

The Labor Market for New Ph.D. Economists

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Each year about 1,500 individuals begin their first year in an economics Ph.D. program. Most are optimistic that they will earn a Ph.D., embark on a career as a professional economist, and achieve financial security and personal satisfaction. Little is known about the information they assimilate before they make such an important decision. They might read Colander and Klammer's (1990) interviews with economics Ph.D. students. A few might locate some of the sporadic information available about the job market for Ph.D. economists (Carson and Navarro, 1988; Barbezat, 1992; Formby et al., 1993; McMillen and Singell, 1994; Stock, Alston and Milkman, 2000; Stock and Alston, 1998). Most probably rely on personal observation of their undergraduate economics professors to predict what life might be like with a Ph.D. in economics.

For the purpose of providing better information for current and prospective Ph.D. students about the employment experiences of recent doctorate graduates, as well as to provide information to advisors of undergraduates considering graduate work in economics, to graduate admissions committees concerned about the eventual employment prospects of the applicants whom they admit, and to the graduate faculty of Ph.D.-granting departments, we participated in an effort to collect and disseminate comparable information about doctorate labor markets in 14 science, engineering, and social science disciplines. The project was organized by the Commission on Professionals in Science and Technology (CPST) and supported by the National Science Foundation (NSF) and the Sloan Foundation. The NSF collects certain information about Ph.D. programs and graduates in its various annual surveys of graduates and graduate students, including the Surveys of Earned Doctorates, of Doctorate Recipients, and of Graduate Students and Post-

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doctorates in Science and Engineering. In the next section we use the NSF data to update Hansen's (1991) report on graduate education. In subsequent sections we supplement the NSF data with new survey data providing information on unemployment, underemployment, and attitudes of new economics Ph.D.'s toward their jobs. We also examine differences in these outcomes across subfield, rank of graduate department, employment sector, and other characteristics.

Profile of Graduate Training

As Executive Secretary of the American Economic Association's Commission on Graduate Education in Economics, W. Lee Hansen analyzed trends in the education and training of U.S. economics doctorates over the decade from 1977 to 1986 or 1987 (Hansen, 1991). Using NSF data, we have extended his tabulations through 1996 in Table 1.

The number of Ph.D.'s awarded annually in economics was virtually constant between 1977 and 1986, but increased by 17 percent from 1986 to 1996. The composition of the degree recipients has also changed over the past decade, for the most part continuing earlier trends: the proportion of female degree recipients rose an additional 3 percentage points since 1986, the proportion of degree recipients with an undergraduate major in economics continued its slow decline, and the dramatic decline in economics doctorates who are American citizens seems to have persisted. Fewer American citizens earned a Ph.D. in economics in 1996 than in 1986, despite an increase of about 150 in the overall number of Ph.D.'s awarded (Aslanbeigui and Montecinos, 1998).

The evidence suggests that doctoral education in economics is adjusting to the roughly 30 percent decline in undergraduate majors that occurred in the three years after 1992–93 (Siegfried, 1998). Although the number of Ph.D.'s awarded in economics rose substantially, from 939 in 1994 to 979 in 1995 and 1008 in 1996, the number of *first-year* graduate students peaked in 1992 and by 1996 had declined by 18 percent. With an average of seven years from matriculation to degree, the annual supply of new Ph.D.'s will probably begin to decline after the turn of the century. When supply does turn downward, the annual reduction will be significant. If the downward trend in new Ph.D.'s continues, and if the attrition rate does not fall sufficiently to offset the reduction in entry, then by 2004 the annual supply of Ph.D.'s may be as much as 300 per year lower than the 1996 peak, a level not seen since before Richard Nixon was in the White House.

Financial support for Ph.D. students has held up well over the past two decades. When federal aid plummeted in the early 1980s, institutions accepted relatively more of the responsibility for financing their Ph.D. students. They have maintained that support into the 1990s. As would be expected on the basis of enrollment trends in undergraduate economics, a slight decrease in teaching assistantships occurred since 1986, but fellowships and traineeships seem to have replaced them. The number of research assistantships has remained fairly constant.

The time required to earn a Ph.D. is increasing. The elapsed time rose by 10

Table 1

A Profile of Doctoral Training in Economics in the U.S.: 1977, 1986/1987 and 1996

	1977	1986 or 1987	1996
Number of Doctorates Awarded	838	861 ^a	1008
Percent U.S. Citizens	67.3	55.7 ^a	42.9
Percent Female	8.7	19.3 ^a	22.4
Percent with BA/BS Degree in Economics	63.6	59.7 ^a	57.8
Number of Full-time First-year Graduate Students	2,886	2,584 ^a	2,466
Number of Total Graduate Students (including part-time)	12,063	12,830 ^a	12,080
Support for Full-time Graduate Students at Doctoral Institutions (percentage distribution) ^c			
Type of Support (percentage distribution)			
Fellowship and Traineeship	18.4	15.3 ^a	18.8
Research Assistant	14.5	11.9 ^a	11.3
Teaching Assistant	25.6	30.9 ^a	28.9
Other	41.5	41.9 ^a	41.0
Source of Support (percentage distribution)			
Federal	7.4	3.1 ^a	4.1
Institutional	44.9	52.4 ^a	52.9
Other	11.5	9.4 ^a	7.8
Self	36.2	35.1 ^a	35.2
Median Years of Registered Time to Ph.D.	5.7	6.3 ^a	6.8
Postdoctoral Plans of New Ph.D.s (percentage distribution) ^c			
Employment	90.5	85.4 ^b	82.9
Education	57.5	54.7 ^b	47.0
Industry/Business	9.2	8.5 ^b	14.1
Government	16.7	14.5 ^b	11.1
Postdoctoral Study	3.9	6.0 ^b	9.3
Postdoctoral Status Unknown	5.6	8.6 ^b	7.8
Firmness of Postdoctoral Plans (percentage distribution) ^c			
Definite Employment or Study	76.5	71.4 ^b	63.8
Seeking Employment or Study	18.5	20.0 ^b	28.8
Percent Accepting Employment Outside U.S.	16.2	19.6 ^b	30.3

Sources: 1977 and 1986 or 1987 data from Hansen (1991, Tables 1 and 2); 1996 data from National Science Foundation.

^a 1986.

^b 1987.

^c Distributions do not always sum to 100 percent because some categories are not reported.

percent from 1977 to 1987, and a further 10 percent—to 6.8 years—from 1987 to 1996. The longer time in school may reflect a soft labor market, in which employers can demand more progress on the dissertation before hiring someone and graduate students may choose to remain in school in the face of discouraging job prospects. Indeed, the NSF data suggest that the labor market for new Ph.D. economists continued to soften from 1987 through 1996. The proportion of graduates with firm postdoctoral plans at the time they completed their degree declined from 71 percent in 1987 to 64 percent in 1996. Of those with definite plans, fewer went directly into the labor force (83 percent in 1996 vs. 85 percent in 1987 and 91 percent in 1977), and more elected postdoctoral study.

Much of the recent growth in U.S. Ph.D. program production has been absorbed abroad. The percentage of graduates working outside the United States has increased by 50 percent from 1987 to 1996, reflecting, at least in part, the sharply rising proportion of Ph.D. students who are not U.S. citizens. Indeed, adjusting the number of Ph.D. degrees awarded by the proportion who take jobs in the United States reveals that the number of new Ph.D. economists hired by U.S. employers has remained virtually constant at about 700 over the past two decades.

The New Survey

Our new survey information comes from two questionnaires. The first was completed by individuals who were officially awarded a Ph.D. between July 1, 1996, and June 30, 1997. The second was completed by the Ph.D. thesis advisors of similar individuals who did not respond to the first questionnaire.

We identified degree recipients from the list of Ph.D. dissertations awarded in economics reported in the December 1997 *Journal of Economic Literature*. The *JEL* listings are obtained from individual U.S. and Canadian departments. They are quite complete with respect to economics degrees, and include some, but not all, departments of agricultural economics. There were 1,033 listings of dissertation titles in economics for 1996–97. Subtracting the 42 graduates of Canadian universities and 56 graduates of agricultural economics programs from the 1,033, assuming the number who did not earn a degree during the period is balanced by others who did but were overlooked, and figuring that a dozen or so are simply missed in tabulating the dissertation titles, leads us to establish 950 as a reasonable estimate of the number of economics Ph.D.'s awarded in the United States in 1996–97. This compares to an NSF count of 1008 economics doctorates awarded in 1996.

We have direct survey responses from 454 of the approximately 950 individuals who earned a Ph.D. in economics in 1996–97, a sample twice as large as the best previous efforts (Barbezat, 1992; Formby, 1993; Stock, Alston and Milkman, 2000). In addition, we secured some information about 155 of the nonrespondents from their thesis advisors. Together, our two samples cover almost two-thirds of the Ph.D.'s awarded in 1996–97.¹

Most of the questionnaire was constructed in cooperation with the other disciplines in the CPST project. Although a few additional questions were added to the economics questionnaire and others were tailored to economics (like the names of subfields), most of the questionnaire was identical across disciplines. The

¹ Of the 1033 initial names, we were never able to secure addresses for 216. These, along with the 49 respondents who told us they received their degree outside the time period, left us with a maximum possible response of 768 from the graduates. Of these 768, 454 responded. Of the remaining 314, we predict that 36 did not earn a degree during the period (based on the advisor responses). Thus we achieved a response rate of 62 percent (454/732) of eligible respondents for whom we had addresses.

principal purpose of the survey was to establish employment status during the week of October 13, 1997.²

Our sample of 454 respondents obtained their Ph.D. degrees from 91 different universities. Including the 155 additional graduates for whom we secured information from thesis advisors, the number of institutions represented is 104. There are ten or more graduates in the sample from each of 13 different universities. There are 23 graduates of Wisconsin, 22 of Harvard, and 20 of California-Berkeley in the sample. No other institution has more than 15 graduates in the sample. For reasons having to do with securing the addresses of graduates, a few major North American Ph.D. producers are underrepresented in the survey, including City University of New York, Notre Dame, New York University, Toronto, and Wayne State. Because of high response rates, Georgetown, Princeton, Minnesota and Wisconsin are modestly overrepresented.

The Sample and Its Representativeness

We present summary statistics for the survey sample in Table 2. Since we are wary of response bias in our sample, the results are reported in several ways. The first column is based on those who actually responded. The second is based on reports from thesis advisors. The third column inflates the advisor responses to represent the entire set of nonrespondents—based on the assumption that responses from the thesis advisors are an unbiased sample of the nonrespondents—and then gives a projection for the entire population of graduates. Differences between the first and third columns can thus be viewed as potentially due to response bias. Where possible, the projections are compared to independent NSF estimates in the fourth column.

A variety of sources confirm that women received about 25 percent of the new economics Ph.D.'s, including the direct respondents to our survey, the responses of advisors, the NSF, and estimates from the AEA's Committee on the Status of Women in the Economics Profession, which found that 24.1 percent of new Ph.D.'s in economics in 1996–97 were awarded to women in its sample of 98 Ph.D.-granting departments (Bartlett, 1998). It appears that U.S. citizens were more likely to respond to our survey than foreign students, judging by the disparity between the first and second columns in the second row of Table 2. When the advisor responses are projected to represent all nonrespondents, our estimate of the share of new economics Ph.D.'s who are not U.S. citizens is 42 percent, which matches the NSF estimate.

The age distribution is surprising to those of us who occasionally figure that

² The first mailing occurred in November 1997; a follow-up to nonrespondents was conducted in January 1998. To encourage responses to the questionnaire, with the approval of the Executive Committee of the American Economic Association we offered a \$40 discount coupon toward one year of regular AEA membership to respondents. In March 1998, an abbreviated version of the survey, concentrating on information about their former students that advisors would reasonably be expected to know, was sent to the thesis advisors of 405 nonrespondents and graduates for whom we could not secure an address.

Table 2
Response Bias Assessment

	U.S. ^a Graduate Responses (n = 445)	U.S. Advisor Responses (n = 141)	Population Projections ^b (based on n = 950)	1996 NSF Estimate ^c
Percent Female	25.8	24.6	25.2	24.1
Percent U.S. Citizen	54.8	30.6	41.9	41.6
Median Age at Degree	32.0	—	—	32.1
Percent with Bachelor's Degree in Economics	68.9	—	—	57.8
Percent Employed with Full-time Job	95.4	94.3	94.8	—
Percent Employed with Permanent ^e Job	80.8	82.0	81.4	—
Percent Unemployed	2.2	3.6	2.9	—
Distribution by Employment Sector (percentage): ^d				
Percent Employed in Higher Education	58.1	51.2	54.4	—
Percent Employed in Business/Industry	15.7	16.0	15.9	—
Percent Employed in Government	14.6	21.6	18.3	—
Distribution by Field (percentage): ^d				
Quantitative	5.4	9.4	7.5	—
Micro Theory	4.7	3.6	4.1	—
Macro/Monetary	12.8	12.2	12.5	—
International	12.8	11.5	12.1	—
Financial Economics	7.6	9.4	8.6	—
Public Finance	8.1	13.7	11.1	—
Labor	10.8	5.0	7.7	—
Industrial Organization	9.7	9.4	9.5	—
Development	7.6	10.8	9.3	—

Source: Authors' survey and NSF.

^a Because the independent NSF estimates are for U.S. doctorates only, the nine Canadian graduates' responses and 14 Canadian thesis advisors' responses are excluded.

^b Projections = .468 (Graduates' Response) + .532 (Advisors' Response) [.468 = 445/950]; 950 is estimated population of 1996–97 U.S. Ph.D.'s in economics.

^c From Survey of Earned Doctorates.

^d Distributions do not always sum to 100 because some categories are not reported. Field is the single subfield of economics identified by respondents as their specialization.

^e Permanent means the job has no specific termination date. Untenured faculty are in permanent jobs if they are on a tenure track.

the typical Ph.D. recipient in economics is 27 years old by counting on our fingers (graduate from college at 22 and earn the Ph.D. five years later). Only 7 percent of the reporting graduates were age 27 or younger: two were 25 years old, four were 26, and 25 new doctorates were 27 years old. The median age at time of degree is 32, and more than a quarter of the degrees were awarded to individuals age 35 or older. Four percent went to people over the age of 45. We do not have information on age and undergraduate degree for the nonrespondents, as we did not expect advisors to know these reliably. There seems to be no reason to expect a difference in response rates based on age or undergraduate major, however, and the median age at degree of the surveyed graduates also matches NSF figures.

Although our estimate of the percent of students whose undergraduate major is in economics exceeds the NSF estimate by 11 percentage points, the two are not

directly comparable.³ Despite the widely held belief that the best preparation for graduate study in economics is mathematics, only 22 doctorates, or just 5 percent of our sample, had an immediately prior degree (including a master's) in mathematics. A vast majority had an immediately prior (bachelor's or master's) degree in economics or agricultural economics, including a few who double-majored in mathematics. No other field accounts for even 2 percent of the sample's undergraduate majors. Forty-three percent of the graduates had a master's degree (MA/MS/MBA) when they entered their Ph.D. program, independent of any master's they received during their Ph.D. program. A few had previously earned an M.D., J.D., or other doctorate.

Surprisingly, direct response rates differ little from those based on advisor responses on the basis of employment status. Those employed in higher education appear to have responded more frequently and those employed in government less frequently, the latter probably reflecting the substantial number of foreign graduates who take jobs in foreign governments, and our greater difficulty contacting them.

The distribution of graduates across subfields of economics is also reported in Table 2. Those in quantitative economics and public finance were more frequent nonrespondents, while those in labor economics were more frequent respondents. The most common fields are macro/monetary and international economics, each accounting for one in eight graduates; public finance trails closely behind.

From the 441 respondents who self-classified their race we learn that 69 percent of the sample is white; 24 percent is Asian or Pacific Islander; 2.3 percent is black; and 4.1 percent of the sample is Hispanic (Hispanic can be of any race). Of the U.S. citizens in the sample, 27 percent are female, 92 percent are white, 4 percent are Asian, 2 percent are black and 3 percent are Hispanic. For comparison, 82 percent of the U.S. resident population aged 30–34 is white, 4 percent is Asian, and 13 percent is black; 12 percent is Hispanic (U.S. Department of Commerce, 1997, p. 22). Sixty-four percent of the sample (61 percent of the U.S. citizens in the sample) is married, compared to 65 percent of the U.S. population of ages 25 to 44 in 1996 (p. 57). Thirty-five percent of the sample (30 percent of the U.S. citizens in the sample) has children, compared to 76 percent of U.S. households with a head 25–34 years old (p. 60), as one would expect from a career-oriented population.

Table 2 suggests caution in drawing inferences about the entire population of 1996–97 economics doctorates from the graduates' responses for questions where the answer is likely to be correlated with citizenship. Otherwise, the sample seems to reflect the population reasonably. In what follows, we will focus on estimates

³ Column 1 reports the undergraduate major only for those doctorates who did not earn a master's degree prior to entering their Ph.D. program. One reason to pursue a master's degree prior to entering a Ph.D. program is for an undergraduate major in some other field (for example, mathematics) to gain exposure to economics. If those who earned a master's before entering their Ph.D. program are thus likely to have been undergraduate economics majors, including them in our estimate of the proportion of economics Ph.D.'s who majored in economics as undergraduates would lower our measure, bringing it closer to NSF estimates. The method of accounting for double-majors also may be partially responsible for the difference.

based on our sample of direct graduate responses and advisor responses, and will note any points where there seems to be significant disagreement between them.

Employment Outcomes

Almost all of the graduates were employed in October 1997; just 3 percent were unemployed and 1 percent was not in the labor force. Among those employed, 54 percent work in higher education, 16 percent in business or industry, and 18 percent in government. Seventy-nine percent of those employed hold full-time permanent positions,⁴ and 16 percent have full-time temporary positions (the remaining 5 percent hold part-time jobs). Twenty-three of the graduates described their position as a “postdoctoral appointment.” Although most of the postdoctoral appointments are at research institutes located on university campuses, a few are at independent research organizations like the Center for Disease Control, the Population Council, the International Food Policy Research Institute, and the International Irrigation Management Institute.

More than half of the employed graduates started their immediate post-degree job with degree in-hand. However, 5 percent had been working for at least five years before earning their Ph.D.

The U.S. government hired more of the graduates (29) than any other employer, followed by the International Monetary Fund (12), the World Bank (12), the Federal Reserve System (9), and various units of Harvard University (7). Thirty-one percent of the jobs are located outside the United States: 30 jobs in Korea, 18 in Canada, and 13 in China. Six percent of the employed U.S. citizens work outside the United States, while 46 percent of the employed non-U.S. citizens held jobs in the United States. The most common place of employment is Washington, D.C. (64 jobs), followed by New York (49), California (46), Massachusetts (30), Illinois (18), Texas (18), and Maryland (17).

Thirty-nine percent of respondents reported that their primary work activity is research. Another 19 percent said that their primary work responsibilities were split about equally between teaching and research (virtually all of these being employed in higher education). Twenty percent reported teaching as their primary work activity. The Ph.D. is primarily training for research, and secondarily training for teaching. There is, however, a substantial minority of graduates—about 22 percent—whose jobs involve neither research or teaching. They do not feel particularly well-prepared for their jobs. Ninety-one percent of those who report either research, or teaching and research in equal proportions as their primary work activity agree with the statement, “My job is commensurate with my education and training,” while 79 percent of those whose primary work activity is teaching and only 67 percent of those whose primary work activity is something other than teaching or research agree with the statement.

⁴ A “permanent” position is one without a specific termination date. Thus an untenured tenure-track assistant professor holds a permanent position.

Salaries

Starting salaries for new assistant professors are reported annually at the chairpersons' breakfast at the Allied Social Science Associations annual meeting, and also on the Association's Universal Academic Questionnaire. In fact, salary data from the Universal Academic Questionnaire are now published annually in the May issue of the *American Economic Review*. In spite of the considerable interest in economists' starting salaries (Carson and Navarro, 1988; Formby et al., 1993; Stock, Alston and Milkman, 2000), seldom is sufficient detail available to allow Ph.D. students to assess the financial implications of decisions they make during their education.

Although a remarkable 436 of the 441 employed respondents reported their salaries, in Table 3 we present 1997–98 salary information for only the 307 doctorates who held full-time (permanent or temporary) jobs in the United States, since salaries for the 110 individuals holding jobs outside the United States and the 19 holding part-time jobs are not directly comparable.⁵ Their median annual salary is \$54,000.⁶ While we know that 99 percent of the employed survey respondents reported their salary, we don't know if the salaries of the survey respondents are representative of the entire population, so the salary data should be interpreted carefully.

The median salary for permanent full-time positions is 27 percent higher than for temporary full-time jobs. For those with permanent jobs, business/industry pays a 39 percent premium over academe.

To isolate the independent relationships between various job characteristics and salaries, we conducted a rudimentary regression analysis. Our sample of 230 observations is restricted to members of the Ph.D. class of 1996–97 who were employed in full-time permanent positions commencing no earlier than January 1995. Academic year salaries were not inflated to match the calendar year salaries of others, on the grounds that most assistant professors work during the summer whether they are compensated or not. Assistant professors at research universities who receive summer pay as part of their compensation package are treated as 12-month employees. All salaries were adjusted to reflect cost of living differentials at the job location relative to Washington, D.C.

We included in the regression a series of demographic characteristics of the graduates like age at the beginning of Ph.D. program, sex, marital status, race, and citizenship; educational background characteristics like whether they held a master's degree when entering their Ph.D. program and whether they majored in economics in their immediately prior degree; the elapsed time between entering their Ph.D. program and earning their degree; and the number of years the

⁵ Table 3 also includes 43 individuals who began their employment prior to 1995. Their salaries do not differ appreciably from the other respondents.

⁶ The median annual salary of the 109 respondents employed full-time (permanent or temporary) outside the United States is \$35,000 in U.S. dollars, with the local currency converted to U.S. dollars by each respondent.

Table 3

New Ph.D. Economists' Annual Salaries for Full-Time Jobs in the U.S., 1997–98

	<i>Median</i>	<i>Mean</i>	<i>Low</i>	<i>High</i>	<i>N</i>
Working in the U.S. in Full-time					
Permanent ^a Positions	\$55,000	\$61,000	\$30,000	\$170,000	255
Academic	51,000	53,600	30,000	128,000	130
9–10 Month	50,000	52,800	35,000	105,000	101
11–12 Month	54,000	56,500	30,000	128,000	29
Business/Industry	71,000	75,900	32,500	170,000	58
Government	53,300	55,700	36,000	88,900	36
Research Organizations	55,500	55,800	35,000	90,000	14
International Organizations	80,000	78,800	54,000	104,000	17
Working in the U.S. in Full-time					
Temporary Positions	43,200	47,000	20,000	100,000	52
Academic: 9–10 Month	40,000	43,800	20,000	100,000	28
Postdoctoral appointment	43,000	43,900	30,000	55,000	12

Source: Authors' survey.

^a Permanent means the job has no specific termination date. Untenured faculty are in permanent jobs if they are on a tenure track.

graduates had worked prior to earning their degree. We also included binary variables for the university where they earned their Ph.D., for the subfield of economics in which they specialized, for the employment sector of their job, for the type of institution at which academics were employed, and to indicate those academic jobs located in a business school. The regression accounts for 35 percent of the variation in the natural logarithm of salaries. Unless noted to the contrary, all relationships described here are statistically significant at the 10 percent level or better.

The results indicate a 15 percent salary premium for U.S. citizens.⁷ There is no evidence of a relationship between the doctorates' age, sex, marital status, or race and the logarithm of their salary. Nor is any difference in salary explained by whether the doctorates earned a master's degree prior to entering the Ph.D. program, or on the basis of the major (economics or not) they selected in their immediately prior degree. We included binary variables for each of the five universities that graduated ten or more of the doctorates in the regression sample: Chicago, Harvard, MIT, California-Berkeley, and Wisconsin. None of their estimated coefficients differs significantly from zero. None of the estimated coefficients for subfield variables is statistically significantly different from the benchmark of micro theory.

Those who took longer to earn their Ph.D. earn an estimated 2 percent less for each additional year elapsed between entering the program and graduating, a finding consistent with Barbezat (1992, p. 270). Those who took a job prior to

⁷ When the nine graduates in the regression sample from Australia, Canada, Ireland, and the United Kingdom are combined with the U.S. citizens, the coefficient increases to 16 percent, suggesting that the citizenship variable may be measuring native English-speaking skills.

completing their degree may suffer a modest salary disadvantage per year of pre-degree work vis-à-vis those who began their job with degree in-hand, although the coefficient is not statistically significant.

Compared to those at institutions where a bachelor's degree is the highest degree awarded, our regression framework found that after adjusting for all other variables, academics working in Carnegie-classified research universities earned 23 percent more, and those employed in doctorate universities earned 16 percent more.⁸ Other things equal, academic economists working in a business school earn 14 percent more than academics whose department is in another administrative unit.

Interestingly, the large raw differentials in salaries between academia and business/industry, consulting, research organizations, and government largely vanished in our regression framework, suggesting that at least part of those differentials can be explained by differences in the graduate's personal characteristics, where they earned their Ph.D., their field of specialization, or the location of their jobs. However, even after adjusting for other factors, those graduates working for international organizations enjoy a 42 percent salary premium over academics.

Differences by Ph.D. Program Rank

We grouped economics graduate programs into five "tiers" based on the method used by Hansen (1991), which employs 1993 National Research Council rankings for quality of graduate faculty (Goldberger, Maher and Flattau, 1995). The first tier (Chicago, Harvard, MIT, Princeton, Stanford, and Yale) and second tier (Columbia, Michigan, Minnesota, Northwestern, Pennsylvania, Rochester, California-Berkeley, UCLA, Wisconsin-Madison) programs did not change from 1982 to 1993. The third tier consists of those programs ranked 16–30, the fourth tier programs ranked 31–48, and the fifth tier the remainder of the ranked programs.⁹ We then examined differences for the new economics Ph.D.'s according to the tier of the program that conferred their degree.

Differences across tiers in demographic characteristics, employment outcomes and responses to attitude questions about the doctorates' jobs are reported in Table 4. The final column contains the results of linear ordinary least squares regressions of each row variable on the rank of the program conferring the doctorate. Ten of the 17 estimated coefficients are statistically significant at the 0.05 level.

The elite Ph.D. programs enroll younger graduate students who have fewer

⁸ The Carnegie Foundation for the Advancement of Teaching classifies institutions of higher education as research universities, doctorate universities, master's institutions, institutions where a bachelor's degree is the highest degree awarded, and community colleges. Research universities include the hundred or so most research-intensive Ph.D.-granting institutions as measured by external funding; the remainder are classified as doctorate.

⁹ A sixth tier consists of unranked institutions, including some that are unranked because they did not reach the threshold for number of Ph.D.'s awarded in the 1993 ranking, but would otherwise be ranked above the fifth level, like Carnegie-Mellon.

Table 4

Comparisons Among Ph.D. Programs by Program Rank

Tier	Program Rank 1-6	Program Rank 7-15	Program Rank 16-30	Program Rank 31-48	Program Rank > 48 ^a	All Graduates	Regression Coefficient of Row Variable on Program Rank	
	(n = 96) ^b	(n = 101)	(n = 108)	(n = 86)	(n = 163)	(n = 609)		
<i>Background Characteristics</i>								
Median time to degree	4.83	5.33	5.33	5.63	5.33	5.33	-.002	
Female ^d	0.21	0.32	0.27	0.21	0.27	0.25	-.000	
White ^d	0.77	0.82	0.76	0.62	0.56	0.69	-.004*	
Married ^d	0.60	0.60	0.66	0.63	0.65	0.64	.001	
Age ^d	30.1	32.8	32.3	34.2	35.3	33.3	.066*	
Have children ^d	0.24	0.29	0.40	0.38	0.46	0.35	.003*	
Had assistantship (work responsibility) ^d	0.78	0.88	0.94	0.87	0.83	0.85	-.001	
Had fellowship (no work responsibility) ^d	0.83	0.62	0.53	0.32	0.38	0.53	-.005*	
<i>Employment Outcomes</i>								
Employed ^d	0.98	0.98	0.92	0.99	0.94	0.96 ^g	-.001	
Academic job ^d	0.64	0.57	0.46	0.52	0.61	0.57 ^g	.001	
Full-time permanent ^c job	0.85	0.78	0.76	0.85	0.75	0.79 ^g	-.001*	
Median salary full-time permanent ^c academic working in U.S. (\$) ^e	58,000	51,900	52,000	46,600	43,000	51,000	-.253*	
Median salary full-time non-academics working in U.S. (\$) ^f	87,500	65,200	57,300	50,000	60,000	60,000	-.276*	
Permanent ^c job and looking for employment ^d	0.04	0.14	0.14	0.15	0.21	0.15	.001*	
<i>Attitudes Toward Job</i> (5 = strongly agree; 1 = strongly disagree)								
The position is commensurate with my education and training	mean	4.52	4.48	4.38	4.29	3.93	4.30	-.008*
The position is similar to what I expected to be doing when I began my Ph.D. program	mean	3.79	3.62	3.40	3.79	3.43	3.61	-.002
The position is professionally challenging	mean	4.51	4.32	4.13	4.19	3.83	4.18	-.008*

Source: Authors' Surveys.

* = statistically significant at .05 two-tail test level.

^a Graduates of unranked institutions are excluded from the table.

^b Sample size varies by row; reported *n* is maximum. Employment status and sex are based on samples close to the maximum. Sample size for other background characteristics, looking for employment, and attitudes are roughly 77, 91, 68, 62, 116, and 450. Sample sizes for salaries of permanent academics working in the U.S. are 35, 30, 13, 18, 27, and 130; for salaries of non-academics 24, 31, 28, 17, 31, and 137.

^c See table 2, note e.

^d Proportions.

^e Median salaries (in \$US) for those academics working outside the U.S. (and sample sizes) are: 32,000 (58), 50,000 (5), 28,500 (13), 27,000 (7), 32,500 (8), and 32,500 (16).

^f Median salaries (in \$US) for those non-academics working outside the U.S. (and sample sizes) are: 35,000 (36), 40,000 (3), 42,000 (3), 55,000 (3), 35,000 (13), and 30,000 (10).

^g Figures for employed, academic job, and full-time permanent job differ from similar values in table 2 because in table 2 unemployment rate excludes those not in the labor force, academic job includes a few secondary school teachers and permanent and full-time are not consolidated.

dependents. Graduates of first-tier programs enjoy significantly more fellowship support and, not surprisingly, complete their degrees in the least elapsed time. Employment outcomes deteriorate modestly as one moves through the ranks, with the idiosyncratic exception of Tier 4 programs, whose graduates fare comparably with Tier 1 graduates in obtaining full-time permanent appointments, although those who graduated from Tier 4 programs are less likely to be employed in academe, more likely to earn lower salaries, and appear to be less content in their current positions, as evidenced by the 15 percent in permanent jobs who are actively seeking other employment.

Both academic and non-academic salaries are highest for graduates of Tier 1 programs, and fall steadily with rank of Ph.D.-granting programs. The graduates of Tier 1 programs are most satisfied with their jobs, too, as reflected in their higher average response to the questions assessing whether their position is challenging professionally and commensurate with their education and training. The actual behavior of Tier 1 graduates confirms the attitudinal responses, as substantially fewer in permanent jobs are actively seeking a new position.

Differences by Employment Sector and Economics Subfield

Demographic characteristics, employment outcomes and responses to the attitudinal questions are compared among employment sectors in Table 5. A higher proportion of women take jobs in research organizations and international organizations than in academe or government. Minorities are better represented in business/industry and less well represented in international organizations and consulting. Older graduates are more frequently employed in government, business and industry.

Most of the temporary jobs are in academe and international organizations, as would be expected, since these sectors include visiting positions and postdoctoral appointments. Salaries are clearly highest in business/industry, international organizations and consulting. The graduates employed in higher education and research organizations more frequently agree that their jobs are professionally challenging and commensurate with their education and training. Relative to those in other sectors, fewer doctorates employed in permanent academic positions are looking actively for a new job.

The graduates employed in business/industry appear to have been most surprised by what they are actually doing post-degree and most likely to feel that their jobs are a mismatch with their education and training. They do receive a substantial salary premium, as discussed earlier, but apparently it is not enough of a compensating differential. A full quarter of those with permanent positions in business and industry are (already) looking for a different job.

Overall, of those in permanent positions, one in seven were sufficiently dissatisfied to be actively seeking a new job. If one adds the unemployed and those in temporary positions, one in four graduates was actively looking for work at the time of the survey. Most of the graduates, however, seem contented with their job. Eleven times as many described their position as related to their field of study as

Table 5
Comparisons Among Employment Sectors

	<i>4-year College/ Univ.^a</i> (<i>n</i> = 321)	<i>Business/ Industry</i> (<i>n</i> = 60)	<i>Research Organization</i> (<i>n</i> = 31)	<i>Government</i> (<i>n</i> = 84)	<i>International Organization</i> (<i>n</i> = 31)	<i>Consulting</i> (<i>n</i> = 38)	
<i>Background Characteristics</i>							
Median time to degree	5.17	5.50	5.75	5.00	5.33	5.75	
Female ^c	0.22	0.25	0.29	0.20	0.41	0.26	
White ^c	0.70	0.58	0.70	0.67	0.78	0.81	
Married ^c	0.60	0.73	0.52	0.75	0.75	0.53	
Age ^c	32.8	34.3	32.2	34.0	31.9	33.0	
With children ^c	0.34	0.36	0.35	0.42	0.29	0.31	
<i>Employment Outcomes</i>							
Full-time permanent ^b job	0.70	0.92	0.87	0.89	0.74	0.97	
Median salary full-time permanent ^b working in U.S. (\$) ^d	51,000	70,000	55,500	53,300	80,000	72,000	
Permanent ^b job and looking for employment ^c	0.11	0.25	0.19	0.13	0.17	0.14	
<i>Attitudes Toward Job</i>							
(5 = strongly agree; 1 = strongly disagree)							
The position is commensurate with my education and training	mean	4.47	3.57	4.61	4.28	4.17	4.34
The position is similar to what I expected to be doing when I began my Ph.D. program	mean	3.98	2.52	3.78	3.30	3.96	2.69
The position is professionally challenging	mean	4.30	3.82	4.30	4.22	4.00	4.25

Source: Authors' Survey.

^a Sample size varies by row; reported *n* is maximum. Employment status and sex are based on samples close to the maximum. Sample sizes for other background characteristics, looking for employment, and attitudes are roughly 247, 44, 23, 60, 24, and 32. Sample sizes for salaries are 128, 33, 14, 36, 17, and 25.

^b See table 2, note e.

^c Proportions.

^d Median salaries (in \$US) for those working outside U.S. (and sample sizes) are: 32,000 (55), 75,000 (7), 30,000 (5), 35,000 (17) and too few to disclose for International Organizations and Consulting.

not. Fourteen times as many described their position as commensurate with their education and training as not. Nine times as many reported their job to be professionally challenging as not. However, less than three times as many reported that their job is similar to what they expected to be doing when they began their Ph.D. program as not, suggesting a sizable mismatch between employment expectations and market reality for many doctoral graduates.

A few demographic characteristics and employment outcomes are reported by economics subfield in Table 6. The high proportion of women in labor economics and the low proportion in micro theory, macro/monetary, and financial economics is immediately apparent. Contrary to popular belief, women are not underrepresented in quantitative economics. Minorities more frequently specialize in quantitative economics, international, financial economics, and development, and are

Table 6
Comparisons Among Fields

	Female ^c	White ^c	Academic Job ^c	Full-time Permanent ^b Job ^c	Median Salary Full-time Permanent ^b Academics Working in U.S. (\$)	Median Salary Full- time Non- academics Working in U.S. (\$)	Permanent ^b Job and Looking For Employment ^c
Quantitative (<i>n</i> = 41) ^a	0.29	0.54	0.64	0.82	57,500	67,000	0.13
Micro (<i>n</i> = 26)	0.15	0.80	0.81	0.65	^d	^d	0.22
Macro/Monetary (<i>n</i> = 77)	0.16	0.67	0.61	0.83	52,000	67,500	0.13
International (<i>n</i> = 76)	0.25	0.52	0.54	0.81	52,500	80,000	0.15
Financial Economics (<i>n</i> = 47)	0.15	0.56	0.49	0.75	^d	74,100	0.16
Public Finance (<i>n</i> = 58)	0.24	0.78	0.61	0.82	48,000	60,000	0.11
Health, Education, Welfare (<i>n</i> = 27)	0.26	0.75	0.73	0.73	54,000	^d	0.11
Labor (<i>n</i> = 57)	0.46	0.85	0.46	0.76	50,000	60,000	0.07
Industrial Organization (<i>n</i> = 59)	0.22	0.79	0.56	0.85	44,500	56,000	0.10
Development (<i>n</i> = 51)	0.29	0.56	0.58	0.65	55,000	52,000	0.16
Natural Res/Ag Economics (<i>n</i> = 51)	0.27	0.80	0.46	0.73	47,000	55,000	0.28

Source: Authors' Survey.

^a Sample size varies by column; reported *n* is maximum. Employment status and sex are based on samples close to the maximum. Sample sizes for other columns are smaller, but all reported data are based on at least eight observations.

^b See table 2, note e.

^c Proportions.

^d Too few observations to disclose.

slightly underrepresented in labor economics. Although not reported in Table 6, micro theorists and those in financial economics are the youngest graduates.

Micro theorists and those in health, education and welfare are disproportionately likely to be employed in academe, while new economists in financial economics, labor, and natural resource economics (including agricultural economics) are least likely to land in academe. Among full-time permanently employed academics, salaries of quantitative economists, development economists, and those in health, education and welfare are the highest; the pay of academic industrial organization economists is the lowest. Although all of the micro theorists were employed, they were among the most likely to hold a temporary position. More micro theorists with permanent employment are seeking new jobs than economics doctorates in any other field except natural resource/agricultural economics. In fact, when the 33 percent of micro theorists in temporary academic jobs is added to the 22 percent in permanent jobs who are looking, roughly half of the micro theorists in the sample seem not to have yet put down permanent employment roots.

And Economists Think They Have It Bad

Many of the survey respondents provided comments about the job market for new economics Ph.D.'s. A few were positive or neutral, like "I got real lucky,"

“Seems quite tight,” and “There is excess supply of new Ph.D.’s in economics.” A substantial number, however, expressed disappointment about the job market. Typical comments included: “The academic market is terrible!” “It sucks,” and “With the information I have now, I would have never gone for a Ph.D. degree in Econ.” It is possible that the negative tone of these comments represents only a small group of respondents who were more likely to express their disappointment because their job market outcomes did not meet their expectations. However, when we combine the tone of these comments with graduates’ responses to questions regarding their attitudes toward their jobs and the observation that a large fraction of Ph.D.’s in permanent jobs report actively seeking other employment, what emerges is a picture of a large group of graduates who are dissatisfied with their investment in the economics Ph.D., at least in terms of its return in the job market. Although it is tempting to sympathize with these sentiments, when we compare the job market outcomes of new Ph.D. economists with new Ph.D.’s in other disciplines, economics looks much less dismal.

Basic employment outcome information for economics and seven other social science and science disciplines that participated in the CPST study is reported in Table 7. Unemployment rates for all of the 1996–97 Ph.D.’s are quite low; only the respondents in political science and chemistry reported more than a 3 percent unemployment rate. However, it’s not clear that a Ph.D. adds much to the chance of being employed. The Bureau of Labor Statistics website reports that the seasonally adjusted unemployment rate for all college graduates in 1997 was 2.1 percent (<http://stats.bls.gov/news.release/empsit.t03.htm>)).

Relatively more of the economics doctorates began careers in permanent jobs than did doctorates in any of the other seven fields reported. Of course, career paths in some of the science disciplines more commonly include temporary postdoctoral appointments. Of those in temporary positions, 88 percent of the chemistry doctorates, 85 percent of physicists, 75 percent of engineers, and 68 percent of psychologists were in such postdoctoral positions, while only 23 percent of the economists in temporary appointments labelled their jobs as postdoctoral positions. The strength of the job market for economists holds up, however, even after adjusting for the frequency of postdoctoral appointments. Only engineering, with 10.6 percent of its graduates involuntarily in temporary positions, had fewer than the 15.6 percent of doctorate economists who were in a temporary position but preferred a permanent one. The percentage runs as high as 27 percent in mathematics, 30 percent in physics, 33 percent in chemistry, and 38 percent in political science.

The 25 percent of employed economists who were actively seeking a new job is lower than the percentage of job seekers in all of the other disciplines except psychology (at 23 percent) and contrasts with 40 percent in political science and 43 percent in chemistry. The 5 percent of employed economics doctorates holding part-time jobs is less than the 7, 14, and 24 percent in sociology, political science, and psychology, respectively, but higher than in any of the natural science disciplines or engineering.

Within business/industry, the salaries of new Ph.D. economists exceed those of

Table 7

The Labor Market for New Ph.D.'s in Eight Disciplines, 1997

	<i>Economics</i> (<i>n</i> = 454)	<i>Psychology</i> (<i>n</i> = 1,666)	<i>Political Science</i> (<i>n</i> = 142)	<i>Sociology</i> (<i>n</i> = 309)	<i>Chemistry</i> (<i>n</i> = 888)	<i>Engineering</i> (<i>n</i> = 1,286)	<i>Mathematics</i> (<i>n</i> = 675)	<i>Physics</i> (<i>n</i> = 438)
Percent								
Unemployed	2.3	0.6	7.0	1.9	4.6	2.7	2.4	1.8
Percent in								
Temporary Job	20	25	41	35	58	24	46	57
Median Annual Salary for Doctorates Employed Full-time in the U.S.: ^a								
Education: 9–10								
mo. (\$) 48,000	48,000	31,090	37,200	37,000	35,530	50,000	36,000	33,000
Business/Industry								
(\$) 73,500	73,500	54,000	38,940	na	58,000	63,600	60,000	62,000
Government (\$) 51,200	51,200	43,500	42,750	53,500	45,000	60,000	57,260	63,000
Distribution by Employment Sector (percentage):								
Education	56	37	78	87	57	32	70	45
Business/Industry	16	2	5	5	29	52	21	31
Government	16	2 ^b	6	3	9	13	5	21

Source: Commission on Professionals in Science and Technology, American Association for the Advancement of Science, "Employment of Recent Graduates in Science and Engineering: Results of Professional Society Surveys," Washington, D.C.: August 6, 1998 and Authors' survey (for economists' data).

na: not applicable.

^a Excludes those with postdoctoral appointments.

^b The largest single category of psychologists is self-employed in private practice.

doctorates from all other disciplines. In education, economists' salaries are exceeded only by engineers. Thus, it appears that economists are more likely to be in a permanent job the year after they earn their Ph.D. and are likely to be paid more than most other social or natural scientists, or engineers. Other than physics, economics has the most diversified demand for employment of new doctorates, with at least 16 percent of jobs coming from each of the government, business/industry, and education sectors.

Of course the CPST survey data do not reveal anything about the dynamic properties of economists' salaries. For changes over time, we return to the NSF data collected by Hansen (1991), which we have updated to 1995, the latest year for which similar data are available. These salary data include economists at all stages of their careers, and are reported in Table 8. Hansen (p. 1059) noted that although the average level of economists' salaries still exceeded that of all doctoral scientists and engineers in 1987, the increase in average salaries of economists lagged behind that of related disciplines from 1977 to 1987. He concluded that the absence of any gain in real salaries from 1977 to 1987, combined with the increased time required to complete the Ph.D., implied a declining economic return on investment in an economics Ph.D. over the period.

Salary patterns in the succeeding decade contrast with what Hansen (1991) found from 1977 to 1987. While the average nominal salary of all doctorate scientists and engineers rose 21 percent from 1987 to 1995, the average salary of all Ph.D. economists increased by 28 percent. The widening gap is driven by nonac-

Table 8

Doctoral Scientists' Nominal Salaries

	<i>Median Nominal Salary^a</i>		
	<i>1977</i>	<i>1987</i>	<i>1995</i>
All Doctoral Economists	\$26,900	\$50,800	\$65,000
Employed by Educational Institutions	25,100	48,000	59,000
Employed by Business & Industry	34,100	65,400	91,200
Employed by Federal Government	32,900	56,900	75,000
Doctoral Scientists and Engineers	25,600	49,600	60,200
Economists	26,900	50,800	65,000
Physicists/Astronomers	26,500	50,500	68,000
Computer Information Specialists	25,800	54,400	65,000
Sociologists/Anthropologists	22,200	41,700	50,000
Electrical Engineers	29,000	60,500	75,000
All Doctoral Scientists/Engineers			
Employed by Educational Institutions	23,700	45,900	50,000
Economists	25,100	48,000	59,000
Physicists/Astronomers	24,400	51,400	55,400
Computer Information Specialists	24,400	49,700	54,000
Sociologists/Anthropologists	22,100	41,900	50,000
Electrical Engineers	27,100	58,400	64,000

Source: National Science Foundation.

^a Individuals are classified by the discipline of their degree.

academic salaries. Although the 23 percent increase in average salaries of academic economists from 1987 to 1995 substantially exceeds the 9 percent increase in average salaries of all academic doctoral scientists and engineers, it is still below the 28 percent average salary increase experienced by all economists. The 39 percent increase in median salaries of doctoral economists employed in business/industry and the 32 percent increase for those employed by the federal government contribute substantially to the surge in the overall average.

However, real average salaries for Ph.D. economists continued to decline from 1987 to 1995, falling 4.6 percent over the period. Over the same interval, the registered time required to earn a Ph.D. increased about 6 percent. Thus, the economic return to a Ph.D. in economics continued to fall after 1987, and may be reflected in the declining numbers of first-year economics graduate students who have enrolled since 1992.

Concluding Remarks

A weak academic and government labor market for Ph.D. economists seems to have forced some aspiring college professors onto Wall Street, Michigan Avenue, or Market Street. About 40 percent of our survey respondents do not agree that their job turned out to be similar to what they had expected when they entered their Ph.D. program. This disappointment is especially acute for Ph.D. economists who

have taken jobs in business/industry, where it seems to many of them that neither the research nor the teaching tools they developed in graduate school apply very well. Thus, it is natural that many of them are disillusioned with careers that have not unfolded like those of the undergraduate professors who may have stimulated their interest in pursuing a Ph.D. in economics.

In a discipline that understands product differentiation, it may seem peculiar that niche Ph.D. programs designed for individuals planning to work in the private sector have not evolved. Perhaps the reason is that few of those who eventually accept jobs in business or industry initially anticipate working there. Many of them may have been unsuccessful in an initial effort to secure an academic, government, or research organization appointment. Alternatively, the absence of specialized Ph.D. programs for business or industry economists may be analogous to the grouping of ice cream vendors near the middle of Harold Hotelling's (1929) famous beach; that is, locating away from the center is a poor strategy, since other institutions will split the difference between you and the center and so the strategy of differentiation will not lead to the prosperity you might have expected.

Addressing the dissatisfaction of new economics Ph.D.'s working in the private sector may be done better by the National Association of Business Economists than the American Economic Association, as the latter's charter clearly identifies its primary goal as the encouragement of economic research (AEA, 1997, p. ix) and the former's members are undoubtedly in a better position to recognize ways to ameliorate the problem. Nonetheless, the problem deserves attention, because the proportion of economists working in the private sector has grown by 70 percent over the past decade, and the even higher proportion of fresh Ph.D.'s taking up jobs in business or industry will continue to raise the employment share of that sector in years to come.

In the longer run, however, the declining number of first-year students entering economics Ph.D. programs eventually will result in a smaller crop of newly harvested doctorates roaming the hotel corridors at the Allied Social Science Associations meeting each January. At least individuals in temporary positions returning to the job market for a second or third time should eventually discover a smaller contingent of fresh faces competing with them.

An international market for new economics Ph.D.'s seems to be evolving along with the globalization of markets for other goods and services. The majority of new economics Ph.D.'s are now awarded to non-U.S. citizens, almost half of whom choose to remain in the United States for their first post-degree job. In addition, the percentage of new economics doctorates accepting employment outside the United States has almost doubled in 20 years. If these trends continue, by the year 2000 more than one in three new economics Ph.D.'s will have to clear customs and immigration (either on the way in or on the way out of the United States) before first getting paid to practice the dismal science.

Finally, we note that choices often made by economics Ph.D. students—which Ph.D. program to enroll in, which subfields to study, where to seek a job, whether to acquire a master's degree first, whether to complete their dissertation before starting employment, and how hard to push to complete their degree—are related

to employment outcomes. Prospective economics Ph.D. students and those already enrolled in doctoral programs would benefit from learning about these relationships, even though employment outcomes are not the only factors that bear on such decisions.

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