New data show tightening Ph.D. job market across disciplines

The Shrinking Ph.D. Job Market

As number of new Ph.D.s rises, the percentage of people earning a doctorate without a job waiting for them is up. While all disciplines face the problem, some have particularly high debt levels.

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By

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American universities awarded 54,070 research doctorates in 2014, the highest total in the 58 years that the National Science Foundation has sponsored the Survey of Earned Doctorates, a new edition of which was released Friday.

But while more doctorates are being awarded, the figures also point to transitions and concerns in graduate education.

Increasingly, the pool of doctoral degrees coming out of American universities is dominated by science and engineering Ph.D.s. Their numbers were up 2 percent in 2014, compared to the prior year, while all other research doctorates were down by 2 percent. With those changes, science and engineering Ph.D.s make up 75 percent of all doctorates awarded in 2014. In 1974, they made up only 58 percent of the total. And science and engineering doctoral education remains dependent on non-American talent -- which many view as a sign of success for American higher education but others worry leaves American universities vulnerable if students opt to enroll elsewhere.

The job market for new Ph.D.s is ever tighter. While this attracts the most attention and debate within academe about humanities graduates, there are signs of a tightening job market across disciplines.

The NSF analysis -- based on research by NORC at the University of Chicago -- encourages examining shifts over several-year periods rather than just a single year, for a better understanding of the trends.

Here are figures for the number of doctorates awarded by broad field for three years over a 10-year period:

Number of Doctorate Recipients by Field of Study

Field	2004	2009	2014
All	42,123	49,553	54,070
Life sciences	8,813	11,403	12,504
Physical sciences	6,047	8,324	9,859
Social sciences	7,043	7,829	8,657
Engineering	5,777	7,642	9,568
Education	6,635	6,528	4,793
Humanities	5,210	4,891	5,486

The figures show growth across fields, with the exception of education. While the number of humanities doctorates fell about five years ago, it is now higher than it was 10 years ago. The growth in engineering has been particularly high in the last five years.

Education, which 10 years ago made up 15.8 percent of new doctorates, now makes up only 8.9 percent of new doctorates. And while humanities doctorates are up, their share of new doctorates has dropped in 10 years from 12.4 to 10.1 percent.

The humanities figures tend to draw particular attention because of gloomy reports about the humanities job market. Consider the latest figures from the Modern Language Association and the American Historical Association.

But the data in the report on the postdoctorate plans of new Ph.D.s show that the tightening job market for doctorate holders is by no means unique to the humanities. Across the board, including STEM disciplines, the percentage of new Ph.D.s with job commitments (including postdocs) after they earn their doctorates is dropping.

Percent of Doctorate Recipients With Job or Postdoc Commitments, by Field of Study

Field	2004	2009	2014
All	70.0%	69.5%	61.4%
Life sciences	71.2%	66.8%	57.9%
Physical sciences	71.5%	72.1%	63.8%
Social sciences	71.3%	72.9%	68.8%
Engineering	63.6%	66.8%	57.0%
Education	74.6%	71.6%	64.6%
Humanities	63.4%	63.3%	54.3%

The disciplines vary widely in terms of the career aspirations and jobs attained by Ph.D.s. While many humanities disciplines are promoting nonacademic careers, the vast majority of those entering Ph.D. programs want academic careers, and that goal leads many of them -- if unable to obtain a tenure-track position -- to work off the tenure track, frequently in positions at relatively low pay and with minimal if any benefits. This also adds to job market competitiveness, as new Ph.D.s are competing with not only their own cohort but also those from several years before who still haven't landed a good position.

In science and technology fields, and some of the social sciences, many doctoral students aspire to corporate or government jobs, and many get those jobs, yet these disciplines also are seeing fewer people earn Ph.D.s with a firm commitment for employment or postdoc. (Postdocs are much more common in the physical and life sciences than in the humanities and social sciences, although they are becoming more common in those fields as well.)

But a key difference among disciplines explains much of the urgency about this issue in the humanities and social sciences. Not only do humanities and some social sciences graduate students take longer to earn their doctorates than those in many STEM fields, but they are graduating with much more debt -- much of it from their time as doctoral students. This makes the need to find employment with adequate compensation more urgent than for those graduating without such large debt levels.

The following table shows the cumulative debt upon receiving a Ph.D., including undergraduate debt, and the percentage of new Ph.D.s with debt in excess of $70,000. Education and the social sciences not only have the highest average debts, but significant numbers with very high debt levels (more than $70,000).

Debt of New Doctoral Degree Graduates, 2014

Field	Mean Cumulative Debt	% With Debt > $70,000
All	$22,392	12.6%
Life sciences	$19,605	9.8%
Physical sciences	$12,365	5.1%
Social sciences	$34,999	22.6%
Engineering	$11,645	5.1%
Education	$36,260	23.3%
Humanities	$29,953	17.4%

This year's data are being released at a time when many minority student protests have focused attention on the relative lack of racial and ethnic diversity at many colleges and universities. In trying to resolve some of those protests, many colleges have pledged to meet certain targets for hiring black and Latino faculty members by set dates -- even as some have warned that the supply of black and Latino Ph.D.s needs to increase significantly for colleges to meet their targets.

The news release from the NSF noted many gains in diversifying the new Ph.D. population. The release noted, for example, that women now account for nearly half (46 percent) of all new doctorates, and that the rates at which women are earning Ph.D.s are much higher than those for men.

The NSF also boasted about gains for racial and ethnic minority groups, but they were generally over the long run. The proportion of doctorates awarded to African-Americans has increased from 4.1 percent to 6.4 percent between 1994 and 2014. And over the same period, the rate for Hispanics or Latinos increased from 3.3 percent to 6.5 percent.

But year to year, the numbers are relatively stagnant, and they do not reflect the overall growth in the Ph.D. population. The number of Latino Ph.D.s in 2014 was 3,157, up from 3,074 the year before. The number of black Ph.D.s in 2014 was 2,649, down 10 from the year before. A disproportionate number (523) of Ph.D.s to black people also continue to be awarded in education. In many STEM fields, new black Ph.D.s in 2014 were in single digits: one in nuclear engineering, two in particle physics, one in robotics and so forth. Those breakdowns may be crucial, as many colleges have said they want not only to increase the numbers of black and Latino faculty members, but to do

so across disciplines.

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