Beyond supply and demand: Assessing the Ph.D. job market

by Elka Jones

Greg O'Malley got a taste of the job market for Ph.D. graduates when he supervised several of them after earning his bachelor's degree. "It was incredible to me that they had gone through so many years of rigorous training," says O'Malley of his subordinates at his postbaccalaureate publishing job, "only to be working under someone who'd barely finished his undergrad work."

Still, the experience failed to deter him from pursuing a graduate degree of his own: O'Malley currently is enrolled in his second year of the history Ph.D. program at Johns Hopkins University.

For O'Malley and thousands of others, the desire for a doctorate outweighs concern about the job market that awaits after graduation. Most Ph.D. candidates are willing to dedicate themselves to intensive research and study because they enjoy the subject matter.

Statistics also show other, more tangible payoffs for Ph.D. recipients when they enter the labor force. Unemployment rates are consistently lower and earnings are significantly higher for people with a Ph.D. degree than they are for people with lower levels of educational attainment. As chart 1 shows, doctoral degree holders in 2001 had an unemployment rate of slightly more than 1 percent and median annual earnings of $66,000—considerably

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better than the 3.7-percent unemployment rate and $30,300 median earnings of the population aged 25 and older.

This article explores some challenges that Ph.D. candidates face, from earning the degree to seeking employment. The first section briefly describes what a Ph.D. degree is and what it entails for those who seek one. Following a section discussing the supply of Ph.D. graduates in the labor force, the article tracks the demand for them in the academic and nonacademic job markets, both overall and by field of study. Resources for Ph.D. candidates are listed on pages 28 and 29.

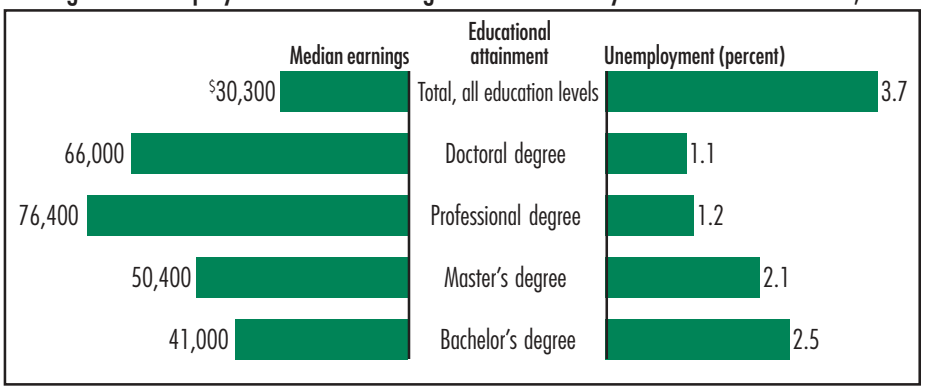
Fields of study in this article are divided into two categories. The first includes several fields within natural sciences and engineering: biological sciences, chemistry, computer sciences, engineering, health sciences, mathematics, and physics and astronomy. The second category includes several fields within humanities and social sciences: business and management, economics, education, English and American language and literature, foreign language and literature, history, political science and government, and psychology. These categories are not exhaustive; some fields have been omitted and are not discussed here.

What is a Ph.D. degree?

A Ph.D. degree is a Doctorate of Philosophy—essentially, it is a research degree. Several sources of information referenced in this article include Ph.D. degrees in the broader category of research doctoral degrees. For example, the Survey of Earned Doctorates, sponsored by the National Science Foundation and five Federal agencies—National Institutes of Health, U.S. Department of Education, National Endowment for the Humanities, U.S. Department of Agriculture, and National Aeronautics and Space Administration—tracks the number of research doctorates awarded each year by U.S. universities and includes titles such as Doctor of Education and Doctor of Science. Of these research doctorates, about 95 percent are Ph.D.'s.

Chart 1

Earnings and unemployment for workers aged 25 and older by educational attainment, 2001



Sources: Earnings, Bureau of Census; unemployment, Bureau of Labor Statistics.

Prior to embarking on doctoral studies, many students already have completed several years of formal study in their chosen field. The Survey of Earned Doctorates shows that in 2000, more than half of all Ph.D. recipients held a bachelor's degree in the same subject as that of their doctoral study—and nearly three-fourths held a master's.

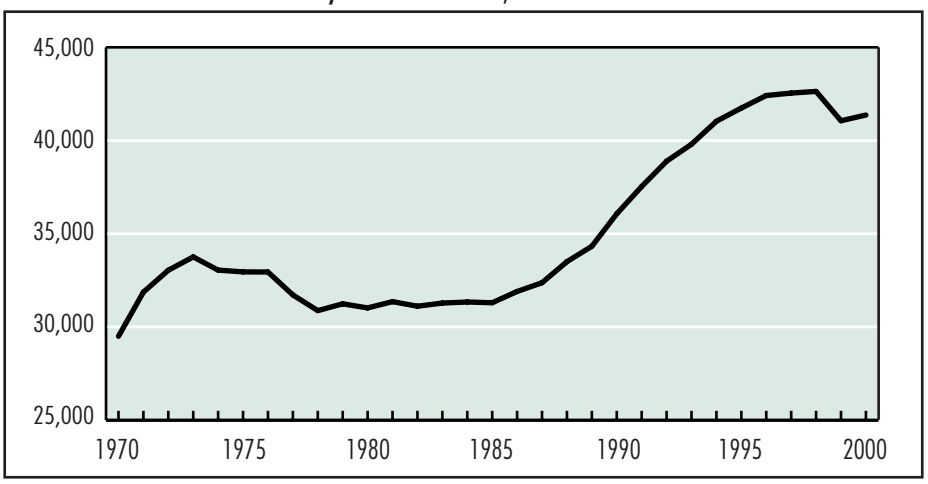
In working toward their Ph.D. degree, students traditionally begin the first few years with advanced coursework in a subject, during which they identify areas of interest. They then work closely with faculty advisors or mentors in research and teaching, learning methods of research and detailed study and identifying a topic for their doctoral thesis, or dissertation. The dissertation is a paper of original research or investigation in the Ph.D. candidate's subject specialty that he or she presents to a faculty committee in that field. It is the final requirement for obtaining a Ph.D. degree. Programs vary but typically take Ph.D. candidates 5 or 6 years to complete.

The supply of Ph.D.'s

According to the Survey of Earned Doctorates, the total number of new research doctorates awarded each year grew about 40 percent between 1970 and 2000. Chart 2 shows that, after

Chart 2

Number of doctorates awarded by U.S. universities, 1970-2000



Source: National Science Foundation/SRS, Survey of Earned Doctorates

rising steadily from the late 1980s into the 1990s, the total number of degrees awarded has stabilized. This section discusses the supply of Ph.D. graduates, first by field of study and then by demographic characteristic.

Field of study

Survey of Earned Doctorates data show that, between 1970 and 2000, there have been changes by field of study in the numbers of Ph.D. degrees granted. Generally, fields with the greatest increases in the numbers of doctoral degrees awarded also had the most job growth.

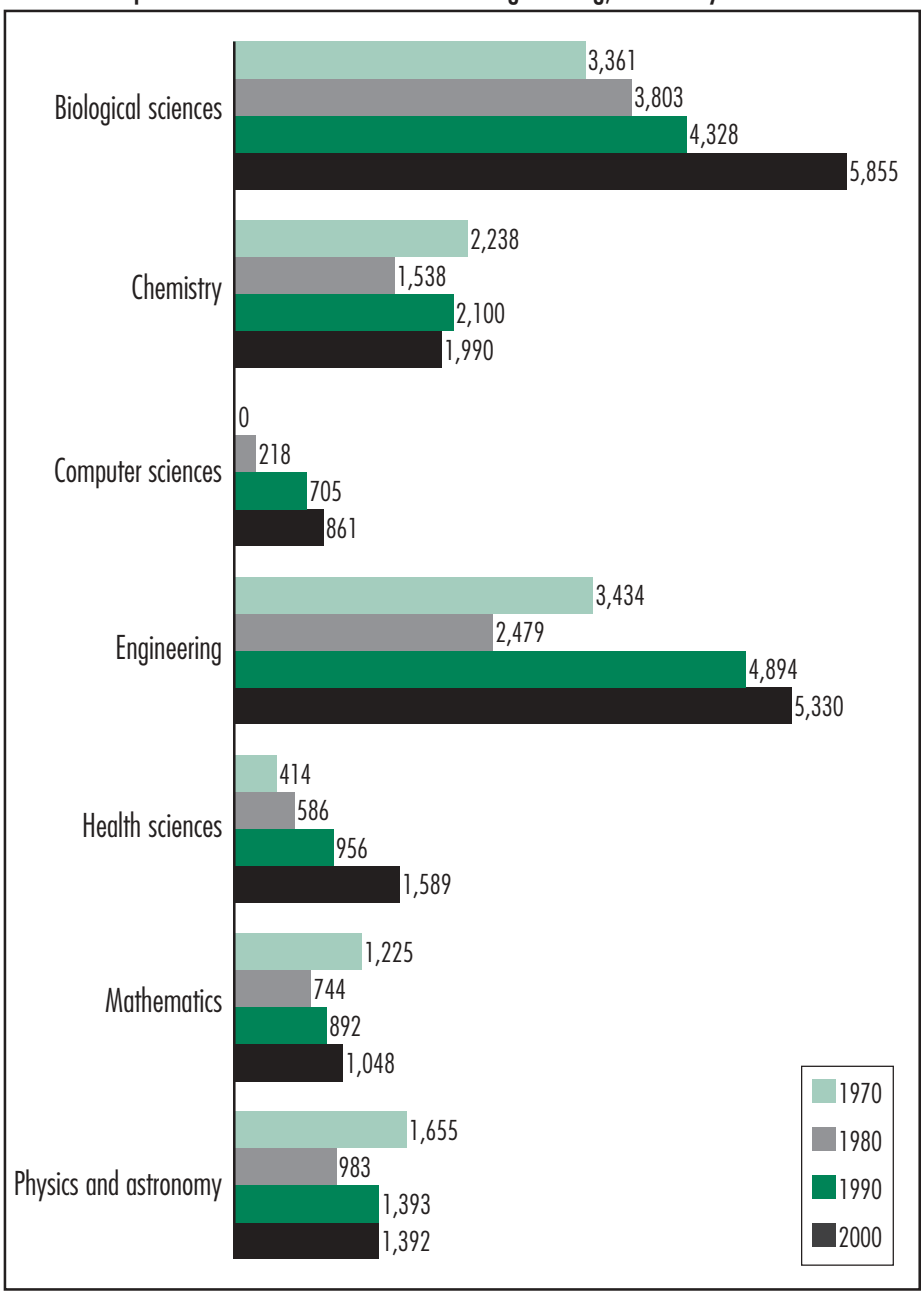
Natural sciences and engineering. In 1999, about 405,000 people held doctorates in the natural sciences and engineering, according to the National Science Foundation's Survey of Doctorate Recipients. Between 1970 and 2000, some fields gained a relative share of doctorates awarded; others lost ground. (See chart 3.)

Of the fields that exhibited gains, biological sciences and health sciences experienced relatively steady increases in the numbers of doctoral degrees awarded. Computer science, first measured in 1978, showed similar increases, demonstrating particularly strong growth from 1980 to 1990. Engineering had large decreases in the number of degrees awarded from 1970 to 1980 but experienced significant increases in the following decades. In physics and astronomy, chemistry, and mathematics, the numbers of doctorates awarded in 2000 were below 1970 levels in those fields.

Humanities and social sciences. Of the humanities and social sciences fields, business and management and psychology were the only ones to experience gains in relative share of doctorate degrees awarded between 1970 and 2000. (See chart 4.) Doctorates in economics, English and American language and literature, foreign languages and literature, history, and political science reached low levels in the early to mid-1980s but by 2000 had increased to around their 1970 levels.

The largest number of doctoral degrees awarded in 2000 was in education; however, the number of degrees in this field remained significantly lower than the high levels reached in the late 1970s and early 1980s, causing education to lose ground relative to other fields. In addition, many of the degrees awarded in 2000 were not Ph.D.'s in education but rather Doctorates of Education.

Chart 3
Doctoral recipients in the natural sciences and engineering, selected years



Source: National Science Foundation/SRS, Survey of Earned Doctorates

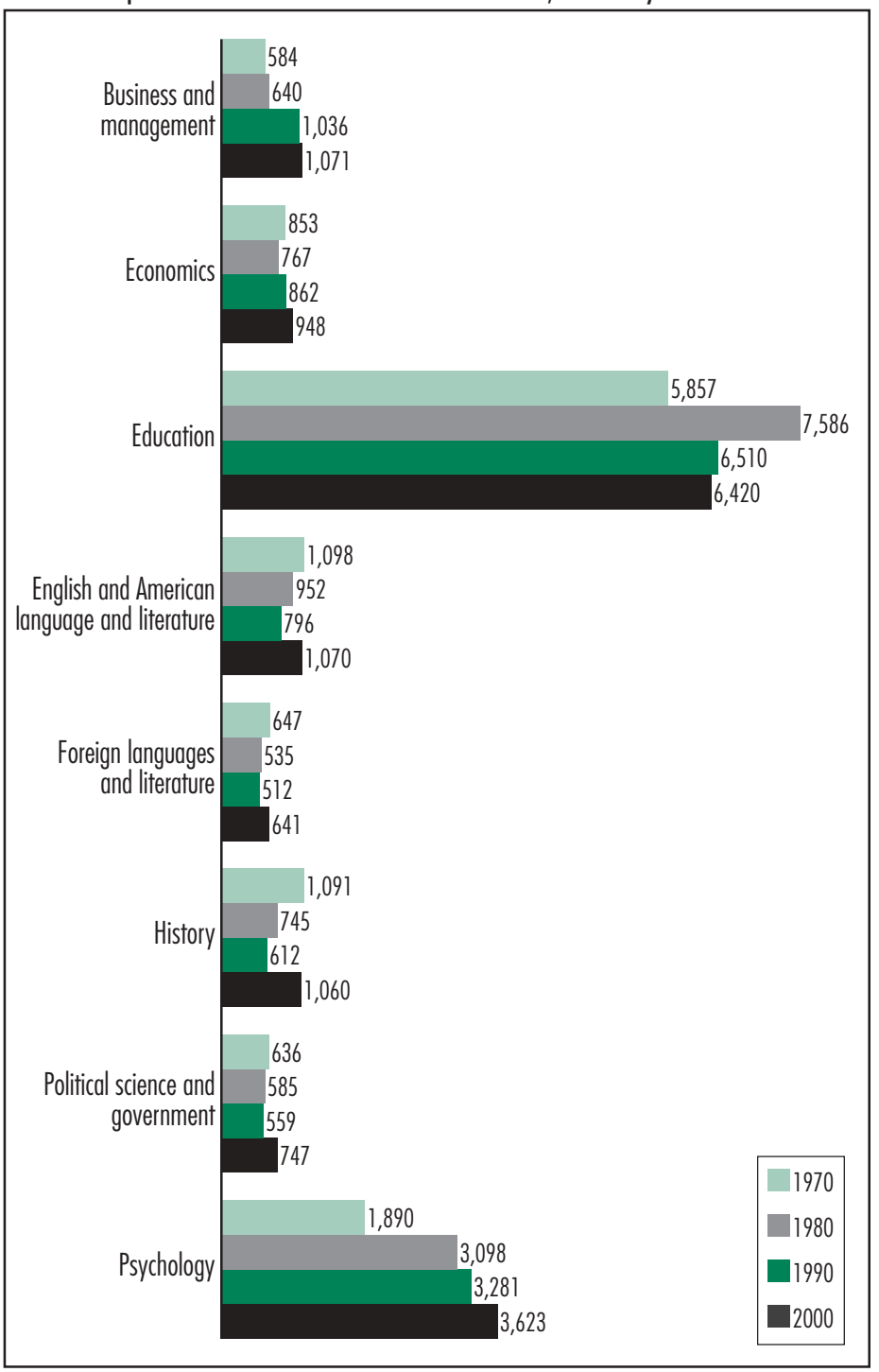
Demographics

Current Population Survey data show that in 2001, about 1.8 million workers—roughly 1 percent of the workforce—held a doctoral degree. Among these, there were more than 500,000 working women—nearly 30 percent of the doctoral workforce—who held doctorates. Minority doctoral workers numbered more than 350,000—about 20 percent of doctoral workers—in 2001. According to the National Science Foundation, numbers of doctorates awarded to women and minorities have been increasing steadily. In 2000, women earned more than 43 percent of all doctorates awarded to U.S. citizens, and U.S. racial and ethnic minority groups earned more than 16 percent.

Another substantial increase has occurred in the number of foreign-born students attaining doctorates in the United States. Foreign students are concentrated in the natural sciences and engineering fields. Engineering had the largest proportion—more than half—of noncitizen doctorate recipients. Foreign students increasingly are remaining in the United States after earning their degrees; however, Mark Regets of the National Science Foundation points out that labor market conditions are more favorable for both U.S.- and foreign-born workers in fields that have higher concentrations of foreign-born doctoral workers. A detailed analysis of the demand for workers with doctorates follows.

Chart 4

Doctoral recipients in the humanities and social sciences, selected years



Source: National Science Foundation/SRS, Survey of Earned Doctorates

The demand for Ph.D.'s

The Ph.D. job market has been characterized for years by ups and downs. These fluctuations are caused by imbalances in the supply of and demand for Ph.D. recipients in the labor force. Imbalances occur for a number of reasons, including the fact that the length of time required to earn a Ph.D. degree makes it difficult for the supply of workers with doctorates to respond quickly to changes in the demand for them.

Inaccurate projections about labor market demand may also adversely affect the job market. In the 1980s, for

example, many students pursued doctoral studies based, in part, on predictions of large numbers of retirements of college and university faculty. But those mass departures from academia failed to materialize, and a decrease in real earnings for college and university teachers that began in the early 1990s was an indication that too many jobseekers with Ph.D. degrees were vying for too few jobs. This phenomenon of oversupply—the number of qualified candidates exceeding the number of employment opportunities—is a concern for Ph.D. candidates and recipients in assessing labor market conditions.

The oversupply problem is further aggravated by the incentive that universities have to continue training doctoral students even if the labor market is unable to absorb them upon graduation. Doctoral candidates often provide their department and university with benefits that include assistance with research and other tasks. In many research universities, graduate students do much of the teaching of undergraduate students.

Ph.D. supply concerns are not entirely attributable to the actions of universities, however. Some doctoral labor market woes stem from the high level of specialization that earning a Ph.D. entails—which makes it more difficult for Ph.D. jobseekers to find a job that is a perfect fit. The information that follows explores the complex labor market issues Ph.D. graduates face, first by discussing their postdoctorate plans and then by examining recent graduates' employment status. It concludes with a look at how Ph.D. candidates might assess the labor market—both academic and nonacademic—that awaits them.

Postdoctorate plans

The Survey of Earned Doctorates shows broad differences among fields regarding Ph.D. recipients' employment plans at graduation. According to those data, most Ph.D. graduates either had or were seeking postdoctoral study positions or employment. In 2000, the proportion still seeking further study or employment at graduation was similar for both the natural sciences and engineering group (25 percent) and the humanities and social sciences group (27 percent). (See table 1.)

Postdoctoral study appointments, which have become common in many fields, allow recent Ph.D. graduates to gain relevant experience. But plans of the two groups for postdoctoral studies differed markedly. In the natural sciences and engineering, 40 percent planned on postdoctoral study, most commonly cited by biological sciences graduates (67 percent) and chemistry and physics and astronomy graduates (48 percent). In the humanities and social sciences, conversely, 11 percent—

Table 1

Postdoctorate plans of Ph.D. recipients by field, 2000

(percent)

Field of study	Still seeking employment or study	Plans upon graduation			Planned sector of employment			
		Postdoctoral study	Employment	Plans unknown	Educational institution	Industry or business	Government	Other and unknown
Total, natural sciences and engineering	**25**	**40**	**51**	**9**	**33**	**48**	**9**	**10**
Biological sciences, except biochemistry	25	67	26	7	38	34	12	15
Chemistry	22	48	43	10	19	69	5	7
Computer sciences	21	10	80	10	36	54	4	6
Engineering	27	20	70	10	18	69	9	5
Health sciences	23	17	73	10	54	19	13	15
Mathematics	23	31	62	7	56	33	3	8
Physics and astronomy	26	48	42	9	18	65	7	10
Total, humanities and social sciences	**27**	**11**	**79**	**11**	**68**	**12**	**6**	**15**
Business and management	16	3	86	11	72	20	3	5
Economics	19	7	85	8	50	22	15	13
Education	22	5	84	11	79	6	4	11
English and American language and literature	39	6	88	6	80	9	1	11
Foreign languages and literature	30	9	85	6	85	5	2	9
History	38	11	80	9	74	7	5	14
Political science/international relations	33	9	82	9	68	11	6	15
Psychology	26	30	58	13	39	24	11	26

Totals may not sum to 100 due to rounding

Source: National Science Foundation/SRS, Survey of Earned Doctorates

led by 30 percent of psychology graduates—indicated plans to secure a postdoctoral position.

Of the 51 percent of Ph.D. graduates in natural sciences and engineering fields planning on postdoctoral employment, nearly half indicated plans to enter the industry sector; one-third indicated plans for employment with educational institutions. Humanities and social sciences Ph.D. graduates are more dependent on academia: 68 percent of graduates planning employment in these fields indicated a desire to work in educational institutions. In fact, more than two-thirds of Ph.D. graduates in all humanities and social sciences fields except psychology (39 percent) and economics (50 percent) indicated such plans.

Employment status

National Science Foundation data show how natural sciences and engineering Ph.D. recipients in some fields fared 1 to 3 years after graduation based on three indicators of the job market for workers with a Ph.D. degree. (See table 2.) Although unemployment was low in all the natural sciences and engineering fields surveyed, there was greater variation by field in the proportion of Ph.D. workers who were involuntarily employed outside their field of study and in the proportion citing limited options as the reason for accepting a position.

In 1999, physics and astronomy and mathematics Ph.D. recipients had relatively high involuntary out-of-field employment rates 1 to 3 years after graduation; computer science Ph.D. graduates had the lowest. Physics and biological sciences had the greatest proportions who took postdoctoral positions, because they believed other employment was not available.

Other National Science Foundation data show how Ph.D. recipients in some humanities and social sciences fields compared with those in natural sciences and engineering 1 to 3 years after graduation. Political science graduates had relatively high rates of unemployment and involuntary out-of-field employment, perhaps highlighting their lack of nonacademic options. Ph.D. graduates in economics and psychology had rates of involuntary, out-of-field employment that were slightly higher than those of the majority of natural sciences and engineering fields. The unemployment rates of Ph.D. graduates in economics and psychology were comparable with those in natural sciences and engineering fields.

Involuntarily accepting employment outside a Ph.D. graduate's field of expertise may suggest that obtaining employment within the field is difficult. Similarly, the increasing length and prevalence of postdoctoral appointments may also signal an inability of graduates to find other employment. However, both indicators are vulnerable to subjective interpretation. For example, postdoctoral experience may be required in some fields for a jobseeker to qualify for employment, but the jobseeker's perception might be that he or she is unable to find other employment.

Table 2

Employment status of doctoral recipients 1 to 3 years after earning Ph.D., by selected field, 1999

(percent)

Ph.D. field	Unemployment	Involuntary out-of-field employment	Postdoctorals claiming "Other employment not available" as the primary reason for taking current position[1]
Natural sciences and engineering			
Biological sciences[2]	1.3	2.5	14.1
Chemistry	0.5	2.4	28.4
Computer sciences	0.9	1.8	–
Engineering	0.9	2.7	20.5
Mathematics	0.7	6.2	18.3
Physics and astronomy	0.0	11.1	8.4
Humanities and social sciences			
Economics	0.5	4.2	–
Political science	3.4	11.6	–
Psychology	1.0	3.5	–

Source: National Science Foundation/SRS, Survey of Doctorate Recipients, 1999

[1]No computer science Ph.D. recipients indicated "Other employment not available" as the primary reason for taking current postdoctoral position. Data not available for humanities and social sciences fields.

[2]Includes health sciences.

Assessing the Ph.D. labor market

The Ph.D. job market generally is separated into two sectors: academic and nonacademic. Traditionally, academia has been a large component of the job market for Ph.D. graduates, especially in the humanities and social sciences. Most Ph.D. workers in academia are college and university faculty; however, those who hold high-level administrative positions within academia, such as college and university presidents and deans, also typically must have doctorates. Faculty responsibilities usually include a mix of teaching, research, and administrative duties, but the time spent on each varies by individual and type of institution.

Nonacademic employment options

(Continued on page 30)

More Ph.D. information

For further study:

For information about financing a graduate education or to learn more about characteristics and employment of Ph.D. graduates, visit your public library or school counselor. Special publications on higher education, such as the Chronicle of Higher Education, list employment opportunities for faculty. Organizations and online resources, including **www.PhDs.org**, provide career information. And professional associations offer information on academic and nonacademic employment opportunities for their subject area.

Financial aid

Ph.D. candidates often receive funding in the form of grants, such as fellowships and traineeships; loans; and teaching and research assistantships. For information about how to pay for graduate school and descriptions of the options available, contact:

Council of Graduate Schools
One Dupont Circle, NW.
Suite 430
Washington, DC 20036-1173
(202) 223-3791
www.cgsnet.org/ResourcesForStudents/financing.htm

Although not geared specifically toward doctoral candidates, general information about financial aid also is available from the U.S. Department of Education. Contact:

U.S. Department of Education
400 Maryland Ave., SW.
Washington, D.C. 20202-0498
1 (800) 872-5327
www.ed.gov/index.jsp

Information about financing a graduate education appears occasionally in the *Quarterly*'s Grab Bag; for example, included in this issue's Grab Bag is "Paying for grad school," highlighting results from a National Center for Education Statistics study. Other items about scholarships available for specific fields of study were in the Grab Bags for fall 2002 (**www.bls.gov/opub/ooq/2002/fall/grabbag.pdf**) and summer 1999 (**www.bls.gov/opub/ooq/1999/summer/grabbag.pdf**).

Statistics

For statistical information on doctorates, contact:

Doctorate Data Project
National Science Foundation
4201 Wilson Blvd., Suite 965
Arlington, VA 22230
1 (800) 877-8339
(703) 292-5111
TDD: (703) 292-5090
www.nsf.gov/sbe/srs/stats.htm

National Center for Education Statistics
Office of Educational Research and Improvement

U.S. Department of Education
1990 K St., NW.
Washington, D.C. 20006
(202) 502-7300
nces.ed.gov

Commission on Professionals in Science and Technology
1200 New York Ave., NW.
Suite 390
Washington, D.C. 20005
(202) 326-7084
www.cpst.org

Career information

For career information about doctorates, contact:

Chronicle of Higher Education
1255 23rd St., NW.
Suite 700
Washington, D.C. 20037
(202) 466-1000
chronicle.com

Woodrow Wilson National Fellowship Foundation
CN 5281
Princeton, NJ 08543-5281
(609) 452-7007
www.woodrow.org

Field of study

For information about doctorates by field of study, contact the relevant organization:

Natural sciences and engineering

Biological sciences
American Institute of Biological Sciences
1444 Eye St., NW.
Suite 200,
Washington, D.C. 20005
(202) 628-1500
www.aibs.org/index.html

Chemistry
American Chemical Society
1155 16th St., NW.
Washington, D.C. 20036
1 (800) 227-5558
www.acs.org/portal/Chemistry

Computer sciences
Computing Research Association
1100 17th St., NW.
Suite 507
Washington, D.C. 20036-4632
(202) 234-2111
www.cra.org

Engineering
American Association of Engineering Societies
1828 L St., NW.
Suite 906
Washington, DC 20036
1 (888) 400-2237 (toll free)
(202) 296-2237
www.aaes.org

Health sciences
National Institute of General Medical Sciences
National Institutes of Health
45 Center Drive MSC 6200
Bethesda, MD 20892-6200
(301) 496-7301
www.nigms.nih.gov

Mathematics
American Mathematical Society
201 Charles St.
Providence, RI 02940-6248
1 (800) 321-4267
(401) 455-4000
www.ams.org

Physics
American Institute of Physics
One Physics Ellipse
College Park, MD 20740-3843
(301) 209-3100
www.aip.org

Humanities and social sciences

Business and management
Association to Advance Collegiate Schools of Business
600 Emerson Rd., Suite 300
St. Louis, MO 63141-6762
(314) 872-8481
www.aacsb.edu

Economics
American Economics Association
2014 Broadway, Suite 305
Nashville, TN 37203
(615) 322-2595
www.vanderbilt.edu/AEA

Education
Association of Teacher Educators
1900 Association Dr.
Suite ATE
Reston, VA 20191-1502
(703) 620-3110
www.ate1.org

English and foreign languages
Modern Language Association
26 Broadway, 3rd Floor
New York, NY 10004-1789
(646) 576-5000
www.mla.org

History
American Historical Association
400 A St., SE.
Washington, D.C. 20003-3889
(202) 544-2422
www.theaha.org/contact.htm

Political science
American Political Science Association
1527 New Hampshire Ave., NW.
Washington, D.C. 20036-1206
(202) 483-2512
www.apsanet.org

Psychology
American Psychological Association
750 First St., NE.
Washington, D.C. 20002-4242
1 (800) 374-2721
(202) 336-5510
TDD/TTY: (202) 336-6123
www.apa.org

(Continued from page 27)

usually are most widely available in the natural sciences and engineering, fields in which Ph.D. graduates conduct much of the Nation's research and development. Most basic research is performed by Ph.D. workers at colleges and universities; applied research and development is conducted primarily in private industry, with most funding going toward developing products and services. In 2000, 75 percent of all research and development was done in private industry, and 68 percent of the total was privately funded.

Academic market. Most Ph.D. faculty are employed at 4-year colleges and universities. Although 2-year colleges provide growing opportunities for faculty employment, they have not historically been a large component of the Ph.D. faculty job market. According to the National Center for Educational Statistics' National Study of Postsecondary Faculty, the proportion of instructional faculty and staff with doctorate degrees in 2-year colleges, although increasing, remains low—about 18 percent for full-time faculty and staff in fall 1998, compared with 61 percent in 4-year private liberal arts institutions and 73 percent in 4-year public research institutions.

Faculty have various levels of rank and tenure status, ranging from professor to instructor or lecturer. Full professorships that include tenure—positions that do not require periodic contract renewal—usually take about 7 years to attain and are the most coveted. Instructors and lecturers are faculty members who usually are not on the tenure track and whose primary responsibility is teaching.

The path to tenured positions usually begins with an appointment as a nontenured assistant professor; following a grant of tenure, promotion to associate professor and, finally, to full professor is common. Overall, the proportion of full-time instructional faculty with tenure has remained relatively stable—64 percent in 1998-99, compared with 65 percent in 1980-81. By field, the proportion of full-time instructional faculty and staff with tenure or on the tenure track in 1998 was highest (88 percent) in engineering, with most other fields registering between 70 percent and 80 percent of faculty as tenured or tenure-track.

The employment outlook for college faculty is expected to be good but competitive, particularly for the most desired tenure-track positions at research institutions. Faculty employment historically has increased, and BLS projects growth of 24 percent over the 2000-10 decade for postsecondary teachers—faster than the 15-percent growth projected for all occupations. BLS also projects that, in the same decade, a higher than average proportion of postsecondary teachers will be needed to replace those currently employed who will either retire or leave the occupation permanently for some other reason.

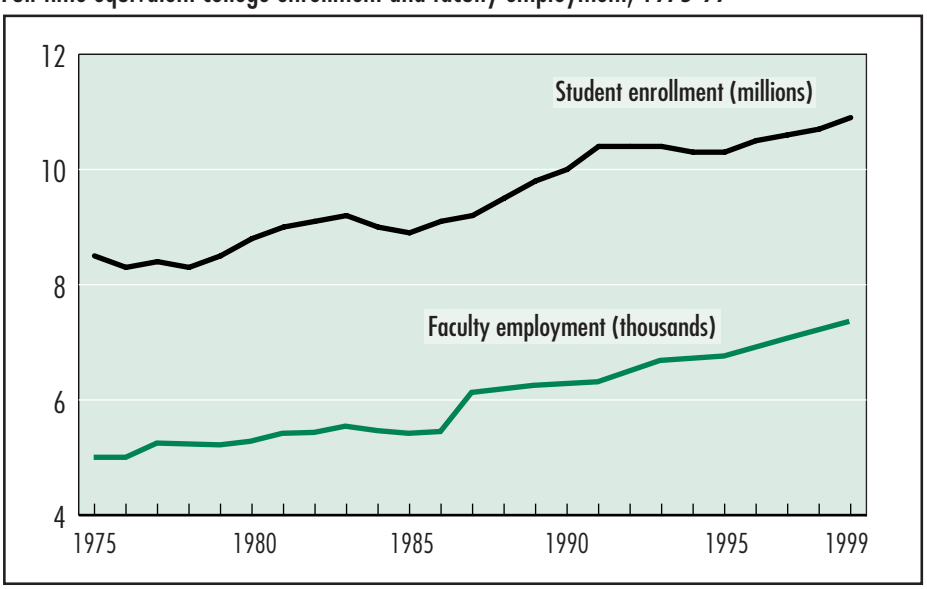
Fueling this growth are projected increases in college enrollments resulting from greater numbers of traditionally college-aged students and higher attendance rates for both traditionally college-aged and older students who are pursuing additional education. Chart 5 shows how faculty employment increases with college enrollments.

Employment of faculty varies by subject specialty. Some fields have experienced more growth than others over the past decade in total numbers of bachelor's, master's and doctoral degrees granted. (See chart 6.) These trends reflect a pattern similar to that occurring with doctoral degrees, in which growth by degree specialty mirrors growth sectors of the economy: higher earnings at the bachelor's-degree level and above generally are offered in high-demand fields.

High-demand fields had relative increases in the number of degrees conferred between 1989-90 and 1999-2000. The greatest proportional increases occurred in the biological and

Chart 5

Full-time equivalent college enrollment and faculty employment, 1975-99



Source: National Center for Education Statistics: Student enrollment from Projections of Education Statistics to 2011; faculty employment from Digest of Education Statistics, 1991 and 2001
Note: Employment and enrollment data presented here as full-time equivalent.

life sciences, health professions and related sciences, computer and information sciences, and psychology. Degrees conferred in economics, physics, mathematics, political science and government, and engineering all decreased in 1999-2000 relative to 1989-90. In 1999-2000, the largest numbers of degrees conferred were in business and education. (See chart 7.)

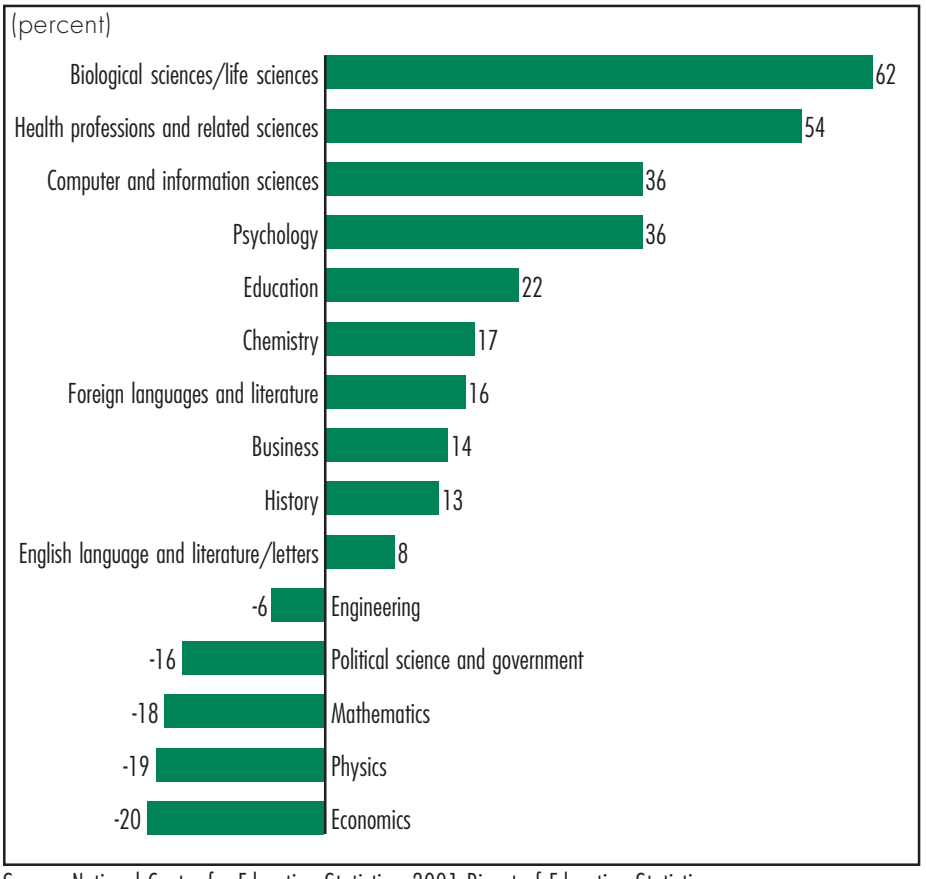
Data from the National Center for Education Statistics' faculty study also indicate that, in 4-year colleges and universities, the highest full-time faculty employment rates in fall 1998 were in engineering, natural sciences—including computer sciences, mathematics, physics, chemistry, and biology—and health sciences; lower employment rates were in education, business, and the humanities (English, foreign languages and literature, and history). And according to the National Science Foundation's 2002 Science and Engineering Indicators, computer and life sciences were the only science and engineering fields that experienced gains in the total number of full-time faculty positions during the 1990s.

Changes in student demand for degree fields lead to reallocation of faculty, but responses are not immediate. "There is a lag between student expansion and faculty growth," says Bob Henry, associate dean of the College of Engineering and Physical Science at the University of New Hampshire. Steve Bolander, Henry's counterpart at the Whittemore School of Business and Economics, estimates that this delay in response is from 1 to 2 years. Furthermore, established departments are difficult to shrink, especially considering that tenured faculty appointments are, in effect, permanent.

Faculty employment and earnings varied by field. (See table 3.) BLS data show that in 2001, the greatest numbers of faculty were employed in health specialties, business, English, and education. The greatest increases in faculty employment from 1998-99, the most recent years for which comparable information by detailed field was available, occurred in computer science, health specialties, and business. And median annual earnings for postsecondary faculty ranged from the mid-$40,000's to high-$60,000's—with engineering, economics, physics, and health specialties faculty earning the most and foreign languages and literature, English, and education faculty earning the least.

Chart 6

Change in total bachelor's, master's, and doctoral degrees awarded, 1989-90 to 1999-2000



Source: National Center for Education Statistics, 2001 Digest of Education Statistics

Table 3

Postsecondary faculty employment and earnings by field, 2001

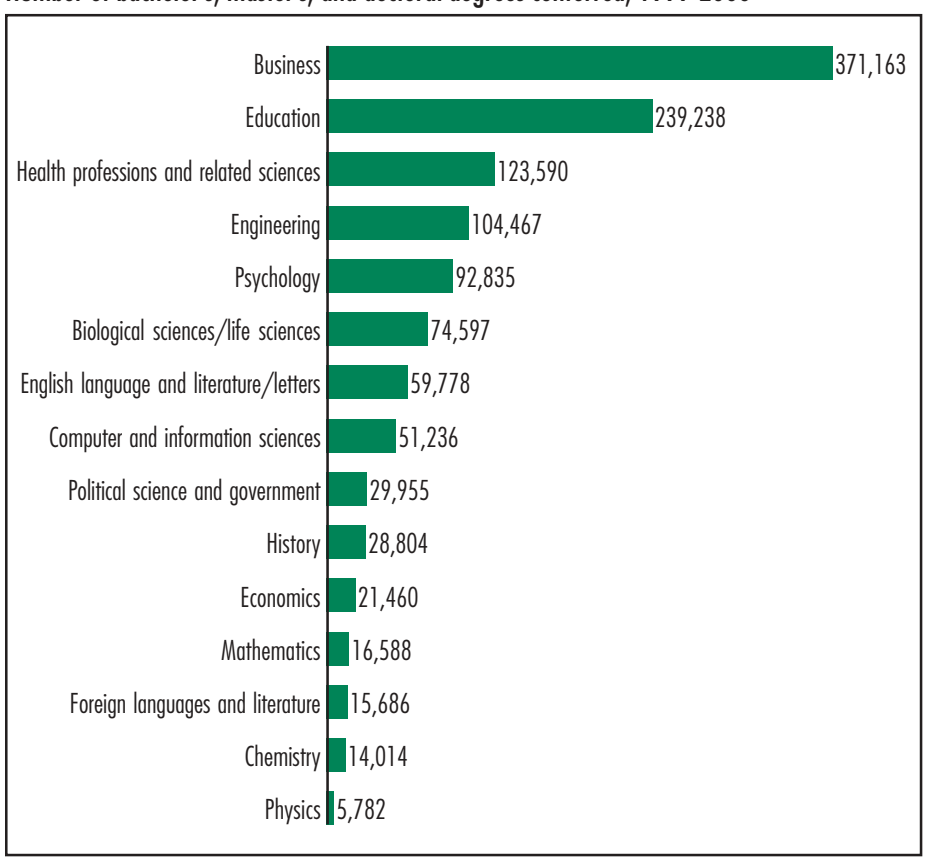
	Employment	Median annual earnings
Health specialties	85,220	$59,100
Business	65,050	54,280
English language and literature	51,360	45,590
Education	40,490	47,060
Biological science	38,560	57,240
Mathematical science	38,480	49,420
Nursing	34,390	49,470
Computer science	29,690	49,050
Engineering	28,360	67,310
Psychology	24,850	53,120
Foreign language and literature	18,590	45,030
History	16,710	50,400
Chemistry	16,610	53,750
Physics	11,830	61,300
Economics	11,600	62,820
Political science	11,230	54,930

Many faculty members have other earnings, such as income from consulting jobs, in addition to their salaries from institutions. Indeed, data from the National Center for Education Statistics' faculty study show that instructional faculty and staff in health sciences, engineering, and business had the greatest levels of total earned income in 1998. Higher earnings, especially in light of an increasing supply of Ph.D. graduates, may indicate greater demand and, thus, a better job market.

But in the Ph.D. job market, as in any job market, some jobseekers have difficulty finding suitable employment even when employment conditions are good. Sue Davis, of the American Political Science Association and a doctoral graduate of Emory University, says that, at least for Ph.D. graduates in political science, serendipity plays a part in a successful job search. "It is important for job candidates to show that they are interested in and qualified for a particular position, but fitting in with what a hiring department perceives as its needs is even more important," she says. "Unfortunately, it is not always clear from a job ad what those needs are."

Chart 7

Number of bachelor's, master's, and doctoral degrees conferred, 1999-2000



Source: National Center for Education Statistics, 2001 Digest of Education Statistics

Budgetary concerns also may impede faculty hiring. "At some point, it becomes a function of the bottom line," says Henry. "Enrollments could warrant more faculty, but the money isn't there." Institutions are funded differently, and the availability of funding ultimately affects the faculty job market. Public institutions are more likely to rely on State funding, whereas private institutions depend more on funding from tuition and endowments.

Without the necessary funds, colleges and universities may be forced to find alternate ways of dealing with increasing enrollments, such as increasing class sizes or faculty workloads. Reliance on nonfaculty, such as graduate assistants and postdoctoral students for teaching and research, might increase as well. Colleges and universities also may not replace retiring professors or may rely increasingly on part-time or non-tenure-track faculty to teach classes.

In fact, lower paid part-time or adjunct positions have been growing at a faster rate than full-time positions. And although employment of adjunct instructors is more prevalent among 2-year institutions, this trend is also a concern for 4-year institutions. Some faculty members may prefer part-time employment, but poor labor market conditions may impel others who want full-time positions to take adjunct positions that offer little potential for upward mobility.

The distribution of funds for academic research by field has shifted as well. In 2000, the largest research and development expenditures in science and engineering were in the medical sciences, biological sciences, and engineering. All fields except economics experienced increases in funding between 1996 and 2000. (See chart 8.) The greatest increases were in the biological and medical

Table 4

Industry and occupational employment of doctoral graduates, 2000

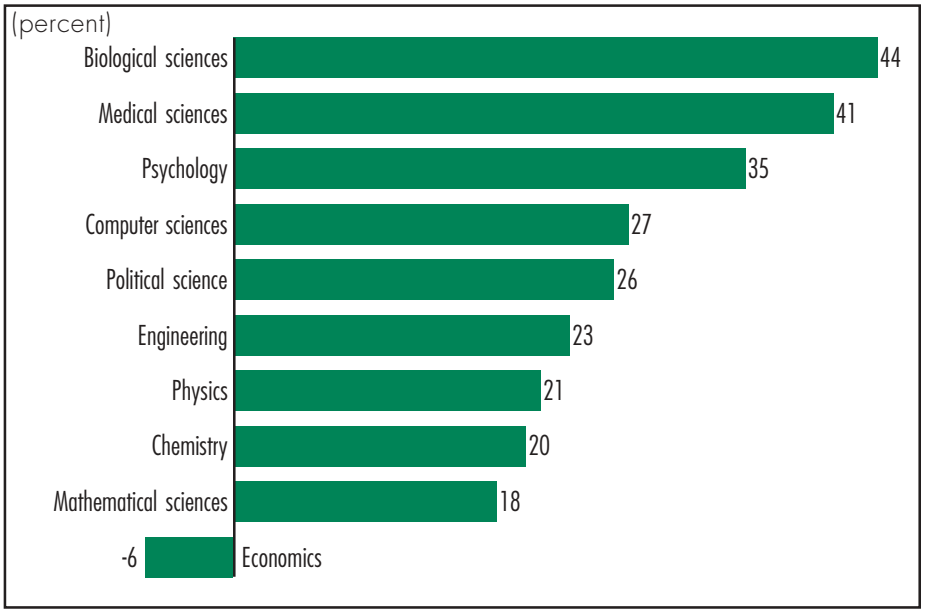
(percent)

	Total doctorates employed, all ages
Industry	**100**
Professional and related services	75
Colleges and universities	28
Health services	21
Legal services	7
Educational services other than college and university	6
Research, development, and testing services	4
Manufacturing	7
Chemicals and allied products	2
Drugs	1
Public administration	5
Business and repair sevices	3
Finance, insurance, and real estate	3
Other industries	6
Occupation	**100**
Professional specialty occupations	79
Teachers, colleges and universities	22
Health diagnosing occupations	17
Lawyers	9
Natural scientists	8
Biological and life scientists	2
Chemists, except biochemists	2
Medical scientists	2
Physicists and astronomers	1
Social scientists and urban planners	5
Psychologists	4
Economists	0
Engineers	4
Teachers, except college and university	3
Mathematical and computer scientists	3
Social, recreation, and religious workers	3
Health assessment and treating occupations	2
Executive, administrative, and managerial occupations	14
Other occupations	7

Source: Current Population Survey

Chart 8

Change in total academic research and development expenditures by field, 1996-2000



Source: National Science Foundation, WebCaspar

sciences (44 and 41 percent, respectively), psychology (35 percent), and computer sciences (27 percent).

Nonacademic market. Academia is only one source of Ph.D. employment. BLS data show in table 4 that the industry in which doctoral graduates are employed to the greatest extent is colleges and universities—but more than 70 percent are employed in other industries. Table 4 also shows that, in addition to college and university teaching, doctoral graduates are employed in a variety of other occupations, most of which are either professional specialty or executive, administrative, and managerial.

In its 2002 edition of Science and Engineering Indicators, the National Science Foundation concluded that overall labor market conditions have been good for new doctorate recipients over the past decade, with gains most notable in nonacademic sectors. Although nonacademic employment historically has been concentrated in science and engineering, in recent years nonacademic options for nonscience Ph.D. graduates have begun to gain recognition. For example, the Humanities at Work program of the Woodrow Wilson National Fellowship Foundation is designed to aid nonscience Ph.D. graduates seeking employment in industry. Hadass Sheffer, director of the program, says that many nonacademic jobs are available. "Doctoral students need to look at what they've accomplished as a set of capabilities that can be transformed to fit into an industry," she says. "It's just a question of attitude and information."