

Recent Trends in Graduate Admissions in Mathematics Departments

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Introduction

During the first several months of 1996 anecdotal reports of a significant drop-off in the number of and, in some instances, quality of applicants to various graduate programs in mathematics circulated within the mathematics community. In response to the concerns raised by these reports, the American Mathematical Society (AMS) conducted a tightly focused survey whose aim was to provide more reliable information on the nature of this problem. This report describes the results of that survey.

In late May the survey form was sent by e-mail to the directors of graduate programs of 71 departments randomly selected from the 176 Ph.D.-granting mathematics departments that are routinely surveyed by the AMS.

The sample was drawn so as to support separate projected estimates for four groupings of the departments. These groupings are based on the reputational ranking of mathematics programs in a 1995 report of the National Research Council. These groupings are updates of those traditionally used in the AMS-IMS-MAA Annual Survey. A more complete description of these groupings and a listing of the departments appeared in the January 1997 issue of *Notices*,

pages 48–49. Group I now consists of the top 48 mathematics departments, Group II the next 56, and Group III the remaining 72. Group I is further divided into the 25 departments at public institutions, Group I Public; and the 23 departments at private institutions, Group I Private. The reports of the 1996 Annual Survey will be based on these updated groupings.

The figures reported in the following tables are projected totals for the various groups based on the responses from the sample for each group. The report is based on a total of 53 responses to the survey.

Results of the Survey

Question 1 asked the sampled departments to report the number of applications they received for admission to graduate school in the fall of 1993, 1994, 1995, and 1996. They were also asked to report separately the number of applications by U.S. citizens and permanent residents and by non-U.S. citizen temporary residents. These results are reported in Table 1.

For all groups combined, the size of the pool of applications for admission in fall 1996 declined 30% from the fall 1994 figure. The declines vary among the different groups. The least decline was for Group I Private, 19%; the greatest decline for Group III, 37%.

For all groups combined, the pool of applications by U.S. citizens for admission in fall 1996 declined 32% from the fall 1994 figure. Group I Public departments reported a decline of 43%, while Group I Private reported a decline of 20%.

Applications by noncitizens declined 29% from fall 1994 to fall 1996, with Group III reporting the largest decline, 38%.

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Editor's Note: *A copy of this report, including explanatory appendices, may be obtained by contacting James W. Maxwell at jwm@ams.org.*

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
Total Pool 1996*	4,293	3,073	7,366	5,034	4,116	16,516
Total Pool 1994	6,316	3,804	10,120	6,897	6,528	23,545
Percent decrease 1994 to 1996	32%	19%	27%	27%	37%	30%
U. S. Pool 1996	1,757	1,351	3,108	1,949	1,234	6,291
U. S. Pool 1994	3,082	1,687	4,769	2,653	1,848	9,270
Percent decrease 1994 to 1996	43%	20%	35%	27%	33%	32%
International Pool 1996	2,546	1,748	4,295	3,210	2,882	10,387
International Pool 1994	3,236	2,262	5,498	4,360	4,680	14,537
Percent decrease 1994 to 1996	21%	23%	22%	26%	38%	29%

Table 1. Changes in the numbers of applications to graduate school, fall 1994 to fall 1996.

*The Total Pool may not equal the sum of the U.S. Pool and the Int. Pool. Since some departments were unable to provide numbers of applications broken out by citizenship or visa status, the projections may be based on slightly different sets of respondents.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	0.0%	0.0%	0.0%	5.5%	0.0%	1.8%
1996 somewhat better than 1995	22.4%	22.6%	22.5%	11.1%	38.9%	25.6%
1996 about the same as 1995	62.0%	51.7%	57.1%	38.9%	36.1%	42.7%
1996 somewhat poorer than 1995	6.8%	25.7%	15.8%	44.5%	19.4%	26.4%
1996 much poorer than 1995	8.8%	0.0%	4.6%	0.0%	5.6%	3.5%

Table 2a. Quality comparisons of all applicants for admission to graduate school, fall 1996 to fall 1995.

Assuming individuals have not significantly increased the number of applications they submit to graduate school over the past two years, the results in Table 1 indicate a substantial drop in the number of individuals submitting applications.

Question 2 asked the sampled departments to compare the quality of the pool of applicants for admission in fall 1996 with the quality of the pool of applicants for admission in fall 1995. They were also asked to make the same comparison independently for U.S. citizens and permanent residents and for non-U.S. citizen temporary residents. The results are reported in Tables 2a, 2b, and 2c. The reader should be especially cautious in interpreting the trends reported due to the subjective nature of the judg-

in quality.

Question 3a asked departments to report the number of applicants admitted for fall 1996, the fall '96 class. In addition, Question 3b asked departments to indicate whether or not the size of the fall '96 class was less than or about equal to the number they were seeking to admit. Table 3 reports the results of these questions.

The size of the fall '96 class is projected to be 2,384 for all groups combined. This can be compared with a fall '94 class of 2,546 for these same groups combined, as reported in the Second Report of the 1994 AMS-IMS-MAA Annual Survey. (See Table 5A, August 1995 *Notices of the AMS*, page 872.)

Question 4 asked the sampled departments to compare the quality of those admitted for fall

ment asked for in this question.

For all groups combined, there appeared to be no upward or downward shift in the quality of the pool of applicants. Among the various groups of departments, Group II reported a downward trend in quality, while Group III reported an upward trend in quality.

For U.S. citizen and permanent-resident applicants there was an upward trend in quality from fall 1995 to fall 1996 for all groups combined. This upward trend was strongest for Group I Public and Group III.

For non-U.S. citizen temporary residents there was no significant change in quality over all groups combined. Group I Public and Group I Private reported a slight upward trend in quality, while Group II reported a slight downward trend

1996, the fall '96 class, with the quality of those admitted for fall 1995, the fall '95 class. They were also asked to make the same comparison independently for U.S. citizens and permanent residents and for non-U.S. citizen temporary residents. The results are reported in Tables 4a, 4b, and 4c. The reader should be especially cautious in interpreting the trends reported due to the subjective nature of the judgment asked for in this question.

Group I Public and Group I Private each reports a decidedly upward trend in the quality of the fall '96 class over the fall '95 class, Group III somewhat less so. Only Group II reports a downward trend.

The upward trend in quality reported by Group I Public and Group I Private holds independently for U.S. citizens and permanent residents and for non-U.S. citizen temporary residents. Likewise the downward trend reported by Group II holds independently for both citizenship groupings.

Next Year

The AMS hopes to conduct a second survey in the late spring of 1997 along the lines of this survey. Those responsible for graduate admissions within their department are encouraged to set up mechanisms for tracking key characteris-

tics of the pool of applicants for admission. Characteristics that might be considered key include: gender, citizenship/visa status, standardized test scores, and previous mathematical sciences degrees.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	0.0%	11.1%	5.4%	11.1%	13.9%	10.7%
1996 somewhat better than 1995	41.4%	25.8%	33.9%	16.6%	50.0%	35.0%
1996 about the same as 1995	41.4%	37.1%	39.3%	31.1%	5.6%	22.9%
1996 somewhat poorer than 1995	6.8%	25.8%	15.9%	28.6%	25.0%	23.7%
1996 much poorer than 1995	10.4%	0.0%	5.4%	12.7%	5.6%	7.8%

Table 2b. Quality comparisons of U.S. citizen and permanent resident applicants for admission to graduate school, fall 1996 to fall 1995.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	0.0%	0.0%	0.0%	5.5%	0.0%	1.8%
1996 somewhat better than 1995	22.4%	11.3%	17.1%	0.0%	27.8%	16.0%
1996 about the same as 1995	70.8%	88.7%	79.4%	72.3%	41.7%	61.7%
1996 somewhat poorer than 1995	6.8%	0.0%	3.5%	22.1%	30.6%	20.5%
1996 much poorer than 1995	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 2c. Quality comparisons of non-U.S. citizen temporary resident applicants for admission to graduate school, fall 1996 to fall 1995.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
Size of fall 1996 incoming class	544	214	759	726	900	2,384
Average class size	22	9	16	13	14	14
Size less than number sought	31.2%	37.0%	34.0%	53.0%	61.1%	51.1%
Size about equal to number sought	68.8%	63.0%	66.0%	47.0%	38.9%	48.9%

Table 3. Profile of fall 1996 incoming class.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	15.5%	0.0%	8.1%	0.0%	0.0%	2.2%
1996 somewhat better than 1995	31.1%	51.7%	41.0%	17.9%	40.4%	33.4%
1996 about the same as 1995	37.8%	48.3%	42.8%	29.1%	32.9%	34.4%
1996 somewhat poorer than 1995	15.5%	0.0%	8.1%	53.3%	20.3%	27.4%
1996 much poorer than 1995	0.0%	0.0%	0.0%	0.0%	6.4%	2.6%

Table 4a. Quality comparisons of incoming classes, fall 1996 to fall 1995.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	15.5%	11.3%	13.5%	6.4%	0.0%	5.7%
1996 somewhat better than 1995	22.3%	40.4%	31.0%	12.3%	36.1%	27.1%
1996 about the same as 1995	53.4%	37.0%	45.5%	37.3%	42.6%	41.7%
1996 somewhat poorer than 1995	8.8%	0.0%	4.6%	37.5%	13.9%	18.9%
1996 much poorer than 1995	0.0%	11.3%	5.4%	6.4%	7.4%	6.5%

Table 4b. Quality comparisons of U.S. citizen and permanent resident incoming classes, fall 1996 to fall 1995.

	Group I Public (25)	Group I Private (23)	Group I Combined (48)	Group II (56)	Group III (72)	All Groups Combined (176)
1996 much better than 1995	8.8%	11.3%	10.0%	6.1%	0.0%	4.7%
1996 somewhat better than 1995	22.4%	25.7%	24.0%	6.4%	27.8%	19.9%
1996 about the same as 1995	55.2%	63.0%	59.0%	50.2%	39.3%	48.1%
1996 somewhat poorer than 1995	13.6%	0.0%	7.1%	18.9%	32.9%	21.4%
1996 much poorer than 1995	0.0%	0.0%	0.0%	18.4%	0.0%	5.9%

Table 4c. Quality comparisons of non-U.S. citizen incoming classes, fall 1996 to fall 1995.