Data Sources: Trends in New Ph.D.s Entering Academe, 1970 to 2005

Doctoral education has experienced enormous growth over the past three decades, especially in the fields of science and engineering. Since 1970, the total number of research doctoral degrees conferred by American universities has grown 47%, and since 1983 the number of awards in science and engineering has risen 51% (Hill, 1993; Hill, 2006; National Science Board, 2006). However, this growth has not led to an increase in the number of new doctoral recipients entering faculty positions. In fact, recent trends suggest that the share of new research doctoral recipients taking faculty jobs fell sharply over the past 30 years, and this decline may have adversely affected students' educational experiences.

The annual Survey of Earned Doctorates recently reported that American universities conferred 43,354 research doctorates in 2005, an all-time high (NORC, 2006; Smallwood, 2006a). In addition, data from the National Science Foundation (NSF) reveal that the number of new doctorates in science and engineering jumped 6.5% between 2004 and 2005 and reached a record high of 27,974 in 2005 (Hill, 2006; Smallwood, 2006a).

However, the number of new Ph.D.s grew at the same time as colleges and universities faced slower growth in student enrollments and lower inflation-adjusted growth in state and federal appropriations (Thurgood, Golladay, and Hill, 2006). As a result, there were fewer opportunities for new doctorates to enter the academy, and a greater share of the faculty jobs that were available were for either part-time or non-tenure-track positions (Ehrenberg, 2005). At the same time, private industry, especially in the science and engineering fields, had increased needs for research scientists and other highly skilled workers to develop new products and services. Thus, the share of new doctorates who achieved jobs in academe fell sharply while the proportion in private industry gained. Table 1 illustrates the pace of these trends.

Between the time period of 1970 to 1974, about two-thirds of new Ph.D.s who received job offers had gained jobs in academe. In the 1995 to 1999 periods, the share of new doctoral degree recipients who received jobs from colleges and universities dropped to less than one half. Conversely, during the same two time spans, the share of new doctorate holders employed by industry or self employed more than doubled. The trends for new science and engineering doctoral degree holders were particularly noteworthy. During the two time spans, the proportion of these doctorates who gained academic employment fell from about 58% to just 36% while the percentage in private industry or self employment grew from only 22% to 44%. More surprising is the finding that the share of non-science and engineering doctorates who were employed in industry also rose sharply while the share in academe fell from roughly 76% to 63%.

As might be expected given the recent trends, the share of new doctorates whose primary job function is teaching declined as the share employed in colleges and universities fell.

Table 1. Employment Sectors of New PhDs With Postgraduation Work Commitments, 1970 to 1974 and 1995 to 1999

All Fields

Years	Academe	Industry and Self Employment	Government	Other
1970 to 1974	66.7%	12.2%	10.3%	10.7%
1995 to 1999	49.4%	26.6%	7.8%	16.2%

Science and Engineering Fields

Years	Academe	Industry and Self Employment	Government	Other
1970 to 1974	57.6%	22.1%	14.4%	5.8%
1995 to 1999	36.5%	44.4%	10.9%	8.2%

Non-Science and Engineering Fields

Years	Academe	Industry and Self Employment	Government	Other
1970 to 1974	76.1%	2.0%	6.1%	15.8%
1995 to 1999	62.8%	8.2%	4.5%	24.5%

Source: Thurgood, Golladay, & Hi ll, 2006.

According to NSF's recent study, *U.S. Doctorates in the 20th Century* (Thurgood, Golladay, and Hill, 2006), in the 1970 to 1974 period, 56% of all new Ph.D.s who had post-graduation employment commitments had received jobs whose primary function was teaching. During the 2000 to 2005 period, only 39% of the new doctorates were in teaching-related jobs (see Table 2). By contrast, the percentage of new degree holders whose primary job was research and development -- jobs primarily with private industry -- jumped from 23% to 39%, and the share in "professional services" increased from about 8% to 12%.

Table 2. Primary Work Activities of Ph.D.s With Postgraduation Work Commitments: 1970 to 1974, 1995 to 1999, and 2000 to 2005

Years	Administration	Professional Services	Research and Development	Teaching	Other
1970 to 1974	11.1%	7.8%	23.1%	56.2%	1.8%
1995 to 1999	13.5%	14.3%	30.9%	38.1%	3.3%
2000 to 2005	14.4%	12.5%	31.5%	38.8%	2.8%

Source: Thurgood, Golladay, & Hi ll, 2006.

Two important factors (in addition to the enrollment and revenue declines cited earlier) account for the decline in new Ph.D.s entering teaching-related positions. One is that faculty salaries have been declining in inflation-adjusted terms for the past several years. The American Association of University Professors has found that average faculty salaries fell by nearly 1% in real value between academic years 2003-2004 and 2005-2006, and have averaged a gain of only 0.2% over the past decade (Smallwood, 2006b).

The salary trends may have contributed to the lower faculty retention rates among new Ph.D.s who did gain academic jobs. This appears to have been especially true at public colleges and universities, which faced worsening fiscal constraints during the 1980s and 1990s (Ehrenberg, 2005). The overall retention rates of new associate professors at public colleges and universities declined from about 93% in 1996-1997 to 90% in 2001-2002 (Nagowski, 2004). Faculty retention rates among new science and engineering degree holders have been even lower. The share of new faculty in these fields who were still employed at colleges and universities within seven years after their initial hiring date fell from 89% in 1973 to 65% twenty years later (National Science Board, 2006).

The second factor is the lower number of retirements among current faculty, which may have limited the number of openings available for new doctoral degree recipients. The Age Discrimination in Employment Act of 1974, which prohibits colleges and universities from forcing faculty members to retire at any age, appears to have encouraged older faculty members to remain employed longer. The percentage of faculty at research universities age 60 to 64 rose from 5% in 1973 to about 12% in 2003, and the share of those age 65 and over increased from 2% to 5%. Non-research universities had similar increases in older faculty (National Science Board, 2006).

These trends, if they were to continue, may have negative effects on the quality of students' college experiences. Ehrenberg (2005) suggests that

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the decline in new Ph.D.s entering the teaching jobs has led to larger student/faculty ratios, which in turn could lower graduation rates for all students. Students may also find it more difficult to get adequate training in some fields, particularly in science and engineering, for which the demand for doctoral students has been very strong.

But more recent trends suggest that improvements may be forthcoming. The Bureau of Labor Statistics estimates that employment opportunities for postsecondary faculty will grow faster than the national average through 2014 (BLS, 2006). Job opportunities likely will vary somewhat by field, as openings for all types of faculty result from retirements of current instructional staff and continued increases in student enrollments. At the same time, business and industry needs for highly trained workers will very likely continue to remain strong. Colleges and universities that want to increase faculty hires will be in increased competition for top talent with private industry and other sectors. New Ph.D.s may thus have greater chances for both faculty and non-faculty positions during the years ahead.

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McNair Memos: The Courage to Care: Intergroup Differences in Test Avoidance and Degree Selection

Introduction

Researching, writing, and commenting about intergroup differences in academic performances are not for the faint of heart. The careers of well-known public figures in politics, sports, business, and most recently higher education have had their reputations and their careers charred by the fallout from observations they have made about perceived differences in performance by race, gender, and ethnicity. Perhaps the greatest suspicion over the possible motives for making such impolite and impolitic observations about intergroup differences is reserved for educators.

Yet as graduate deans, or members of the Council for Opportunity in Education (COE) -TRIO community, or those of us who subscribe to high stakes testing, we know all too well that there do exist intergroup differences in both test performance and in the fields of study selected for graduate degrees. I am confident that students, undergraduate as well as graduate students, are also aware of these intergroup differences. There is anecdotal evidence that the choices that students make about selection of graduate degrees may be impacted by their awareness of intergroup differences in test performance. At the risk of some charring to our own professional reputations and careers, we in the graduate community must have the courage to care about the students' perceptions and the choices they make regarding whether to pursue degrees at our institutions.

This article highlights observations of a few intergroup differences that I have observed that impact graduate education and describes one project that has been embraced by the Minority Graduate Education (MGE) Committee of the Graduate Record Examination (GRE) Board and the Joint Committee of the Council of Graduate Schools (CGS) and the COE.

Fear, Testing and Degree Selection

African Americans, Mexican Americans, Puerto Ricans, Other Hispanics, and American Indians are underrepresented in the number of doctoral degrees awarded by graduate schools in the United States. In contrast to their under representation in the overall number of doctorates received, these same groups tend to be over represented in select fields of study when they are awarded degrees. Table 1 shows the percent of United States citizens by race and field

TABLE 1
Percent U.S. Recipients by Race and Field of Study - 2004

	US Tot*	White	Black	Asian	Oth His	Mex Am	P Rican	Am Ind
N =	26,431	20,745	1,869	1,449	490	429	258	129
% of Total	100	78	7	5	2	2	1	>1
Field of Study	%							
Phy Sci	11.4	11.8	4.1	13.9	8	7.7	10.5	8.5
Engineer	7.3	7	4.5	15.8	6.5	5.1	7.4	3.9
Life Sci	21.6	21.8	13.8	31.5	19.2	16.1	27.1	16.3
Soc Sci	18.5	18.5	18	15.9	26.7	21.2	14	16.3
Human	15.5	16.3	9.1	10.3	18	17	14.3	11.6
Educ	20.1	19.1	41.3	7.8	16.3	29.1	21.7	35.7
Ot/Prof	5.6	5.4	9.2	4.8	5.3	3.7	5	7.8

**** includes 1,062 unknown/other races who are not factored in % of Total***
Source: Doctorate Recipients from United States Universities: Summary Report 2004
NSF/NIH/USED/NEH/USDA/ NASA, Survey of Earned Doctorates
adapted from appendix Table A -4. Pgs.112 - 113

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