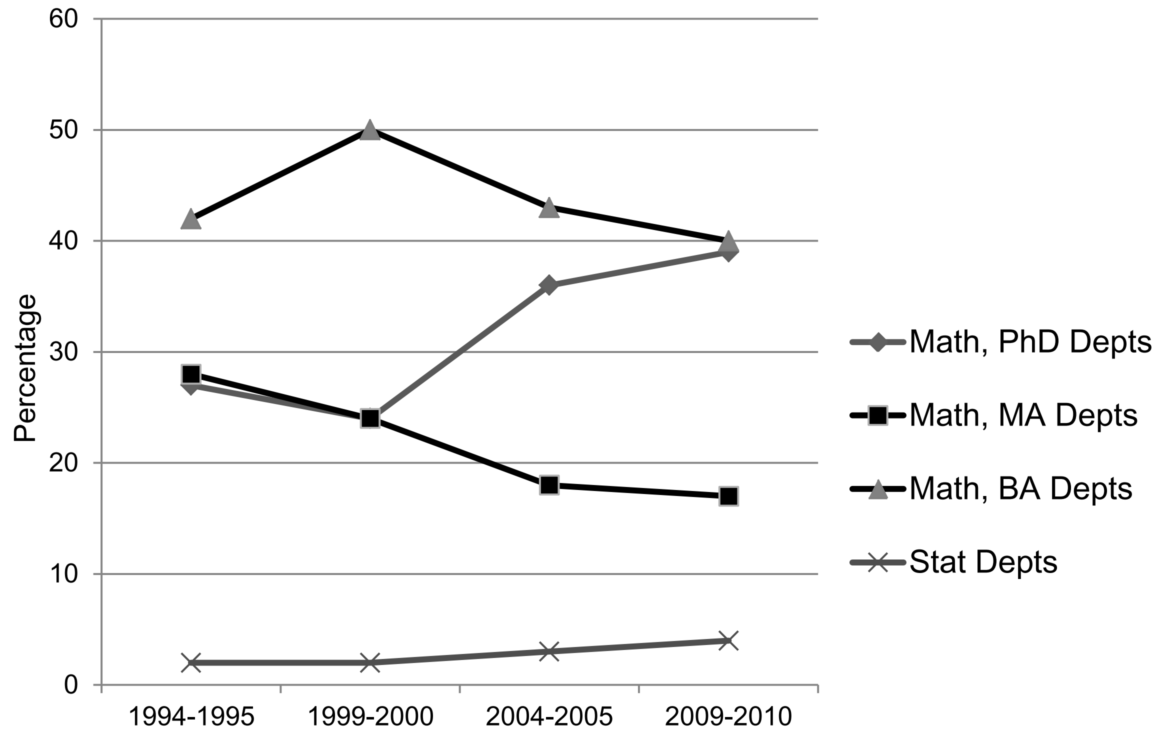

FIGURE E.1.3 Percentage of mathematical sciences bachelors degrees (including computer science) awarded through mathematics and statistics departments of various kinds in academic years 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

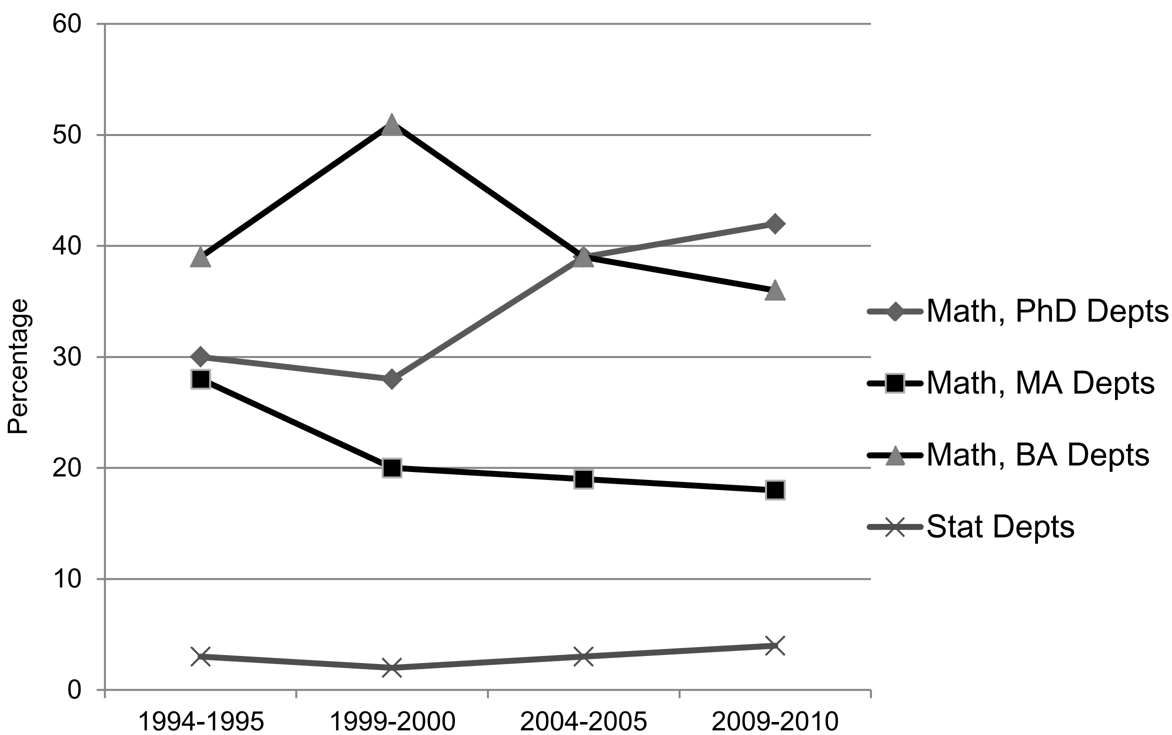

FIGURE E.1.4 Percentage of mathematical sciences bachelors degrees (excluding computer science) awarded through mathematics and statistics departments of various kinds in academic years 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

the largest producer of total numbers of mathematical sciences degrees awarded, with 8,565 degrees awarded in 2009-2010, but the bachelors-level departments were only about 200 degrees awarded ahead of the doctoral-level departments (while in 2004-2005 bachelors-level departments held a roughly 1,400 total mathematical sciences degrees awarded advantage). Whether because of criteria in federal grant programs or because large universities offer more programs in engineering and other STEM disciplines that are attractive to students during difficult economic times, doctoral-level departments seem to be increasing producers of undergraduate mathematical sciences majors (see also [B4]).

Table E.1 shows that the number of degrees awarded by mathematics departments in mathematics education increased 7% from 2004-2005 to 2009-2010, rebounding after a large decline reported in 2004-2005. The number of mathematics education degrees awarded in 1994-1995 was 4,829 degrees, in 1999-2000 it was 4,991 degrees, in 2004-2005 it was 3,369 degrees, and in 2009-2010 it was 3,614 degrees. The increase in 2009-2010 over 2004-2005 resulted from increases within the masters-level and bachelors-level departments; the number of mathematics education degrees awarded from doctoral-level departments declined from 766 awarded in 2004-2005 to 570 awarded in 2009-2010. See Figure E.1.2.

Table E.1 shows that the total number of mathematical sciences degrees awarded to women was up at each level of mathematics and statistics department. The overall total percentage of undergraduate degrees awarded to women by mathematics and statistics departments combined in 2009-2010 was 43%, up from 40% in 2004-2005. The percentage of degrees awarded to women varies by the level of department. The percentage of the total number of mathematical sciences degrees awarded to women by the doctoral-level departments has been declining: in 1994-1995 the percentage of all undergraduate degrees awarded to women by doctoral-level mathematics departments was 43%, in 1999-2000 it was 40%, in 2004-2005 it was 37%, and in 2009-2010 it was 36%. In 2009-2010, the percentage of all degrees awarded to women was down slightly in the doctoral-level departments in both mathematics and statistics, but it was up at the other levels of departments. The percentage of women obtaining degrees also varies within the various subcategories of mathematics degrees; it is highest in mathematics education (in 2009-2010 it was 63%, up from 60% in 2004-2005). The percentages of degrees awarded to women were up in each category of degree awarded by the bachelors-level departments, and in 2009-2010 the percentage of undergraduate degrees awarded to women in mathematics was 48% at bachelors-level departments, compared to 35% at doctoral-level departments. The percentage of degrees awarded to women by statistics departments in 2009-2010 was 40%, down from 42% in 2004-2005. See Figure E.1.1.

Tables E.2 and E.3: Undergraduate enrollments and number of sections offered in mathematics and statistics departments

The CBMS2010 data show that enrollments in mathematical sciences courses were substantially larger in fall 2010 than in fall 2005, and these enrollments were up in almost every category. Table E.2 shows that the total enrollment in mathematical sciences courses (<u>including</u> distance-learning enrollments) taught in mathematics departments in fall 2010 was 231,000, up 25% from fall 2005. Table E.2 breaks enrollments down by broad categories of courses (mathematics courses, statistics courses, and computer science courses) and by levels of department. The enrollments of individual courses are given in Appendix I (where enrollments both with, and without, distance-learning enrollments can be found; in previous CBMS survey reports, Appendix I gave enrollments <u>with</u> distance-learning enrollments included). Enrollments in introductory-level, calculus, and elementary statistics courses are considered in more detail in Chapter 5 (where tables do not include distance-learning enrollments). When a table in this report concerns <u>sections</u> of a course, the corresponding enrollments do not contain distance-learning enrollments; otherwise, distance-learning enrollments are generally included.

Considering first the enrollments in mathematics courses, Table E.2 shows that the total national enrollment in mathematics courses in fall 2010 was roughly 1,971,000, up 23% from 1,607,000 in fall 2005. Mathematics courses are broken down into precollege courses, introductory courses (including precalculus), calculus-level courses (including linear algebra, differential equations, discrete mathematics, as well as various kinds of calculus), and advanced mathematics; each of these course grouping enrollments is broken down further by the level of the department. See Figure E.2.1. The biggest percentage growth in mathematics course enrollment was in advanced courses, which increased 34%, from an enrollment of roughly 112,000 in 2005 to an enrollment of 150,000 in 2010. The next largest growth in enrollment in fall 2010 over fall 2005 occurred in calculus-level courses, up 27%, followed by a 22% growth in enrollment in introductory-level courses, and only a 4% increase in enrollment in precollege-level mathematics courses. There was enrollment growth in all levels of departments. Enrollment in mathematics courses grew 12% at the doctoral-level departments, 28% at the masters-level departments, and 34% at the bachelors-level departments in fall 2010 over fall 2005. In 2010, total enrollment in

TABLE E.2 Enrollment (in thousands) in undergraduate mathematics, statistics, and computer science courses (including distance-learning enrollments) in mathematics and statistics departments by level of course and type of department in fall 2010. Numbers in parentheses are (2000, 2005) enrollments.

	Fall 2010 (2000, 2005) enrollments (in 1000s)						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege	57 (59,55)	64 (59,60)	88 (101,87)	209 (219,201)			
Introductory (incl. Precalc)	299 (258,269)	214 (227,190)	350 (238,248)	863 (723,706)			
Calculus level	383 (302,345)	145 (131,88)	221 (137,154)	748 (570,587)			
Advanced Mathematics	64 (43,52)	39 (24,24)	47 (35,36)	150 (102,112)			
Total Math courses	803 (662,720)	462 (441,362)	706 (511,525)	1971 (1614,1607)			
Statistics Courses							
Elementary Statistics	51 (38,30)	40 (35,32)	140 (63,86)	231 (136,148)	54 (46,42)	27 (8,13)	81 (54,54)
Upper Statistics	15 (12,15)	6 (12,9)	11 (11,10)	32 (35,34)	15 (17,20)	12 (3,3)	28 (20,24)
Total Stat Courses	66 (50,44)	45 (47,42)	151 (74,96)	262 (171,182)	70 (63,62)	39 (11,16)	109 (74,78)
Computer Science Courses							
Lower Computer Science	3 (5,3)	3 (33,11)	50 (52,30)	56 (90,44)			
Middle Computer Science	1 (1,1)	1 (7,1)	9 (9,6)	12 (17,8)			
Upper Computer Science	1 (2,1)	1 (6,1)	8 (8,3)	10 (16,5)			
Total CS courses	5 (8,5)	6 (46,13)	67 (69,39)	77 (123,57)			
Total all courses	874 (720,769)	513 (534,417)	924 (654,659)	2310 (1908,1845)	70 (63,62)	39 (12,18)	109 (75,80)

Note: Beginning in 2010, the CBMS Survey did not include computer science courses taught in statistics departments.

Note: Due to round-off, row and column sums may appear inaccurate.

bachelors-level mathematics departments exceeded that in doctoral-level departments; see Figure E.2.3.

Statistics enrollments showed large gains in both mathematics and statistics departments. In mathematics departments, Table E.2 shows that elementary statistics enrollments in fall 2010 were 231,000, up 56%, while advanced-level statistics enrollment in mathematics departments declined by 6% compared

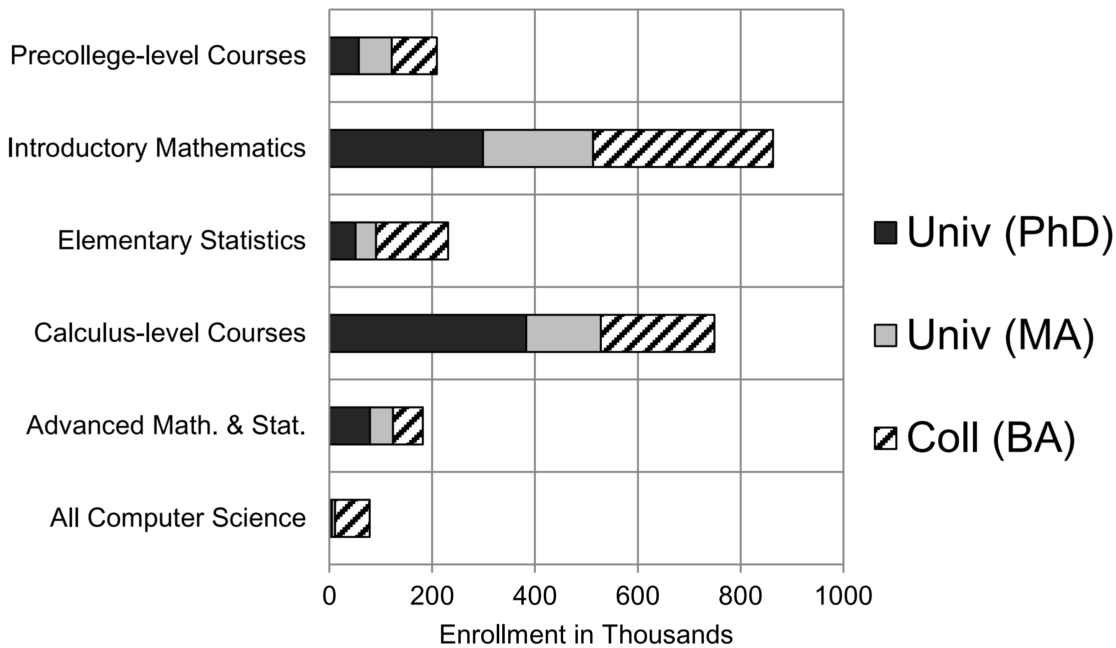

FIGURE E.2.1 Enrollment (in thousands) in undergraduate mathematics, statistics, and computer science courses in four-year college and university mathematics departments by type of course and type of department in fall 2010.

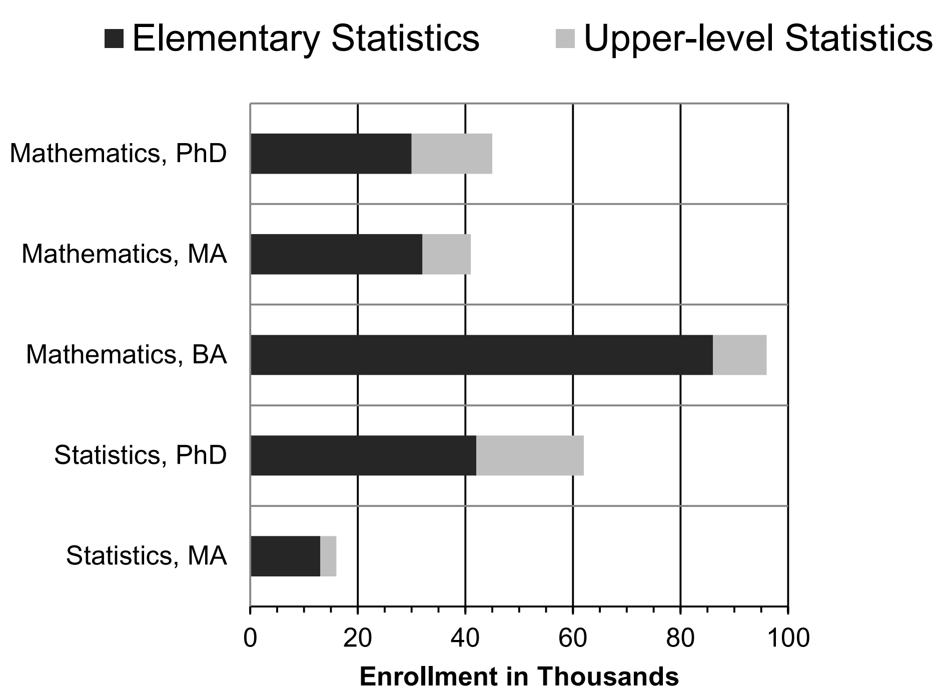

FIGURE E.2.2 Enrollment (in thousands) in undergraduate statistics courses by level of course and type of department in fall 2010.

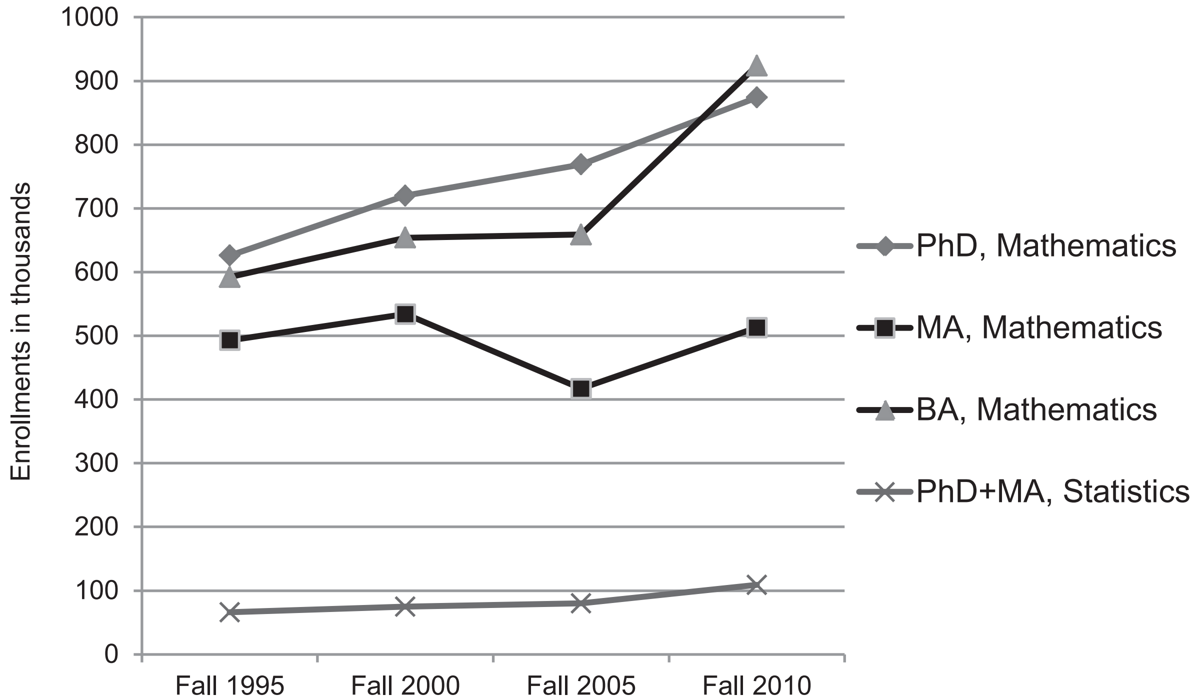

FIGURE E.2.3 Undergraduate enrollment (in thousands) by type of department in fall 1995, fall 2000, fall 2005, and fall 2010.

to fall 2005. Most of the elementary statistics that is taught in mathematics departments occurs at bachelors-level departments, where the fall 2010 enrollment in elementary statistics was roughly 140,000. In statistics departments, elementary statistics enrollments were 81,000, a little over one-third of that in mathematics departments, and up 50% over 2005. Enrollments in upper-level statistics courses grew 17% in statistics departments and were 28,000 in fall 2010, compared with the 32,000 enrollments in mathematics departments. See Figure E.2.2.

Computer science enrollments in mathematics departments are now largely confined to bachelors-level departments. These enrollments were up 35% to 77,000 in fall 2010 over fall 2005, despite the long-running trend of declining computer science enrollments, as more computer science courses are taught in computer science departments than in mathematics departments. Despite the increase in 2010, these enrollments are still well below the total enrollment of 123,000 reported for computer science courses taught in mathematics departments in fall 2000. Computer science course enrollments for courses offered in statistics departments were collected in past CBMS studies, but these enrollments had become so small that it was decided not to collect them in 2010. The computer science enrollments in mathematics departments, though small, are still significant in mathematics departments; as one example, according to Table E.2, in fall 2010 the bachelors-level departments had more total enrollments in computer science courses than in advanced-level courses.

Another way to measure changes in enrollment is to track the number of course sections that are offered. Table E.3 shows that from fall 2005 to fall 2010, overall, the total number of mathematics course sections grew 21%; the number of advanced-level mathematics course sections grew 35%, the number of calculus-level course sections grew 21%, the number of introductory-level course sections grew 21%, and the number of precollege-level course sections grew 3%. The total number of sections of mathematics courses grew 10% at the doctoral-level departments, 34% at the masters-level departments, and 21% at the bachelors-level departments.

Table E.3 shows the dramatic rise in the number of statistics course sections. Within mathematics departments, there was a 51% increase in the number of elementary statistics course sections offered. Following the drop in enrollment in upper-level statistics courses taught in mathematics departments, there was an 18% decline in the number of these course sections. In statistics departments, the

TABLE E.3 Number of sections (not including distance learning) of undergraduate mathematics, statistics, and computer science courses in mathematics and statistics departments by level of course and type of department in fall 2010 with fall 2005 figures in parentheses.

	Number of sections: Fall 2010 (Fall 2005)						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege level	1578 (1363)	2075 (1902)	3699 (3862)	7352 (7126)			
Introductory (incl. Precalc)	6268 (5518)	6556 (5543)	12525 (9895)	25349 (20955)			
Calculus	7976 (7696)	4559 (3237)	9575 (7388)	22110 (18321)			
Advanced Mathematics	3266 (2625)	3304 (1622)	3913 (3507)	10483 (7754)			
Total Math courses	19088 (17202)	16494 (12303)	29712 (24652)	65294 (54157)			
Statistics Courses							
Elementary Statistics	969 (629)	1208 (924)	5014 (3191)	7191 (4744)	1113 (696)	638 (186)	1751 (882)
Upper Statistics	561 (869)	420 (714)	929 (771)	1910 (2354)	461 (499)	447 (156)	907 (654)
Total Stat Courses	1530 (1498)	1628 (1638)	5943 (3962)	9102 (7098)	1573 (1195)	1085 (342)	2658 (1537)
Computer Science Courses							
Lower Computer Science	101 (114)	146 (512)	2230 (1629)	2477 (2254)			
Middle Computer Science	51 (61)	92 (121)	769 (739)	912 (921)			
Upper Computer Science	49 (61)	69 (83)	741 (444)	859 (587)			
Total CS courses	201 (236)	307 (715)	3740 (2811)	4248 (3762)			
Total all courses	20820 (18935)	18428 (14656)	39396 (31425)	78644 (65017)	1573 (1208) [1]	1085 (378) [1]	2658 (1586) [1]

[1] Includes Computer Science sections taught in Statistics departments.

Note: Due to round-off, row and column sums may appear inaccurate.

number of sections of elementary statistics courses nearly doubled, and the number of sections of upper-level statistics courses increased by 39%. As noted in Chapter 1, changes to the mathematics and statistics department questionnaires may have led some enrollments that were listed as advanced-level statistics enrollments in 2005 to be classified as elementary-level statistics enrollments in 2010.

In the process of analyzing the CBMS2010 data that were collected, the survey directors learned that, particularly in lower-level courses, it is not clear what constitutes a course section or a recitation section. The 2010 questionnaire asked whether calculus and elementary statistics courses were taught in lecture with recitation or in individual classes; now there seem to be other options, and the 2015 survey directors will need to give some thought to the definition of a "section" of a course. The issue of "sections" is addressed further in Chapter 5, where the tables have broken down courses by the type of section structure.

Table E.4: Distance education in four-year colleges and universities

The 2010 CBMS survey defined distance-learning courses as "those courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)". Various practices in distance-learning courses were discussed in Chapter 2 (see Tables SP.10-SP.14). While at four-year departments these enrollments were still a small percentage of total enrollments, these enrollments appear to be growing. Distance-learning enrollments were a larger percentage of two-year college enrollments than of four-year college enrollments, and data on distance-learning enrollment at two-year colleges are included here for comparison (more information regarding distance-learning enrollments at two year-colleges is contained in Chapter 6).

Table E.4 shows that enrollments in certain distance-learning courses were up in 2010 over 2005 for every category in the table, except for Calculus I at two-year colleges, with the total distance-learning enrollments in Table E.4 for four-year mathematics and statistics departments (combined) in fall 2010 being nearly double those of fall 2005. In fall 2010, at two-year colleges, distance-learning enrollments represented 8% of precollege enrollments, 13% of college algebra, trigonometry and pre-calculus (combined) enrollments, 4% of Calculus I enrollments, and 21% of elementary statistics enrollments. At four-year mathematics departments, these percentages were 4%, 3%, 0.6%, and 6%, respectively, and in four-year statistics departments, 5% of the elementary statistics enrollment was taught in distance-learning sections. All of these percentages are increases over 2005, with the exception of Calculus I at two-year colleges. Distance-learning enrollments for individual courses (except for advanced-level courses) are contained in Appendix I; Chapter 2, Tables SP.13(A) and SP.13(B), present data on the advanced-level mathematics and statistics courses that were reported to be available in a distance-learning format in 2010.

Table E.4 shows that the largest distance-learning course category enrollment in mathematics departments at four-year institutions in fall 2010 occurred in elementary statistics, where the distance-learning enrollment was 12,368 (and the non-distance-learning enrollment was 218,385); the distance-learning enrollment in elementary statistics taught in mathematics departments in fall 2010 was more than four times that of fall 2005. The next largest category of distance enrollment in mathematics courses occurred in the category of college algebra, trigonometry, and pre-calculus, followed by the category of precollege-level mathematics. The distance-learning enrollment in elementary statistics courses offered in statistics departments was 4,172 in fall 2010, more than four times the distance-learning enrollment in fall 2005, as was the case for mathematics departments.

Tables E.5-E.12: Rank of instructors in mathematics and statistics courses at four-year mathematics and statistics departments in fall 2010

Past CBMS surveys have analyzed the rank of the instructors teaching mathematics and statistics courses at four-year departments. The 2000 survey generally tabulated percentages of *enrollments* taught by various rank instructors, while the 2005 survey switched to percentages of *sections* taught by instructors of various ranks. The 2010 survey continues the practice begun in 2005 of considering percentages of *sections*. In 2010, instructors were broken into the following categories: tenured, tenure eligible, or permanent faculty (TTE), other full-time (OFT) (a category that includes, for example, postdocs and academic visitors), part-time (PT), graduate teaching assistant (GTA), and unknown (Unk) (a category that was used when the response did not account for all sections of a course). The 2005 survey instrument did not include the phrase "permanent faculty" in the description of the TTE category but instructed departments at institutions that did not recognize tenure (estimated at 12% of all mathematics departments in the 2010 CBMS survey and 5% in the 2005 survey) to list 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 have teaching positions that

TABLE E.4 Enrollments in distance-learning courses (meaning courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)) and other sections for various freshman and sophomore courses, by type of department, in fall 2010. (Fall 2005 data in parentheses.)

	Four-year Mathematics Departments		Two-year Mathematics Departments		Statistics Departments	
	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments
Precollege Level	8106 (2489)	201089 (198760)	87073 (37036)	1062667 (927697)		
College Algebra, Trigonometry, & Pre-Calculus	12021 (5856)	431420 (352591)	40898 (15721)	309272 (298081)		
Calculus I	2159 (593)	332632 (308518)	3504 (3620)	82192 (68919)		
Calculus II	782 (577)	128104 (94858)	285 (270)	30827 (20003)		
Differential Equations & Linear Algebra	862 (238)	115837 (82034)	298 (83)	10473 (7423)		
Elementary Statistics	12368 (3075)	218385 (140077)	23363 (9894)	110910 (107304)	4171 (990)	77153 (44303)

Note: For some distance-learning enrollments in this table, the Standard Error (SE) was very large. See the SE Appendix.

are regarded as permanent, although these faculty do not have tenure and are not eligible for tenure, even if their institution recognizes tenure. The instructions did not define "permanent" beyond the situation where the institution does not recognize tenure, but it seems quite possible that some departments 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 have renewable contracts, but are not tenured or tenure-eligible, may have been added to the TTE category, even if the institution recognizes tenure. As a consequence of this change, the other full-time category may consist primarily of postdocs and other temporary academic visitors.

Table E.5 summarizes the rank of the instructor in mathematics departments and statistics departments at four-year institutions in fall 2010. The percentage of sections taught by faculty at each rank, for each level of department, for instruction in mathematics courses, statistics courses, and computer science courses, is presented. The total number of sections is also given, and the numbers in parentheses are from the 2005 CBMS survey. Figure E.5.1 shows the percentages of mathematics course instructors of known rank for the different levels of mathematics departments, Figure E.5.2 gives these ranks for statistics courses in mathematics and statistics departments by level of department, and Figure E.5.3 gives these ranks for computer science courses.

Across all levels of four-year mathematics departments, the percentage of sections taught by tenured, tenure-eligible, or permanent faculty was slightly up in fall 2010 over fall 2005, with the one exception being computer science courses taught within mathematics departments, where the percentage of sections taught by part-time instructors almost doubled. In the 2010 survey, the percentage of sections of mathematics and statistics courses taught by an instructor of unknown rank generally increased, so it is difficult to reach definitive conclusions regarding decreases in the percentages of a given rank of course instructors. The increase in the number of sections with instructors of unknown rank may also be due to the increasing problem of defining what constitutes a section of a course, as "unknown" instructors resulted from discrepancies between numbers of reported sections and numbers of reported instructors for these sections.

The tables that follow Table E.5 give more detail on specific course categories; they present the *number* of sections (excluding distance-learning sections) of different course categories taught by the various ranks of faculty at the different levels of departments. Table E.6 gives the ranks for precollege-level mathematics courses, Table E.7 for introductory-level courses, Table E.8 for calculus-level (various types of calculus, linear algebra, differential equations, and discrete mathematics) sections, Table E.9 for elementary statistics sections, Table E.10 for lower-level computer science sections, and Table E.11 for middle-level computer science sections. For computer science courses, the phrase "permanent faculty" was not included in the TTE description that was on the questionnaire. Table E.12 presents the number of sections of advanced-level mathematics sections (including operations research) known to be taught by tenured/tenure eligible/permanent faculty, and similarly for statistics sections taught in mathematics departments and statistics departments.

From Table E.6, it appears that in fall 2010 there was increased use of tenured/tenure-eligible/permanent faculty for precollege-level mathematics courses, particularly at the masters and bachelors-level departments, perhaps reflecting the expanded definition of TTE faculty. Table E.8 shows a slight decrease in the percentage of calculus-level sections taught by tenured/tenure-eligible/permanent faculty, as the percentage dropped from 61% in 2005 to 59% in 2010 (but, in 2010, 8% of the instructors were of unknown rank, while in 2005, 5% were of unknown rank).

According to Table E.12, in advanced-level mathematics courses, the percentage of sections known to be taught by tenured, tenure-eligible, or permanent faculty decreased from 84% in 2005 to 79% in 2010 (however, at bachelors-level departments, this percentage increased from 84% in 2005 to 91% in 2010). For advanced-level statistics courses taught in mathematics departments, this percentage rose from 59% in 2005 to 77% in 2010. In statistics departments, the percentage of sections taught by tenured, tenure-eligible, or permanent faculty increased from 74% in 2005 to 79% in 2010.

TABLE E.5 Percentage of sections, excluding distance learning, of mathematics, statistics, and computer science courses taught by tenured/tenure-eligible or permanent faculty (TTE) [1], other full-time faculty (OFT), part-time faculty (PT), graduate teaching assistants (GTA), and other unknown (Unk) in mathematics departments and statistics departments by type of department in fall 2010, with fall 2005 figures in parentheses.

	Percentage of mathematics sections taught by						Percentage of statistics sections taught by						Percentage of CS sections taught by					
	TTE [1] %	OFT %	PT %	GTA %	Unk %	No. of Math sections	TTE [1] %	OFT %	PT %	GTA %	Unk %	No. of Stat sections	TTE %	OFT %	PT %	GTA %	Unk %	No. of CS sections
Math Depts																		
Univ (PhD)	33	24	14	17	13	19088	51	14	7	16	12	1530	42	30	15	11	2	201
	(35)	(24)	(14)	(21)	(6)	(17202)	(39)	(44)	(7)	(9)	(2)	(1498)	(39)	(38)	(9)	(7)	(6)	(214)
Univ (MA)	46	17	21`	6	11	16494	63	10	16	1	10	1628	89	0	11	0	0	307
	(45)	(20)	(22)	(8)	(6)	(12303)	(49)	(33)	(15)	(1)	(2)	(1639)	(43)	(8)	(18)	(0)	(30)	(715)
Coll (BA)	57	11	23	0	10	29712	62	8	15	0	14	5943	58	18	22	0	2	3740
	(54)	(20)	(23)	(1)	(3)	(24652)	(59)	(13)	(25)	(0)	(3)	(3962)	(80)	(9)	(9)	(0)	(1)	(2811)
Total Math Depts	47	16	20	6	11	65294	60	9	14	3	13	9102	60	17	21	1	2	4248
	(46)	(21)	(20)	(9)	(5)	(54157)	(52)	(24)	(19)	(2)	(2)	(7099)	(70)	(11)	(11)	(0)	(7)	(3762)
Stat Depts																		
Univ (PhD)							38	13	7	15	27	1573						
							(41)	(22)	(7)	(14)	(15)	(1195)						
Univ (MA)							65	9	10	2	14	1085						
							(64)	(27)	(7)	(0)	(2)	(342)						
Total Stat Depts							49	11	8	10	22	2658						
							(46)	(23)	(7)	(11)	(12)	(1537)						

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

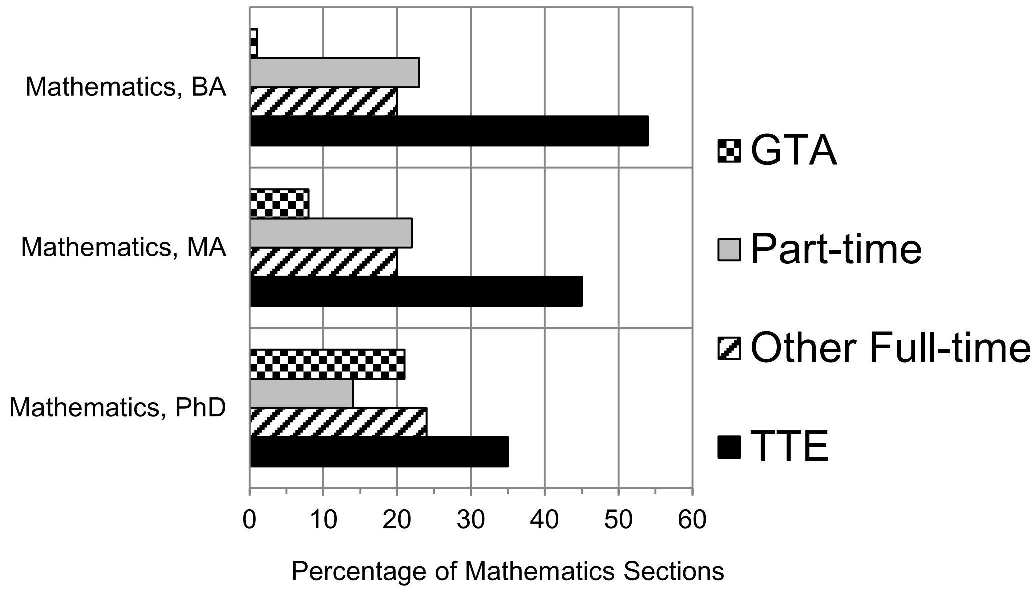

FIGURE E.5.1 Percentage of mathematics sections in mathematics departments whose instructors were tenure/tenure-eligible/permanent (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to "unknown" instructor percentages.)

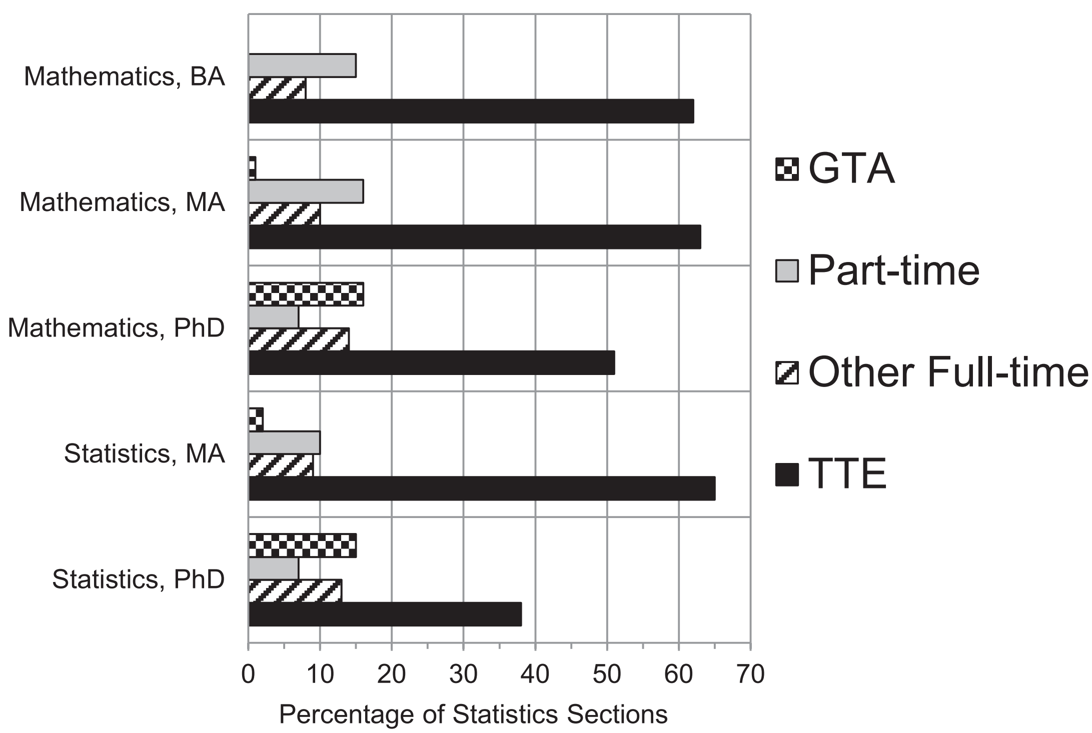

FIGURE E.5.2 Percentage of statistics sections in mathematics and in statistics departments whose instructors were tenure/tenure-eligible/permanent (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to "unknown" instructor percentages.)

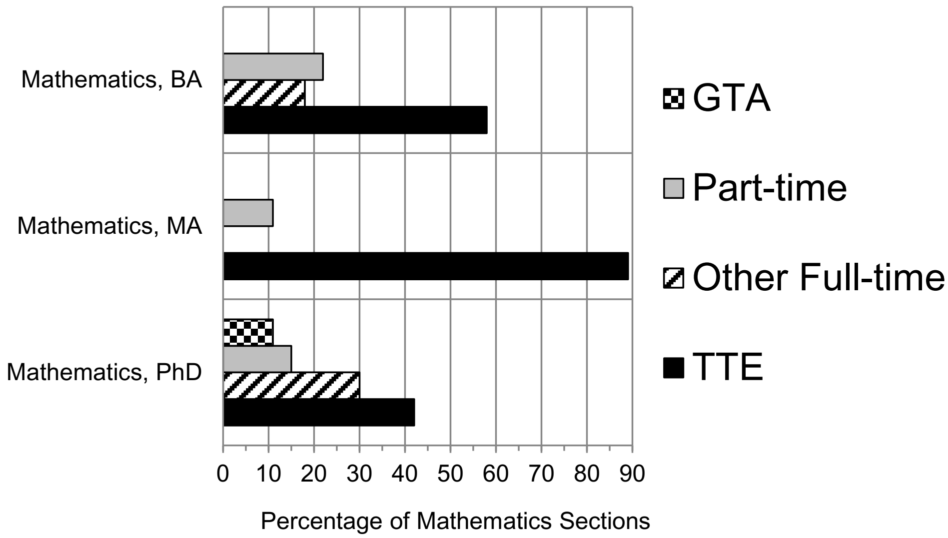

FIGURE E.5.3 Percentage of computer science sections in mathematics departments whose instructors were tenure/tenure-eligible/permanent faculty (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to "unknown" instructor percentages.)

TABLE E.6 Number of sections, not including distance learning, of precollege-level courses in mathematics departments taught by various types of instructor, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of precollege-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	31	353	666	365	162	1578
	(29)	(346)	(579)	(376)	(66)	(1363)
Univ (MA)	279	620	769	279	128	2075
	(55)	(534)	(616)	(641)	(99)	(1902)
Coll (BA)	1043	461	1806	27	362	3699
	(576)	(1189)	(2091)	(23)	(192)	(3862)
Total	1353	1434	3241	671	652	7352
	(660)	(2069)	(3286)	(1040)	(357)	(7126)

Note: Round-off may make row and column sums seem inaccurate.

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

TABLE E.7 Number of sections (excluding distance learning) of introductory-level courses (including precalculus) in mathematics departments taught by various types of instructors, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of introductory-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	636 (588)	2128 (1798)	1123 (1176)	1616 (1902)	766 (394)	6268 (5517)
Univ (MA)	2073 (1849)	1611 (1570)	2058 (1657)	485 (295)	329 (369)	6556 (5543)
Coll (BA)	5529 (4079)	1891 (2808)	3761 (2998)	0 (0)	1344 (432)	12525 (9895)
Total	8238 (6517)	5631 (6175)	6942 (5831)	2100 (2196)	2438 (1196)	25349 (20955)

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

TABLE E.8 Number of sections (excluding distance learning) of calculus-level courses in mathematics departments taught by various types of instructor, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of calculus-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	3120 (3199)	2057 (3015)	789 (726)	1289 (1261)	721 (650)	7976 (7696)
Univ (MA)	3080 (2196)	495 (534)	611 (402)	160 (16)	213 (249)	4559 (3237)
Coll (BA)	6743 (5754)	839 (1426)	1223 (520)	0 (107)	771 (108)	9575 (7388)
Total	12943 (11149)	3391 (4976)	2622 (1648)	1448 (1384)	1705 (1006)	22110 (18321)

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

TABLE E.9 Number of sections (excluding distance learning) of elementary-level statistics taught in mathematics departments and statistics departments by types of instructor and type of department in fall 2010 with fall 2005 figures in parentheses.

	Number of elementary-level statistics sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	251 (145)	243 (292)	124 (104)	274 (136)	77 (25)	969 (629)
Univ (MA)	641 (441)	185 (219)	293 (250)	19 (15)	70 (34)	1208 (924)
Coll (BA)	2564 (1738)	601 (456)	1130 (987)	28 (0)	691 (100)	5014 (3191)
Total	3456 (2324)	1029 (967)	1547 (1341)	320 (151)	838 (159)	7191 (4744)
Statistics Departments						
Univ (PhD)	262 (144)	202 (171)	103 (88)	243 (172)	302 (180)	1113 (696)
Univ (MA)	318 (80)	93 (97)	113 (24)	17 (0)	96 (7)	638 (186)
Total	581 (224)	295 (268)	217 (112)	260 (172)	399 (187)	1751 (882)

Note: Round-off may make row and column sums seem inaccurate.

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

TABLE E.10 Number of sections (excluding distance learning) of lower-level computer science taught in mathematics departments, by type of instructor and type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of lower-level computer science sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	25 (31)	29 (68)	29 (10)	15 (14)	4 (15)	101 (114)
Univ (MA)	116 (187)	0 (50)	30 (127)	0 (0)	0 (149)	146 (512)
Coll (BA)	1089 (1199)	397 (223)	656 (256)	14 (0)	73 (6)	2230 (1629)
Total	1229 (1416)	426 (341)	715 (393)	30 (14)	77 (169)	2477 (2254)

Note: Round-off may make row and column sums seem inaccurate.

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

TABLE E.11 Number of sections (excluding distance learning) of middle-level computer science taught in mathematics departments, by type of instructor and type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of middle-level computer science sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	31 (19)	11 (55)	2 (3)	7 (3)	0 (0)	51 (61)
Univ (MA)	92 (72)	0 (11)	0 (6)	0 (0)	0 (33)	92 (121)
Coll (BA)	521 (613)	156 (168)	95 (6)	0 (0)	0 (22)	769 (739)
Total	644 (703)	168 (234)	97 (15)	7 (3)	0 (55)	912 (921)

Note: Round-off may make row and column sums seem inaccurate.

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

TABLE E.12 Number of sections of advanced mathematics (including operations research) and statistics courses in mathematics departments, and number of sections of advanced statistics courses in statistics departments, taught by tenured/tenure-eligible/permanent [1] (TTE) faculty, and total number of advanced level sections, by type of department in fall 2010 with fall 2005 data in parentheses.

Mathematics Departments	Sections taught by TTE [1]	Total sections	Statistics Departments	Sections taught by TTE [1]	Total sections
Advanced Mathematics courses					
Univ (PhD)	2500 (2184)	3266 (2625)			
Univ (MA)	2098 (1382)	3304 (1622)			
Coll (BA)	3548 (2941)	3913 (3507)			
Total advanced mathematics	8146 (6506)	10483 (7754)			
Advanced Statistics courses			Advanced Statistics courses		
Univ (PhD)	438 (434)	561 (869)	Univ (PhD)	324 (343)	452 (499)
Univ (MA)	308 (359)	420 (714)	Univ (MA)	382 (140)	442 (156)
Coll (BA)	721 (604)	929 (771)			
Total advanced statistics	1467 (1398)	1910 (2354)	Total advanced statistics	706 (483)	894 (654)
Total all advanced courses	9613 (7904)	12394 (10108)	Total all advanced courses	706 (483)	894 (654)

Note: Round-off may make row and column sums seem inaccurate.

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

TABLE E.13 Average section size (excluding distance learning) for undergraduate mathematics, statistics, and computer science courses in mathematics and statistics departments, by level of course and type of department in fall 2010, with fall 2005 data, when available, in parentheses. Also, all departments' average section sizes from previous CBMS surveys.

	Average section size Fall 2010 (2005)										
	Mathematics Depts				Statistics Depts			All Departments			
	Univ (PhD)	Univ (MA)	Coll (BA)	Overall Math	Univ (PhD)	Univ (MA)	Overall Stat	1995	2000	2005	2010
Mathematics courses											
Precollege	36	30	23	27				31	29	28	27
	(40)	(31)	(22)	(28)							
Introductory (incl. Precalc)	47	31	27	33				34	35	33	33
	(48)	(34)	(25)	(33)							
Calculus	48	31	24	34				31	32	32	34
	(45)	(27)	(21)	(32)							
Advanced Mathematics	20	12	12	14				12	13	14	14
	(20)	(15)	(10)	(14)							
Statistics courses											
Elementary Statistics	52	32	26	30	49	38	45	38	37	35	33
	(47)	(34)	(26)	na	(60)	(63)	na				
Upper Statistics	27	13	12	17	33	27	30	19	22	19	21
	(17)	(13)	(13)	na	(40)	(22)	na				
CS courses											
Lower CS	29	22	20	21	na	na		22	22	19	21
	(25)	(22)	(18)	na	(16)	(66)					
Middle CS	18	15	12	12	na	na		14	22	9	12
	(19)	(8)	(8)	na	(48)	(16)					
Upper CS	15	16	11	11	na	na		12	11	8	11
	(15)	(8)	(7)	na	(0)	(0)					

Tables E.13 and E.14: Data on section size

Table E.13 summarizes data on the average section size for a selected list of course categories, broken down by the level of department, over the last four CBMS surveys. The Mathematical Association of America has recommended 30 students as the appropriate maximum class size for undergraduate mathematics courses [MAAGuidelines], and the CBMS surveys have shown that this maximum often is not maintained. In particular, section sizes at the doctoral-level departments often substantially exceed the MAA Guidelines. As we have noted, the definition of a section caused some problems with responses in 2010, particularly with calculus sections, a fact that will be discussed further in Chapter 5.

Table E.13 shows that there has not been much change from 2005 in the average section sizes in 2010; over the past four surveys, the overall section size of precollege-level mathematics, introductory mathematics, and elementary statistics has been slightly decreasing, while the overall section sizes of calculus and advanced-level mathematics have been slightly increasing. The average size of sections of calculus increased from 32 students in fall 2005 to 34 students in fall 2010, while the average size of sections of elementary statistics classes taught in mathematics and statistics departments combined decreased from 35 students in fall 2005 to 33 students in 2010. The size of computer science classes taught in mathematics departments increased from 2005 to 2010.

Table E.14 presents the size of recitation sections in calculus and elementary statistics courses. The size of recitation sections of calculus courses increased from fall 2005 to fall 2010, more than doubling in Mainstream Calculus II at bachelors-level departments. The average size of recitation sections in elementary statistics courses taught in mathematics and statistics departments decreased slightly, except at bachelors-level mathematics departments and masters-level statistics departments, where it increased significantly from fall 2005 to fall 2010.

TABLE E.14 Average recitation size in Mainstream Calculus I and II and other Calculus I courses and in elementary statistics courses that are taught using lecture/recitation method, by type of department in fall 2010, with fall 2005 data in parentheses. Distance-learning sections are not included. (A calculus course is "mainstream" if it leads to the usual upper-division mathematical sciences courses.)

	Average recitation section size		
For Lecture/Recitation Courses	Univ (PhD)	Univ (MA)	College (BA)
Calculus Courses			
Mainstream Calculus I	29 (28)	30 (19)	30 (21)
Mainstream Calculus II	29 (26)	25 (20)	33 (15)
Other Calculus I	30 (29)	19 (na)	15 (na)
Elementary Statistics			
in Mathematics Depts	28 (30)	29 (32)	32 (22)
in Statistics Depts	30 (32)	34 (19)	na (na)

Table E.15: AP credit for Calculus I in mathematics departments and Elementary Statistics in statistics departments

In 2010, for the first time, the CBMS survey produced an estimate of the average percentage of freshmen who received AP mathematics or statistics credit, broken down by level of department. The four-year mathematics questionnaire asked departments to give the total number of freshmen enrolled at the institution and the total number of these students who received AP credit for Calculus I. The statistics questionnaire asked the parallel question about AP credit for Elementary Statistics. The total of these numbers is given in the first two rows of Table E.15, broken down by level of department. Hence, for example, 10% of the total freshmen enrolled in doctoral-level institutions received credit for Calculus I. Moreover, the percentage of freshmen who received AP credit was calculated for each institution, and the mean values of these percentages are reported in the third row of Table E.15. Hence, across all mathematics departments, the average percentage of freshmen receiving AP credit for Calculus I was 5% (13% at doctoral-level mathematics departments) and 12% across all statistics departments. These baseline percentages may be compared to future years.

TABLE E.15 Number of freshmen (in 1000s) entering in Fall 2010 with AP credit for Calculus I in Mathematics Departments (Elementary Statistics in Statistics Departments) and the average of the ratio of number of freshmen with AP credit to the number of freshmen by type of department in fall 2010.

	Mathematics Departments				Statistics Departments		
Enrollments	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total
Total freshmen enrolled in Fall 2010	346	209	336	891	65	57	122
Total entering with AP credit	34	8	13	55	11	2	13
Mean ratio of those with AP credit to total enrollment	0.13	0.03	0.04	0.05	0.18	0.04	0.12