

Changes in Mathematics Faculty Composition, Fall 1990 to Fall 1996

James W. Maxwell

This article highlights recent trends in the composition of faculty within departments of mathematics at four-year institutions in the U.S. The most striking trends are the sizable cumulative decline in tenure-track faculty across all mathematics departments—more than a one-quarter reduction between 1990 and 1996—and the constant or slightly declining numbers of part-time faculty. The former trend points to a significant factor in the difficult job market faced by those receiving their doctorate in the 1990s. The latter trend is somewhat surprising, as it runs counter to anecdotal reports of a significant increase in the use of part-time faculty within mathematics departments. In the Ph.D.-granting mathematics departments, the decline in tenure-track faculty was largely offset by an increase in non-tenure-track faculty, many of whom hold postdoctoral positions. For the remaining mathematics departments the decline in tenure-track faculty resulted in a comparable decline in the total full-time faculty.

James (Jim) W. Maxwell is AMS executive director for Professional Programs and Services. His e-mail address is jwm@ams.org.

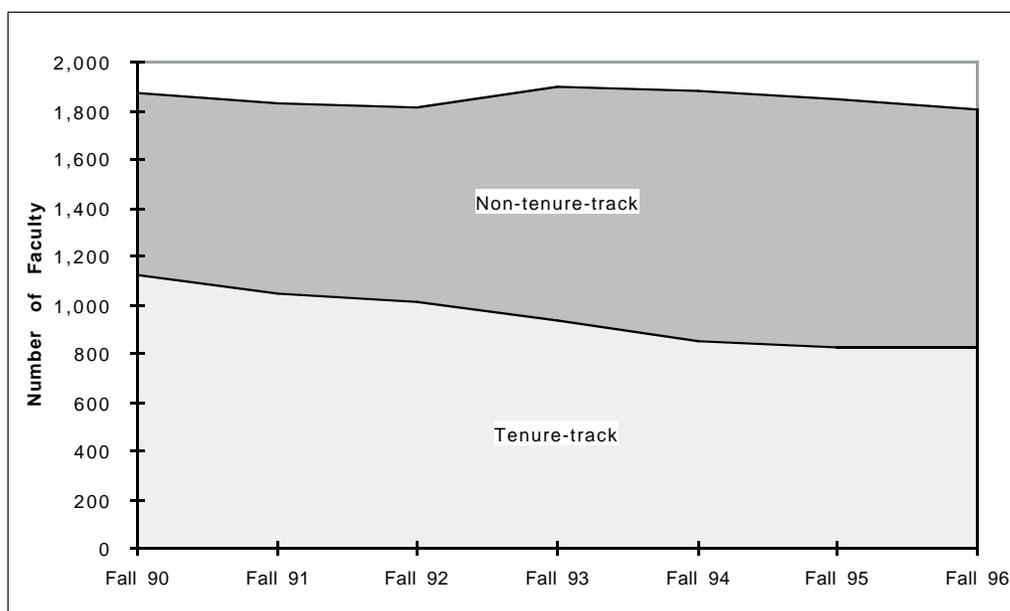


Figure 1a. Trends in tenure-track and non-tenure-track faculty in Groups I-III. (Throughout this article, the term “tenure-track faculty” excludes tenured faculty.)

The trends reported here became apparent during a retrospective analysis of the data gathered in the AMS-IMS-MAA Annual Surveys since 1990. The term “Groups I-III” denotes the 176 mathematics departments with doctoral degree programs during the 1995-96 academic year, and the term “Groups M&B” denotes those remaining mathematics departments at four-year institutions. The list of the departments in each of Group I, Group II, and Group III can be viewed at www.ams.org/committee/profession/groups_des.html.

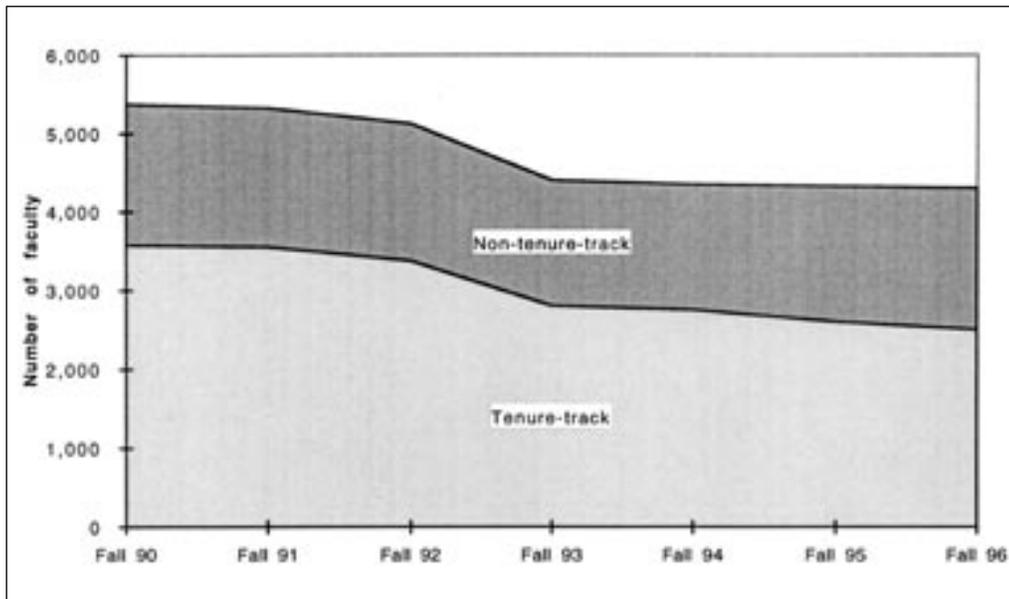


Figure 1b. Trends in tenure-track and non-tenure-track faculty in Groups M&B.

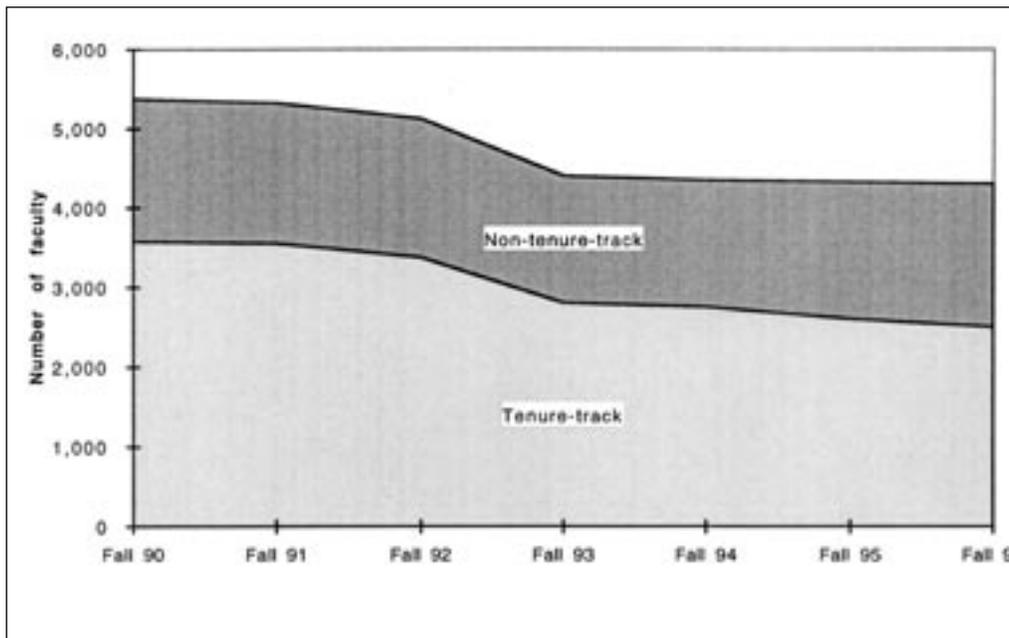


Figure 2. Trends in part-time faculty, Groups I-III and Groups M&B.

Figure 1a shows a steady decline in the number of tenure-track faculty within Groups I-III between fall 1990 and fall 1996. The cumulative decline in tenure-track positions over the six years was 300, a 27% decline. During this same time there was an increase in the number of non-tenure-track faculty that largely offset the decline in tenure-track faculty. These trends will come as no surprise to those who have followed the difficult job market in recent years. A major factor in this decline was university policies that prevented many departments from filling positions of retiring tenured faculty with tenure-track faculty.

The number of tenure-track faculty in Groups M&B is three times the number in Groups I-III. Unfortunately, the trend in the number of these positions is similar to that for Groups I-III. Figure 1b shows a steady decline in the number of tenure-track faculty between fall 1990 and fall 1996. The cumulative decline in tenure-track positions was approximately 1,100, a 30% decline from the fall 1990 level. Unlike Groups I-III, the number of (full-time) non-tenure-track faculty was essentially constant. Furthermore, the total number of full-time faculty in Groups M&B declined by 8% between fall 1990 and fall 1996, virtually all of the decline coming from the reduction in the tenure-track faculty.

Figure 2 shows the number of part-time faculty in Groups I-III was essentially constant between fall 1990 and fall 1996. In addition, other data show that a significantly larger fraction of the part-time positions was occupied by doctorate-holding faculty in fall 1996 than in fall 1990: 40% compared to 25%. Figure 2 also shows that for Groups M&B there was a small decline in the number of part-time faculty from fall 1990 to fall 1995, with a rebound indicated for fall 1996.

Within Groups M&B there is a significant number of tenure-track and (full-time) non-tenure-track faculty without a doctorate. Inspecting Figures 3a and 3b, one can see that the number and proportion of nondoctoral faculty declined within each of these two faculty categories, reflecting the ready availability of recent doctoral recipients. One should keep in mind that in many instances nondoctoral faculty subsequently earn a doctoral degree, particularly those in tenure-track positions.

For further perspective on the impact of the preceding trends on the employment situation, consider the following two observations. In the five years preceding July 1990, a total of approximately 4,300 new doctorates were awarded by math-

ematics, applied mathematics, and statistics departments in the U.S., based on the reports of the Annual Surveys. For the five-year period from July 1990 to July 1995, the comparable count was approximately 5,700, a 33% increase. This rising tide of new doctorates faced a steadily declining pool of tenure-track positions, one which declined by more than 27% between fall 1990 and fall 1996.

The number of tenure-track faculty in Groups I, II, III, M, and B combined declined by approximately 1,400 between 1990 and 1996. During the same time the cumulative turnover in faculty due to deaths and retirements was approximately 2,600, based on figures reported in previous Annual Survey reports. This suggests that approximately half of the positions that were vacated due to deaths and retirements went unfilled or were converted to non-tenure-track full-time positions.

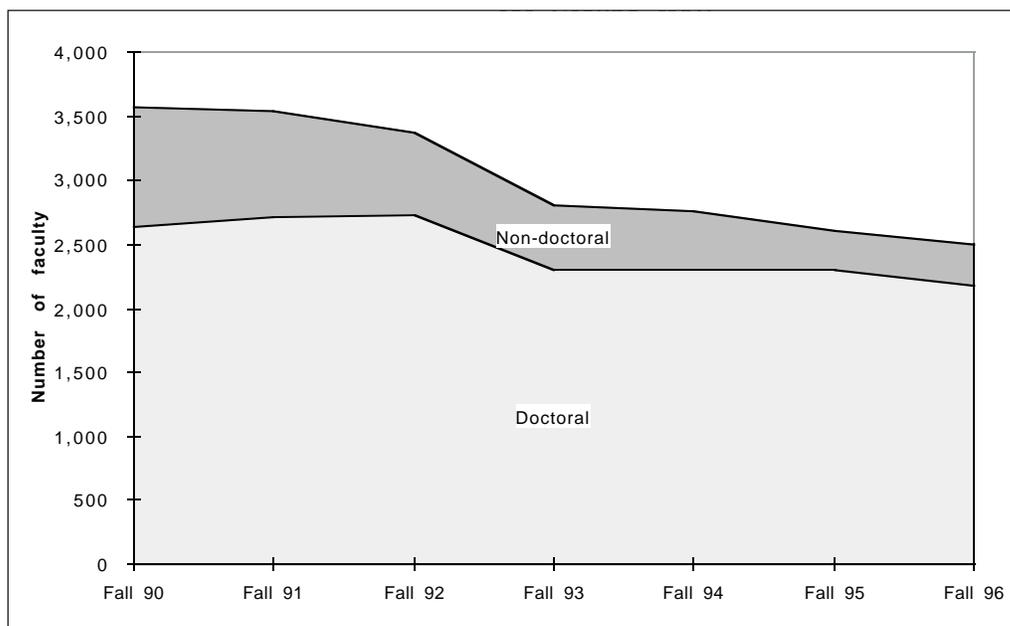


Figure 3a. Degree status of tenure-track faculty for Groups M&B.

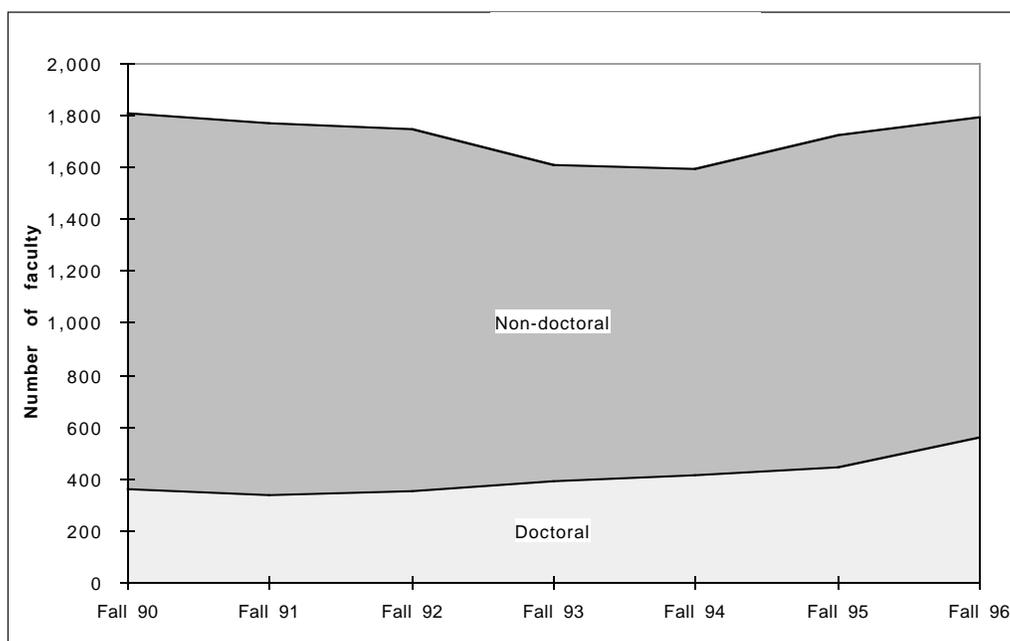


Figure 3b. Degree status of non-tenure-track faculty for Groups M&B.

The reader should keep in mind that survey responses and the proportional projections of faculty counts are potentially biased due to (i) selection bias of the responding departments and (ii) inhomogeneity of departments within the survey groups. Over the six years studied, survey group response rates have remained relatively stable, but they do vary significantly among

survey groups. Response rates range from a relatively high overall rate of 80% or better for Groups I, II, and III down to 40% for Group B. In analyzing the data collected between 1990 and 1996, effort has been made to eliminate the extraneous effects of some small changes in the survey methodology.