

Report of the Committee on the Status of Women in the Economics Profession 2008 - submitted by Barbara M. Fraumeni*

The Committee on the Status of Women in the Economics Profession was established by the American Economic Association to monitor the status of women in the profession and to engage in other efforts to promote the advancement of women in economics. This report presents results from our annual survey of economics departments, a supplemental survey of economists in the top twenty business schools and CSWEP's activities over the past year.

Data on Women Economists

The 2008 CSWEP surveys were sent to 123 economics departments with doctoral programs and 145 non-Ph.D. departments. Most of schools represented in the non-Ph.D. survey came from the Carnegie Classification of Institutions of Higher Education (2000 Edition) "Baccalaureate Colleges – Liberal Arts" list as less than ten are schools with economics departments offering an undergraduate and Masters only economics degree. We obtained our highest response ever for the Ph.D. survey of 90.2 percent (102 departments responded) and a lower rate of 55.9 percent (81 departments) for our non-Ph.D. programs survey.

Figure 1 and Table 1 summarize the trends in women's representation in Ph.D. granting departments over the past decade. These charts are labeled as female economists "in the pipeline" to show the progression of women through the ranks from newly minted Ph.D.s to tenured full professors. The fraction of first-year Ph.D. students in all Ph.D. granting departments who are women increased between 2007 and 2008 to 34.9 percent, but this figure is still lower than the 38.8 percent peak in 2000. The female share of newly completed Ph.D.'s has increased for the fourth year in a row to a new high of 35.1 percent in 2007. Assuming 4-5 years to complete a doctorate in economics this suggests that the pipeline is not very leaky at least through completion of the Ph.D. However, the figures for women at top ten or twenty Ph.D. granting departments are less encouraging.¹ The fraction of first-year Ph.D. students who are women at top ten Ph.D. granting departments declined substantially between 2007 and 2008. The fraction of first-year Ph.D. students who are women at top twenty Ph.D. granting departments is about 5 percentage points lower than the corresponding figure for all Ph.D. granting departments. In addition, the fraction of new Ph.D.'s who are women at top ten or twenty Ph.D. granting economics departments is about 5 percentage points lower than that for all Ph.D. granting departments.

¹ These rankings are taken from *US News and World Report* 2008 Edition. The top ten departments in order are the Massachusetts Institute of Technology; University of Chicago; Harvard University; Princeton University; Stanford University; University of California-Berkeley; Yale University; Northwestern University; University of Pennsylvania; and the University of California-San Diego. The next ten top departments in order are Columbia University; University of California-Los Angeles; University of Michigan-Ann Arbor; University of Wisconsin-Madison; New York University; University of Minnesota-Twin Cities; California Institute of Technology; Cornell University; University of Rochester; and Carnegie Mellon..

The female share of professors at all ranks shown in Figure 1 and Table 1 increased between 2007 and 2008, but in each case the 2008 figure is still lower than the previous peak. The share for female untenured assistant professors increased to 28.8 percent, the share for female tenured associate professors increased to 21.4 percent, and the share for tenured female full professors increased to 8.7 percent.

Computations based on figures in Table 2 shows that for 2008 a smaller share of women than men from top twenty departments are obtaining academic jobs, whether these jobs are in the United States or abroad (52.7 versus 64.0 percent). In 2008, about 30 percent of all doctorates granted to women were to women receiving doctorates from a top twenty department; also about 30 percent of all women finding jobs were from top twenty departments. While the pipeline is not leaky through completion of the Ph.D., this suggests that there will be proportionately fewer top-twenty-department trained female (than male) role-models and mentors in academic settings in the future .

Figure 2 presents data on the status of women in economics departments located in liberal arts institutions over the past five years. Here the pipeline is much less leaky with the share of female economics majors, assistant professors, and tenured associate professors very similar. The share of tenured full professors in liberal arts institutions who are women is more than double that in Ph.D. departments and has been rising over time to just over 20 percent in 2008.

Detailed Results for Ph.D. Granting Departments (2007-2008)

Tables 3 and 4 present results from the 2008 CSWEP survey for Ph.D. granting departments in greater detail, first for all departments and then for the top ten and twenty ranked departments separately. There are some differences between the share of women faculty by rank for all Ph.D. granting programs and those in the top ten or twenty departments at the assistant and full professor level. For example, although the share of women at the full professor level is approximately equal for all Ph.D. granting departments and for the top twenty Ph.D. granting departments, the share of female tenured full professors at the top ten Ph.D. granting departments is 7.0 percent, while it is 8.7 percent for all Ph.D. granting departments. The greatest differences are at the associate professor level where the share of tenured women is lower for the top twenty departments (15.1 percent) versus all Ph.D. granting departments (21.4 percent). In terms of students, there is a gap in the share of women for all Ph.D. programs and the share of women in the top twenty programs. Women are 34.9 percent of first-year Ph.D. students in all Ph.D. departments but 25.6 percent in the top ten departments and 28.3 percent in the top twenty departments. The gap is larger for those who received their Ph.D. in 2007-2008. For all Ph.D. programs the female share of doctorates granted was 35.1 percent, but just 30.3 percent in top ten departments and 29.4 percent in top twenty departments.

Tables 2, 3 and 4 show how women have fared in the job market for new Ph.D.'s relative to their male counterparts. The vast majority of male and female graduate students in economics end up taking jobs in the United States and women are somewhat more likely

to take a U.S.-based job than their male counterparts. Historically women have been underrepresented in academic positions in Ph.D. granting institutions and “over-represented” (relative to their share of all graduates) in academic positions in non-Ph.D. granting institutions and in public sector jobs. Focusing just on the U.S. job market (Table 3), women constituted 33.6 percent of new hires in Ph.D. granting departments and 39.5 percent in non-Ph.D. granting academic programs. Table 2 provides more detailed analysis of where male and female Ph.D.’s end up becoming employed by rank of department -- the top ten departments, the top eleven to twenty departments, and all the remaining departments. While there is a higher fraction of males in the top ten programs that end up in an academic position in a Ph.D. program than females, there is a fairly similar pattern in the types of other positions students in these departments end up in by gender. However there is a large difference in the occupational distribution by gender of students in the top eleven to twenty departments. A much higher fraction of male students end up as faculty members in Ph.D. departments than female students (60.9 versus 33.3 percent) while a much higher fraction of female students leave academia for public or private sector jobs. For students in the remaining 103 doctoral programs a slightly higher share of male students end up in academic positions in Ph.D. and non-Ph.D. departments. Focusing on jobs abroad, men from top twenty departments are more likely to end up in an academic job. Interestingly, women from other than top twenty departments are more likely to end up in an academic job than men (60.5 percent versus 50.5 percent).

The CSWEP survey also includes information on non-tenure track faculty. As seen in Tables 3-4, this category is disproportionately female. Among all Ph.D. granting economics departments in the United States, the female share of non-tenure track faculty is double that for the female share of all tenured/tenure track faculty (33.4 versus 16.7 percent). Similarly, in the top ten (twenty) departments women comprise 32.7 (26.8) percent of the non-tenured faculty versus 13.9 (15.0) percent of the tenured/tenure track faculty. More generally we see an increase in the share of all faculty at all Ph.D. granting institutions in non-tenured positions increasing from 10.8 percent in 2005 to 14.8 percent in 2008.

Detailed Results for non-Ph.D. programs (2007-2008)

As shown in Figure 2 female faculty are better represented at liberal arts institutions than at Ph.D. granting institutions. In our 2008 survey of liberal arts institutions (plus less than ten departments that only granted BA/MA economics degrees) women were 33.1 percent of untenured assistant professors, 35.7 percent of tenured associate professors and 20.7 percent of tenured full professors; comprising 27.6 percent of tenured or tenure track faculty versus just 16.7 percent in Ph.D. granting programs. The fraction of undergraduate majors who were women at these institutions fell to 32.8 percent from almost 40 percent in the 2007 survey.²

² Because of the historically substantially lower response rate to the liberal arts department survey than to the Ph.D. granting departments survey, there is less confidence in year-to-year trends and overall results in the liberal arts department survey. In early 2009 efforts will be made to obtain responses from a higher fraction of liberal arts departments.

The Committee's Recent Activities

On-going Activities

One of CSWEP's major activities is the production of our thrice-yearly newsletter. In addition to reporting on the annual survey of departments, the Winter newsletter, co-edited by Dick Startz, included articles on being the boss, as there are an increasing number of female economists in leadership positions. Trish Mosser co-edited the Spring Newsletter that included articles alternative careers in economics. The Fall newsletter was co-edited by Linda Bell and featured a discussion on academic leadership. This issue also included an interview with 2007 Carolyn Shaw Bell Award winner, Olivia Mitchell and "Top Ten Tips on How to be Mentored.". These newsletters would not be possible without the tireless efforts of Karine Moe.

As part of its ongoing efforts to increase the participation of women on the AEA program, CSWEP organized six sessions for the January 2008 ASSA meetings in New Orleans. Anna Paulson organized three sessions on developing countries issues and Karine Moe organized three sessions on gender-related issues. After an extended discussion with AEA's Executive Committee, it was concluded that two CSWEP sessions would be published in the May Papers and Proceedings (P&P) edition of the American Economic Review. Lisa Lynch, the previous CSWEP Chair, made convincing arguments about how reducing the number of CSWEP sessions in the P&P to one would make a significant difference in the number of published P&P papers authored or co-authored by women. To make room for more sessions in the Papers and Proceedings, CSWEP's annual reports will no longer be published in that edition. The reports will be continued to be posted to the CSWEP web site and printed in the CSWEP newsletter.

In 2008 the American Economic Association Annual Meeting was held in New Orleans. At the business meeting Lisa Lynch presented results on the annual department survey and summarized CSWEP activities over the past year. During this meeting, the Carolyn Shaw Bell Award was presented to Olivia Mitchell of the Wharton School of the University of Pennsylvania. The Carolyn Shaw Bell award is given annually to a woman who has furthered the status of women in the economics profession through her example, achievements, contributions to increasing our understanding of how women can advance through the economics profession, and mentoring of other women. The Chair thanks Patricia Mosser and Caren Grown for their service on the 2008 Carolyn Shaw Bell Awards Committee. The 2008 winner of the Carolyn Shaw Bell award is Anne Carter and the Chair would like to thank Amy Schwartz, Patricia Mosser and Caren Grown for all their work on this award committee. The 2008 winner of the Elaine Bennett Research Prize is Amy Finklestein of MIT. This prize was established in 1998 to recognize and honor outstanding research in any field of economics by a woman at the beginning of her career. The Chair thanks Kathryn Shaw, Judith Chevalier and Monika Piazzesi for their service on the Bennett Prize award committee.

As part of our ongoing mentoring efforts CSWEP sponsored one national mentoring workshop for junior faculty in economics after the January 2008 American Economic Association meetings in New Orleans. Participants were enthusiastic in their exit survey about the quality and usefulness of the panels and overall activities of the workshop. We

thank all the mentors and organizers who participated in these workshops especially Donna Ginther. We will conduct a regional workshop after the November 2009 Southern Economic Association meetings in San Antonio. The National Science Foundation has extended our funding for these national and regional workshops through 2008. From 2011-2014 the American Economic Association has agreed to fund two additional national workshops and two regional workshops for mentoring junior faculty. In addition, we are continuing a Summer Fellows initiative in 2009 supported by NSF and the AEA and run jointly with CSMGEP. The purpose of this program is to increase the participation and advancement of women and underrepresented minorities in economics. The fellowship allows the fellow to spend a summer in residence at a sponsoring research institution such as a Federal Reserve Bank, other public agencies, and think-tanks. We had over 80 applications for 10 positions. For the summer 2008 program the number of sponsoring or cooperating institutions has been increased to almost twenty. In addition, field coverage has been broadened and outreach to under-represented minority candidates has increased.

CSWEP's Regional Activities

CSWEP's regional representatives organized sessions at each of the regional association meetings—including the Eastern, Southern, Midwest, and Western Economic Association. Our thanks go to Anna Paulson (Midwest), Linda Bell (Eastern), Julie Hotchkiss (Southern) and Martha Olney (Western), for their excellent programs and efforts to help women economists in their regions maintain and increase their professional networks. Abstracts of the papers presented at these association meetings are presented in the newsletters each year.

Additional Words of Thanks

The Chair would like to thank the membership chair, Joan Haworth and her staff, particularly Lee Fordham, for their essential contribution to our outreach mission. The terms of four of our Committee members ended in January 2009 – Donna Ginther, Karine Moe, Anna Paulson and Dick Startz. Donna Ginther has agreed to serve a second term, continuing in her role as the CeMENT coordinator for one more year. Karine Moe has served two terms as the editor of the newsletter and Anna Paulson has served as the Midwest representative. Dick Startz has agreed to serve as the Summer Fellows coordinator for one more year even though he will not be on the Board. They have all made outstanding contributions and we are enormously grateful to them for their willingness to serve. The Chair thanks new committee members Debra Barbezat, Julie Hotchkiss, and Amy Schwartz along with all the other members of the Committee for their exceptional efforts over the past year to advance the goals of CSWEP. CSWEP receives both financial and staff support from the American Economic Association. We are especially grateful for all the help we receive from John Siegfried and his staff -- particularly Barbara Fiser and Susan Houston. The Chair also warmly thanks Deborah Arbique from the Muskie School of the University of Southern Maine who has provided extraordinary and indispensable administrative support for the Committee during the second half of 2008. The Chair also appreciates that the Muskie School and the University of Southern Maine is willing to host CSWEP for the next three years.

Finally, the Committee wishes to express their gratitude to Lisa Lynch for leading CSWEP for the past two-and-a-half years. Lisa Lynch stepped down from being Chair at the end of June to assume the position of Dean of the Heller School of Brandeis University. Being Chair is a very substantial time and effort commitment and Lisa has performed her duties at an extraordinary level. Finally, the Committee also thanks Kathy Spagnoli, who provided administrative support through the first half of 2008, and, along with Lisa, continues to be indispensable in facilitating the transition to a new Chair in a new location.

*Barbara M. Fraumeni
Chair, CSWEP
Chair, Ph.D. in Public Policy and Management Program
Professor of Public Policy and Management
Muskie School of Public Service
University of Southern Maine
P.O. Box 9300
Portland, ME 04104-9300
Phone 207/228-8245
Fax 207/780-4060
E-mail cswep@usm.maine.edu

Figure 1
Percentage of Economists in the Pipeline Who Are Female
All Ph.D. Granting Departments

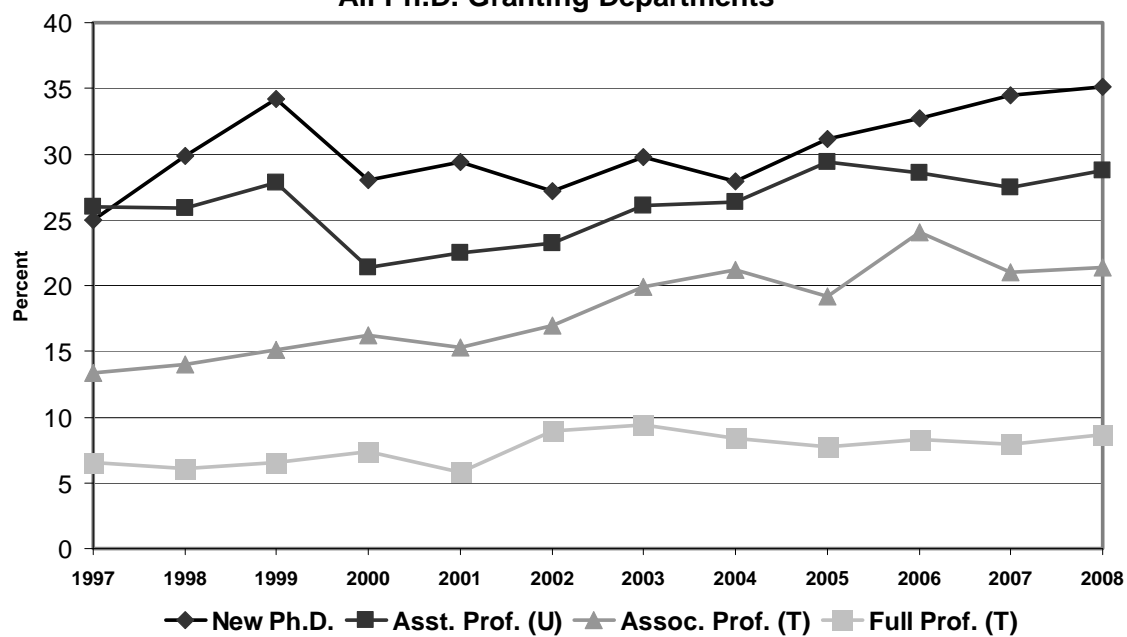


Figure 2
Percentage of Economists in the Pipeline Who Are Female
Liberal Arts Departments

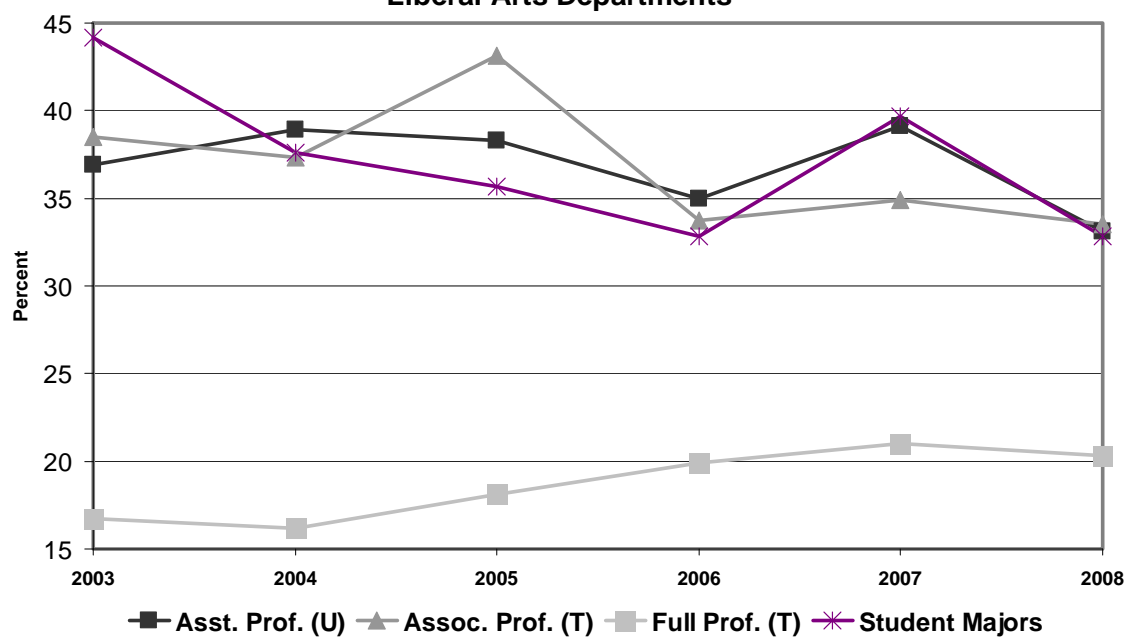


Table 1 -- The Percentage of Economists in the Pipeline Who Are Female, 1997-2008

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
All Ph.D. Granting Departments												
1st yr students	31.3	32.2	35.6	38.8	31.9	33.9	34.0	33.9	31.9	31.0	32.7	34.9
ABD	26.8	28.2	33.0	32.3	30.2	30.6	32.7	33.1	33.9	33.6	32.7	33.4
New Ph.D.	25.0	29.9	34.2	28.0	29.4	27.2	29.8	27.9	31.1	32.7	34.5	35.1
Assistant Professor (U)	26.0	25.9	27.8	21.4	22.5	23.2	26.1	26.3	29.4	28.6	27.5	28.8
Associate Professor (U)	11.1	15.9	27.3	17.2	10.0	17.2	24.0	11.6	31.2	24.6	20.0	30.0
Associate Professor (T)	13.4	14.0	15.1	16.2	15.3	17.0	19.9	21.2	19.2	24.1	21.0	21.4
Full Professor (T)	6.5	6.1	6.5	7.4	5.8	8.9	9.4	8.4	7.7	8.3	7.9	8.7
Number of departments	95	92	77	76	69	83	95	98	93	96	102	111
Top 10 Ph.D. Granting Departments												
1st yr students	20.3	27.2	29.6	29.5	26.9	28.5	21.2	26.0	26.0	24.8	29.5	25.6
ABD	25.0	22.0	25.2	25.2	26.6	27.0	26.1	26.3	26.3	27.8	27.6	24.4
New Ph.D.	16.5	25.9	24.3	23.0	30.5	25.7	26.3	25.5	31.4	30.3	27.5	30.3
Assistant Professor (U)	20.0	17.7	14.7	18.2	18.8	15.8	21.9	21.3	24.1	27.4	24.3	26.7
Associate Professor (U)	12.5	36.4	45.5	30.8	13.3	7.7	11.1	12.5	30.0	27.3	0.0	33.3
Associate Professor (T)	12.5	7.7	28.6	36.4	23.5	28.6	17.6	6.7	14.3	10.0	18.5	16.0
Full Professor (T)	5.0	3.7	3.9	7.1	6.3	5.6	7.0	8.2	7.3	8.0	7.9	7.0
Number of departments	8	7	7	7	10	9	10	10	10	10	10	10
Top 20 Ph.D. Granting Departments												
1st yr students	21.5	28.8	31.1	32.8	30.5	31.9	26.1	27.7	27.0	27.4	29.0	28.3
ABD	28.6	24.1	25.4	26.2	27.2	27.2	28.4	29.7	28.9	28.9	27.1	27.4
New Ph.D.	24.9	27.1	28.1	24.6	26.8	24.7	24.8	28.2	30.7	30.7	30.8	29.4
Assistant Professor (U)	17.8	16.4	21.6	17.7	18.8	21.5	25.1	24.1	27.0	26.2	24.4	25.7
Associate Professor (U)	7.7	36.4	46.2	26.7	13.3	13.3	23.1	20.7	26.7	24.4	27.8	35.3
Associate Professor (T)	16.0	8.3	16.3	12.8	19.6	22.9	18.9	12.1	14.3	12.5	12.0	15.1
Full Professor (T)	5.9	4.7	4.8	7.4	7.0	9.0	6.3	7.6	7.5	7.9	7.9	8.5
Number of departments	17	16	15	15	18	18	19	19	20	20	20	20

Notes: U refers to untenured and T refers to tenured. ABD indicates students who have completed "all but dissertation."

Table 2 -- Job Market Employment Shares by Gender 2008*

	Top 10		Top 11 through 20		All Others	
	Women	Men	Women	Men	Women	Men
U.S. based job, share of all individuals by gender	77.2	70.4	75.0	57.5	73.5	65.2
Academic, Ph.D. granting department	52.3	58.0	33.3	60.9	36.1	38.3
Academic, Other	4.5	3.0	11.1	8.7	28.4	29.6
Public sector	15.9	11.0	22.2	13.0	10.3	11.3
Private sector	27.3	28.0	33.3	17.4	25.2	20.9
Foreign Job obtained, share of all individuals by gender	22.8	26.8	22.2	42.5	20.4	28.0
Academic	53.8	65.8	62.5	70.6	60.5	50.5
Nonacademic	46.2	34.2	37.5	29.4	39.5	49.5
No job found, share of all individuals by gender	0.0	2.8	2.8	0.0	6.2	6.8
Number of individuals	57	142	36	80	211	353

* Shares by detailed type of job, e.g., academic, public or private sector, sum to 100, except for rounding.

Table 3 -- Percentage Female for Ph.D. granting Economics Departments 2008**111 responding institutions**

A. Faculty Composition (2008-2009 Academic Year)	Women	Men	Percentage Female
Assistant Professor	200	493	28.9
Untenured	188	464	28.8
Tenured	12	29	29.3
Associate Professor	107	377	22.1
Untenured	12	28	30.0
Tenured	95	349	21.4
Full Professor	125	1287	8.9
Untenured	4	13	23.5
Tenured	121	1274	8.7
All tenured/tenure track	432	2157	16.7
Other (non-tenure track)	150	299	33.4
All faculty	582	2456	19.2
B. Students and Job Market	Women	Men	Percentage Female
Students (2008-2009 Academic Year)			
First-year Ph.D. students	498	928	34.9
ABD students	1092	2177	33.4
Ph.D. granted (2007-2008 Academic Year)	384	711	35.1
Job Market (2007-2008 Academic Year)			
U.S. based job	226	376	37.5
Academic, Ph.D. granting department	88	174	33.6
Academic, Other	49	75	39.5
Public sector	29	43	40.3
Private sector	60	84	41.7
Foreign Job obtained	64	171	27.2
Academic	38	99	27.7
Nonacademic	26	72	26.5
No job found	14	28	33.3

Note: ABD indicates students who have completed "all but dissertation."

Table 4 -- Percentage Female for Top 10 and Top 20 Ph.D. Granting Economics Departments 2008

	Top 10			Top 20		
A. Faculty Composition (2008-2009 Academic Year)	Women	Men	% Female	Women	Men	% Female
Untenured Assistant Professor	23	63	26.7	49	142	25.7
Associate Professor	6	25	19.4	14	56	20.0
Untenured	2	4	33.3	6	11	35.3
Tenured	4	21	16.0	8	45	15.1
Tenured Full Professor	19	254	7.0	39	418	8.5
All tenured/tenure track	57	352	13.9	111	627	15.0
Other (non-tenure track)	17	35	32.7	38	104	26.8
All faculty	74	387	16.1	149	731	16.9
B. Students and Job Market	Women	Men	% Female	Women	Men	% Female
Students (2008-2009 Academic Year)						
First-year Ph.D. students	61	177	25.6	125	317	28.3
ABD students	186	576	24.4	349	923	27.4
Ph.D. granted (2007-2008 Academic Year)	63	145	30.3	107	257	29.4
Job Market (2007-2008 Academic Year)						
U.S. based job	44	100	30.6	71	146	45.2
Academic, Ph.D. granting department	23	58	28.4	32	86	27.1
Academic, Other	2	3	40.0	5	7	22.7
Public sector	7	11	38.9	13	17	26.5
Private sector	12	28	30.0	21	36	36.8
Foreign Job obtained	13	38	25.5	21	72	22.6
Academic	7	25	21.9	12	49	19.7
Nonacademic	6	13	31.6	9	23	28.1
No job found	0	4	0	1	4	20.0
Total	57	142	28.6	93	222	29.5

Table 5 -- Percentage Female for Economics Departments in Liberal-Arts Institutions 2008
81 responding institutions

A. Faculty Composition (2008-2009 Academic Year)	Women	Men	Percentage Female
Assistant Professor	49	99	33.1
Untenured	49	99	33.1
Tenured	0	0	0.0
Associate Professor	53	105	33.5
Untenured	3	15	16.7
Tenured	50	90	35.7
Full Professor	49	192	20.3
Untenured	0	4	0.0
Tenured	49	188	20.7
All tenured/tenure track	151	396	27.6
Other (non-tenure track)	52	82	38.9
All faculty	203	478	29.8
B. Student Information	Women	Men	Percentage Female
Student Majors (2007-08 Academic Year)	852	1,745	32.8



American Economic Association

Committee on the Status of Women in the Economics Profession

Office of the Chair, Barbara M. Fraumeni
University of Southern Maine, Muskie School
P.O. Box 9300, Portland, ME 04104-9300
Phone 207/228-8245, Fax 207/780-4060
E-mail cswep@usm.maine.edu

Memorandum: Explanation for the CSWEP Survey Results
From: Barbara M. Fraumeni, CSWEP Chair
To: American Economic Association Executive Committee
Date: March 24, 2009

At the January AEA Executive Meeting, Susan Athey asked for an explanation of why the CSWEP survey numbers continue to show that female economists at Ph.D. granting institutions are less likely than men to advance upward through the academic professorial ranks. An analysis of this question focusing on tenuring during the nineties is reported in an article co-authored by Donna K. Ginther (a CSWEP Board member) and Shulamit Kahn in the Summer 2004 Journal of Economic Perspectives, entitled "Women in Economics: Moving Up or Falling Off the Academic Ladder." They conclude:

"We find that compared with other academic disciplines, women are less likely to get tenure and take longer to achieve it. Although gender differences in productivity and the effect of children on promotion partly explain women's lesser chances of receiving tenure in economics, a significant portion of the gender promotion gap remains unexplained by observable characteristics."

The article begins by taking a longer and cross-discipline view, comparing the percentage of tenured faculty who are female in economics, statistics, political science, life science, physical sciences, and engineering during the seventies through the beginning of the 21st century. Between 1987 and 2001, the percentage of female tenured professors grew more rapidly in each of the other disciplines than in economics.

Two longitudinal data sets were constructed to study the question of tenuring in economics more fully: the first based on the 1973-2001 waves of the Survey of Doctoral Recipients (SDR) and the second from a sample of Ph.D. economists who were assistant professors in Ph.D.-granting economics departments in the U.S. and Canada in 1988 and/or 1989 who had received Ph.D.'s during the eighties. The samples were admittedly small. A variety of equations were estimated. In both samples, women were less likely to receive tenure and for those who were tenured, it took about a year longer for women to earn tenure than men. In the SDR sample, equations were estimated including a number of demographic and descriptive variables such as age, marital status, presence of children (young or of any age), the proportion of time spent teaching and in administrative duties, employer characteristics, and publications. After controlling with all of the variables, they found that women were about 15% less likely to be tenured than men. Ginther and Kahn have updated the analysis using data from the 1973-2006 waves of the SDR and find that women in economics are 9% less likely to get tenure than men after controlling for the above covariates. Although the situation appears to have improved with time, the gender promotion gap in economics remains the largest of the science and social science disciplines evaluated.

The article finished by considering a variety of explanations for the gap. The authors conclude:

"Any satisfactory explanation ...based on women's behavior or choices must account for why it does not apply equally in many other scientific disciplines."

and

"...we are left to wonder whether institutional and departmental behaviors contribute to the gender gap."

Women in Economics: Moving Up or Falling Off the Academic Career Ladder?

Donna K. Ginther and Shulamit Kahn

The percentage of economics doctorates awarded to women increased from 8.7 percent in 1974 to 26.9 percent in 2000, according to data from the National Science Foundation (NSF) Survey of Earned Doctorates. This article considers whether the corresponding increases of women economists that one might expect as women move up the academic career ladder have occurred. A number of studies based on data through the 1980s find that women economists are less likely to be promoted to tenure than men (Kahn, 1993; Broder, 1993; McDowell, Singell and Ziliak, 1999, 2001) and that these differences are not fully explained by observable characteristics. Other recent studies on Sweden and the United Kingdom find that women are underrepresented in tenured academic ranks in economics there (Persson, 2002; Booth, Frank and Blackaby, 2002). However, relatively little is known about women economists' academic employment outcomes in the United States during the most recent decade. Our study draws upon several empirical approaches and multiple data sets for the 1990s. We find that when compared with other academic disciplines, women in economics are less likely to get tenure and take longer to achieve it. Although gender differences in productivity and the effect of children on promotion partly explain women's lesser chances of receiving tenure in economics, a significant portion of the gender promotion gap remains unexplained by observable characteristics.

■ Donna K. Ginther is Associate Professor of Economics, University of Kansas, Lawrence, Kansas. Shulamit Kahn is Associate Professor of Economics, Boston University School of Management, Boston, Massachusetts. Their e-mail addresses are <dginther@ku.edu> and <skahn@bu.edu>, respectively.

The Academic Career Ladder: Economics and Other Disciplines

Education: Stepping Onto the Career Ladder

Both economics and the sciences require mathematical skills and analytical abilities that attract people with a comparative advantage in these skills. Thus, the natural disciplines with which to compare economics are statistics, the physical sciences, the life sciences and engineering—along with political science, which is the social science we consider the closest to economics. Figure 1 shows the share of doctorates granted to women in these fields since 1974. Data on Ph.D.'s granted and on the sector of first job for economics and other fields are from the National Science Foundation (NSF) 1974–2000 Survey of Earned Doctorates (SED), a census of doctorates granted in the United States.

A significantly larger percentage of women obtain doctorates in the life sciences, political science and statistics than in economics, whereas the percentage of women obtaining doctorates in the physical sciences is similar to economics. Engineering awards a lower percentage of doctorates to women than any other discipline. In general, the rankings of these fields in terms of the share of doctorates received by women has not changed since 1974, although statistics and the life sciences have experienced the largest percentage point changes.

The percentage of doctorates granted to women in the humanities and the noneconomics social sciences is not shown here, but it was around 30 percent in 1974 and roughly 50 percent by 2000.

The last few years, however, growth in economics doctorates granted to females has slowed or stopped. In Figure 1, the economics line flattens out in 1999 and 2000. This flattening out is confirmed by data from an annual survey done by the Committee on the Status of Women in the Economics Profession (CSWEP) of the American Economic Association. CSWEP finds that the percentage of economics doctorates received by females has stabilized between 27 and 30 percent for the past six years (except for 1999, whose 34.2 percent female seems an anomaly). Data on first-year graduate students in economics predicts further drops among graduates in the coming years, particularly at top schools.

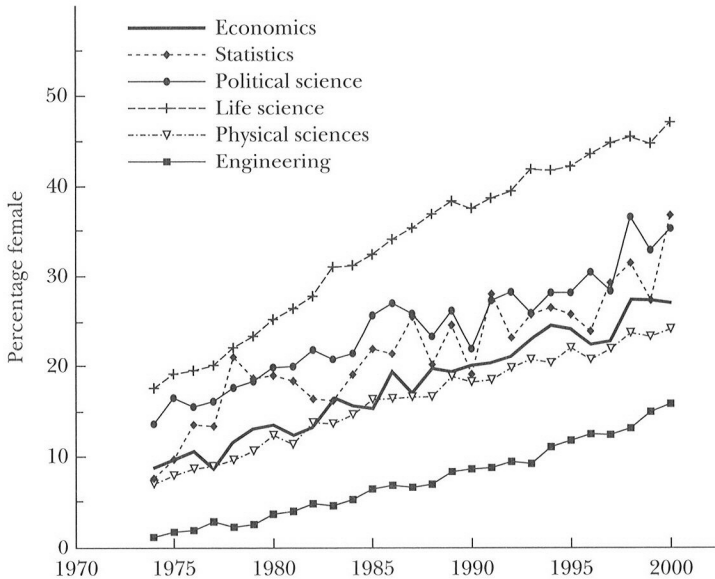
Women's Representation in Academia

How are these trends in doctorates received by women reflected by the academic rank achieved?

Figure 2 shows the percentage of female faculty by academic rank in economics, based on data from the AEA/CSWEP surveys that gather data from Ph.D.-granting economics departments. For some years the AEA conducted a Universal Academic Questionnaire (UAQ), but these data are not consistent because different departments respond each year. Therefore, CSWEP began its own survey in 1993, which has a higher response rate and more consistency, and it is used when

Figure 1

Percentage of Doctorates Granted to Females, 1974–2000 Survey of Earned Doctorates



Source: 1974–2000 Survey of Earned Doctorates.

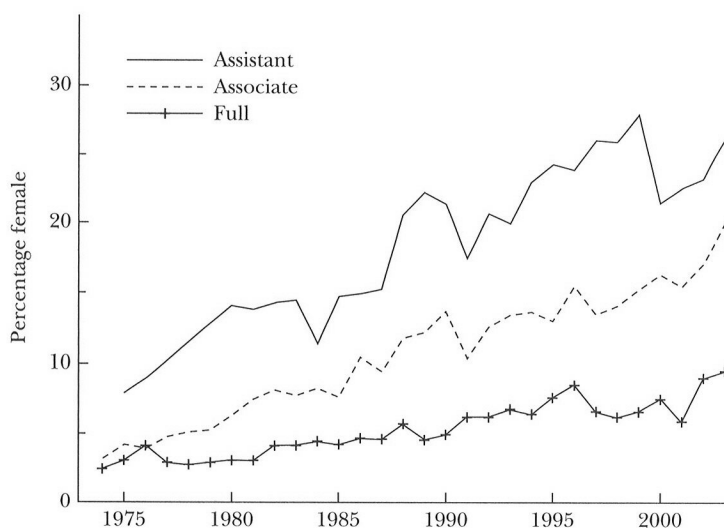
available. The two series are adjusted to be continuous.¹ In both panels, we use the data on the percentage female in various ranks because given the year-to-year variations in the surveys, the percentages are likely to be more consistent than absolute numbers.

The series for assistant professors is very irregular. The percentage female grows during the late 1970s and the late 1980s. The 1990s data shows a steady rise for most of the decade, but then a sharp decline in 2000 and a bounce back through 2003. The data series among associate professors show overall growth, particularly from 1985 through 1990. Yet in the early 1990s, when we might have expected even more growth due to increasing associates in the previous decades, the growth virtually stopped. There has been some growth in the percentage of female associate professors since the mid-1990s and an acceleration in growth since 2000. Finally, the percentage of full professors who are female has risen very slowly from decade to decade, often stagnating for years at a time. The 1990s showed very little if any growth in full professors, although there may have been some growth in the last two years.

Figure 3 shows the percentage of tenured faculty who are female in economics

¹ We multiplied all of the earlier UAQ percentages female by the ratio of CSWEP/UAQ percentage female in the overlapping years.

Figure 2

Percentage of Female Economists in Academic Rank

Source: 1973–2003 AEA/CSWEP Surveys.

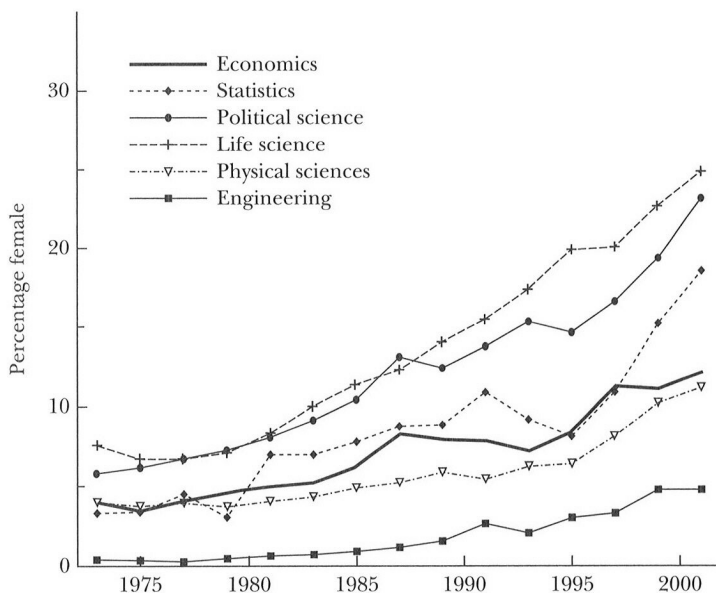
compared to other science and social science disciplines, using data from the Survey of Doctoral Recipients, a biennial longitudinal survey of doctorate recipients from all U.S. institutions of higher education conducted by the NSF.² Economics has a lower percentage of tenured female faculty than the life sciences, political science or statistics and a higher percentage than engineering, with comparable levels for physical science. Between 1987 and 2001, the percentage of tenured faculty who were female grew more slowly in economics than in the sciences, engineering, political science and statistics. More recent data from CSWEP indicate that in 2003, the percentage female among tenured professors of economics remained about 12 percent at Ph.D.-granting departments. These data suggest that the growth in the representation of women in tenured academia in economics has slowed relative to other fields.

We carried out a rough calculation of what the percentage of tenured female faculty *would* have been by 2003 as predicted based on Ph.D.'s granted, assuming

² The SDR data can also be used to discuss differences in assistant, associate and full professors as in Figure 2. Many of the patterns in the SDR data are similar to the CSWEP data, which has considerably broader coverage, but some differences exist. For assistant professors, the SDR data show a flatter pattern in the 1990s, rather than a rise and fall. For associate professors, the timing of the increase percentage female in the 1990s starts a few years earlier in the SDR data. For full professors, the SDR percentages are very volatile in the 1990s. But the sample of SDR females is small, and the women who are full professors are less than 10 percent of this small sample, so this time series is likely to be very noisy. Given data problems with each series, the differences between the sources might be random. However, they might also represent real differences between Ph.D.-granting economics departments and other four-year academic institutions and departments hiring economists.

Figure 3

Percentage of Tenured Faculty who are Female, by Discipline



Source: 1973–2001 Survey of Doctorate Recipients.

that women and men progressed through academic careers at the same pace and with the same mobility and retirement patterns mirroring the “typical” careers of academics who get tenure. This calculation predicts well the actual rise in tenured female Ph.D. economists from the early 1970s up to about 1988. But after that point, the calculation predicts that the percentage of economics faculties that are tenured women should have increased to about 19 percent in 2003, while the actual percentage was only about 12 percent. In the next section, we examine the tenure process in detail to understand why the steady growth in economics Ph.D.’s granted to women has not translated into a corresponding increase in tenured women faculty.

Gender Differences in Career Attainments in Economics and Other Disciplines

Longitudinal data that track individuals across time is best for studying developments of individual careers and the granting of tenure. We have constructed two longitudinal data sets of economics professors, both of which include variables about professors and their employers, which can help in calculating whether observable factors might explain gender differences in attaining tenure.

Our first longitudinal data set is based on the 1973–2001 waves of the Survey

of Doctoral Recipients. We draw upon the SDR to create a data set of individuals who received their Ph.D. in economics between 1972 and 1991, are observed at some point to be working in a tenure-track academic job and are observed in the survey at least ten years after Ph.D. receipt. The longitudinal sample includes 320 economists, of whom 93 are female. In the SDR, time until tenure is measured as the duration from Ph.D. until promotion to tenure, conditional on having a tenure-track academic appointment after receiving the doctorate. Time-varying covariates such as employer characteristics, marital status and primary work activities are measured as the proportion of surveyed years an individual meets each condition; for example, the variable, the proportion of time employed at a private institution, is defined as the number of times we observe an individual working at a private college or university divided by the total years this person is observed in the survey within 10 years of receiving their doctorate.³ Measures of academic productivity are largely missing from the SDR data, but the SDR does ask questions about publications in the 1983, 1995 and 2001 surveys. The 1983 question refers to publications between 1980 and 1983, whereas the 1995 and 2001 questions refer to numbers of publications in the previous five years. We use these data to create rough measures of productivity in the 10 years following the doctorate. If productivity data are missing for a particular year (as they are prior to 1980), average observed productivity is used to impute total productivity—an admittedly rough correction that nevertheless seems preferable to omitting the information altogether.

Our second longitudinal data sample Ph.D. economists who were assistant professors in Ph.D.-granting economics departments in the United States and Canada in 1988 and/or 1989 and had received Ph.D.'s during the 1980s. The names were randomly chosen from the 1989 AEA Directory and gender-stratified to ensure a roughly equal number of women and men. Specifically, by examining the 1989 AEA Directory we identified 95 female and 93 male assistant professors in Ph.D.-granting economics departments. Because of the scarcity of women in this category, this task required searching more than 90 percent of the AEA Directory pages. Career information on these 188 Ph.D. economists was obtained from the Internet and from subsequent AEA directories, including information on Ph.D. education, employers, rank and tenure status at a North American university or

³ The SDR has undergone substantial changes between the 1977 and 1993 waves (Mitchell et al., 1998). Technical reports provided by the National Science Foundation have allowed us to construct a longitudinal data set with consistent variable definitions and sampling frames over time. For example, individuals are excluded from the sample if they are not observed more than once or if they skip more than three surveys and do not report the year they received tenure. Individuals with missing or inconsistent data were dropped from both samples. The SDR sample does include individuals who no longer reside in the United States. Using the 1973 through 1991 surveys, we observe the exact tenure year. After 1991, we impute tenure year when people in the subsequent surveys report being tenured. Even though we have to impute tenure year for the later surveys, this is a better measure of promotion than changes in rank because we can only observe rank changes every other year. An appendix describing the data construction and variable definitions is available from the authors upon request.

college each year. Each person was matched with annual publication data from *EconLit*. Publications were categorized into four categories: top-10 journals (based on Laband and Piette, 1994, Table 2), other journals, book chapters and books (edited or authored). Working papers and other unpublished manuscripts were not included. Citations were calculated (excluding citations to oneself) and were collected from the *Social Science Citation Index*. The quality tier of the Ph.D.-granting department (a proxy for ability) and employing department are based the AEA's Committee on Graduate Education from this period (Hanson, 1991). The top tier contains the top six economics departments, the second tier, departments 7–16. Finally, to fill in missing information and to get a better sense of the reasons behind the specific career development of these economists, e-mail surveys were sent to those economists who were no longer at the same institution that they were in 1989 and had left that institution untenured.

It is useful to sum up the major differences between these two longitudinal samples. The SDR sample has a wider range of cohorts since it includes people who received doctorates between 1972 and 1991, while the sample of assistant professors in 1989 includes only people who received Ph.D.'s during the 1980s. The SDR sample includes all economics Ph.D.'s who held tenure-track jobs in any academic institution at any point 1973–2001, while the assistant professor sample includes only economics Ph.D.'s who held an assistant professorship in a Ph.D.-granting economics department during the late 1980s. In addition, the two data sets have different explanatory variables; for example, the SDR has more information on family status and demographic characteristics, while the sample of assistant professors has more detailed data on publications, citations and department rankings. The sample sizes of economists in each of these longitudinal sources are small, and so the results presented below must be interpreted with caution.

Descriptive Statistics by Gender

Table 1 gives descriptive statistics from the two data sets for male and female economists. Numbers in bold indicate statistically significant gender differences. In the SDR data, women are significantly less likely to get tenured and those who do take about a year longer to achieve tenure. Ten years after the Ph.D., 68 percent of the male economists but only 47 percent of female ones have tenure. Although men publish more than women in the SDR sample, the differences are not statistically significant. Key differences between men and women are that women are significantly less likely to be married and have children. In the assistant professor sample, tenured women also take a year longer to achieve tenure. The difference in the percentage tenured 10 years after the Ph.D. is smaller and less significant than in the SDR, presumably because of differences in sample construction and size, but the same general conclusion holds: fewer women received tenure than men. Notably, men publish more than women, particularly in non-top-10 journals. These patterns suggest two possible explanations for why the proportion of tenured women in economics is so low: family responsibilities and publication patterns. The next sections will examine these possible explanations in more depth.

Table 1
Average Characteristics by Gender

1973–2001 Survey of doctorate recipients			1988/1989 Assistant professors in Ph.D.-granting departments (1980–2001)		
Control variables	Males	Females	Control variables	Males	Females
Age 10 years post-Ph.D.	41.264	42.387	Ph.D. from top-6 economics department	0.247	0.316
African American = 1	0.075	0.075	Ph.D. from 7–15 economics department	0.301	0.347
Other race = 1	0.141	0.172	Year of Ph.D.	85.57	85.126
Foreign born = 1	0.260	0.280	Macroeconomics	0.333	0.379
Variables measured 10 years post-Ph.D.			Labor economics	0.161	0.200
Proportion married	0.708	0.505	Econometrics	0.183	0.147
Children = 1	0.648	0.559	Theory	0.172	0.105
Young children	0.288	0.185	Agricultural economics	0.140	0.126
Proportion research	0.292	0.335	First job in private institution	0.434	0.400
			First job in top-6 economics department	0.054	0.105
Proportion teaching	0.602	0.550	First job in 7–15 economics department	0.086	0.105
Proportion management	0.066	0.047	Variables measured 10 years post-Ph.D.		
Government support	0.178	0.226	Number of employers	1.817	1.916
Proportion private institution	0.385	0.363	Top-10 journal articles	1.323	0.989
Number of employers	1.846	1.828	Other journal articles	8.710	4.895
Year of Ph.D.	81.899	81.323	Nonjournal publications	1.968	1.484
Papers	6.238	6.770	Citations	40.892	38.000
Publications	5.799	5.136	Present job in top-6 economics department	0.032	0.053
			Present job in 7–15 economics department	0.064	0.084
Tenure and related variables			Tenure and related variables		
Average years to promotion	7.473	8.484	Average years to tenure	7.033	8.322
Tenured 10 th year post-Ph.D.	0.683	0.473	Tenured 10 th year post-Ph.D.	0.570	0.463
Tenured as of 2001	0.819	0.688	Tenured as of 2001	0.645	0.568
Years experience since Ph.D. as of 2001	19.101	19.677	Years experience since Ph.D. as of 2001	15.376	15.8
In U.S. academia 10th year post-Ph.D.	0.894	0.860	In U.S./Canadian academia 10 th year post-Ph.D.	0.677	0.737
Sample size	227	93	Sample size	93	95

Notes: Numbers in bold indicate averages significantly different at five percent level of significance. See text on variable construction.

Sources: 1973–2001 Longitudinal Sample from the SDR; Sample of Assistant Professors in 1988/1989.

Gender Differences in Publications in the Assistant Professor Sample

Can differences in publications explain different tenure rates for women economists? The assistant professor survey is better suited for comparing publications because it has data for publications in every year. As the averages in Table 1 illustrated, women have fewer publications than men at com-

parable years from Ph.D. receipt, although only the “other journal” publications are significantly different. Table 2 presents regression results where the dependent variable is whether the person has received tenure after ten years.⁴ The first three columns use the entire sample, the other columns only those in academia in the United States and Canada, where academic tenure systems are similar. The first column again shows the overall size of the gender differences. Column B shows that the gender difference does not change with controls for cohort and for differences observable in the beginning of an academic career—the tier of Ph.D. institution, the tier of the first job and field, with agricultural economics being the only field that affects tenure rates. However, adding controls for publications (column C) erases this gender difference.

The other columns limit analysis to those remaining in academia in the United States or Canada 10 years from Ph.D. In this case, gender differences in tenure rates are twice as large as with the full sample. Publications account for between 23 to 30 percent of this gender difference, depending on the specification. Even with all controls, unexplained gender differences in tenure rates are more than 13 percent.

When looking at the impact of publications, the academic sample is more relevant since it is reasonable to believe that publications decline drastically for those who leave academia. Consequently, for people leaving academia, publications are more a result of not receiving tenure than a cause. An alternative methodology is hazard analysis in which leavers are not dropped, but instead censored at the point they leave academia. Using this alternative, we have graphed the likelihood of remaining without tenure as years pass, controlling for all variables including publications in Figure 4.⁵ At 10 years past Ph.D., 37 percent of women and only 12 percent of men remain without tenure.

Citations may measure a person’s reputation, and tenure decisions often rest on an assessment of reputation by senior colleagues in the field. Column G in Table 2 shows that cumulative citations are not correlated with tenure receipt, once publications and the other covariates are controlled for. Also, although women’s slower progress is often attributed to reputational factors, analysis of the citation data shows that women have more citations per publication, whether measured in terms of top-10 publications, journal publications or total publications.

Employer variables in the assistant professor survey data set are the prestige of the department converted into variables describing current and first department, whether the institution is private or public, whether it is a Ph.D. department and

⁴ We also replicated results using probit analysis, and the qualitative results were similar to those reported here. For simplicity of exposition, we focus in this paper on the linear probability regressions.

⁵ We estimated a proportional hazards model where duration until tenure was a function of year of Ph.D., Ph.D. from a top-6 department, Ph.D. from a top-7–15 department, an indicator for agricultural economist, currently employed at a top-6 department, publications in top journals and other publications. As would be expected, the significance of the gender tenure differential was between the two analyses reported in the text, as was the impact of publications on this differential. The comparable graph from the SDR data, shown in the first panel of Figure 5, is very similar.

Table 2
Linear Probability Estimates of Promotion to Tenure 10 Years Post-Ph.D.,
Survey of 1989 Assistant Professors

Variables	Full sample				In North American academia				H:	
	A	B	C	D	E	F	G	Female	H: Male	
								coef.	coef.	
Female	-0.107 (0.073)	-0.109 (0.071)	-0.051 (0.068)	-0.213 (0.075)	-0.187 (0.074)	<u>-0.130</u> (0.075)	<u>-0.135</u> (0.073)			
Year of Ph.D.		-0.019 (0.014)	-0.022 (0.013)		0.019 (0.014)	0.008 (0.014)	0.010 (0.015)	0.010 (0.020)	-0.001 (0.022)	
Ph.D. from top-6 economics department		-0.118 (0.090)	-0.202 (0.088)		-0.093 (0.095)	-0.155 (0.095)	<u>-0.169</u> (0.094)	<u>-0.295</u> 0.154	-0.052 (0.118)	
Ph.D. from 7-15 economics department		-0.175 (0.085)	-0.250 (0.083)		<u>-0.148</u> (0.089)	-0.191 (0.088)	-0.197 (0.087)	-0.173 (0.126)	<u>-0.231</u> (0.122)	
Agricultural economist		0.271 (0.133)	0.310 (0.102)		0.289 (0.105)	0.304 (0.103)	0.302 (0.101)	0.394 (0.156)	0.152 (0.133)	
First job in top-6 economics department		0.271 (0.133)	0.287 (0.127)		0.104 (0.124)	0.157 (0.123)	<u>0.229</u> (0.136)	0.495^b (0.184)	-0.235 ^b (0.204)	
Cumulative top-ten journal articles ^a			0.052 (0.017)			0.036 (0.016)	0.037 (0.018)	0.045 (0.035)	0.024 (0.020)	
Cumulative other journal articles ^a (log)			0.037 (0.011)			0.034 (0.016)	0.026 (0.016)	0.027 (0.018)	0.086 (0.063)	
Cumulative citations (log)							0.035 (0.028)	0.057 (0.043)	0.011 (0.036)	
Presently working in a top-6 department ^a							-0.359 (0.171)	-0.481 (0.236)	-0.139 (0.259)	
Intercept	0.570 (0.052)	0.698 (0.106)	0.640 (0.099)	0.841 (0.055)	0.754 (0.106)	0.711 (0.100)	0.637 (0.107)	0.415 (0.138)	0.674 (0.174)	
R-squared	0.011	0.106	0.210	0.057	0.156	0.223	0.263	0.337	0.214	
Adjusted R-squared	0.006	0.076	0.174	0.050	0.116	0.172	0.203	0.238	0.080	
Sample size	188	188	188	133	133	133	133	70	63	

Notes: Standard errors in parentheses. **Bold** indicates significant at 1 percent level. *Italics* indicates significant at 5 percent level. Underline indicates significance at 10 percent level.

^a Variables measured 10 years post-Ph.D.

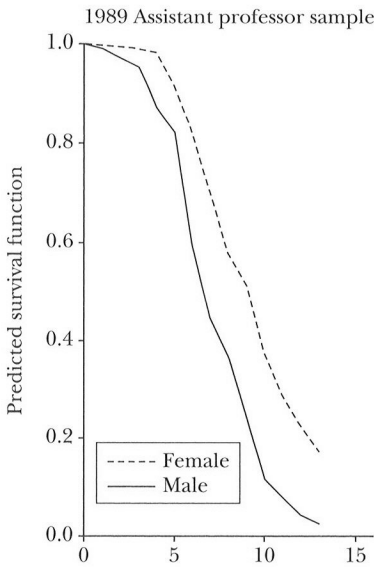
^b Gender difference significantly different at the 5 percent level.

Other variables excluded because they were insignificant in all specifications are the fields of labor, econometrics, micro theory and macroeconomics/international finance, whether an institution is private or public, other gradations of tier of Ph.D. and present department. The functional forms used for publications and citations were those that fit the regression best. For scaling, Ph.D. year subtracted 1980.

whether the current employer is an economics department rather than a business school or an agricultural economics department, for example. Only department prestige variables are significant determinants of tenure outcomes. It is more difficult for people to get tenure in a top six department, but people starting in these departments nevertheless are more likely to get tenure *somewhere* by the 10th year (column G). When coefficients for men and women are not constrained to be the same, starting in these prestigious departments increases ten-year tenure probabilities more for women than for men (column H).

Top Ph.D. programs try to admit students with the most potential, yet in the 1989 assistant professor sample, graduates of the top 15 Ph.D. programs did not have better tenure prospects and actually had worse ones, with or without control

Figure 4
Predicted Likelihood of Remaining Without Tenure, by Gender, Ph.D. Economists



Source: 1989 APS; Based on hazard model estimates.

variables. Two possibilities suggest themselves for this anomalous result, with very different implications. On the one hand, it could have been due to affirmative action in education or in the hiring process at the more highly ranked institutions. Alternatively, it could indicate more discriminatory promotion practices at more prestigious schools.

Fields make little difference to tenure rates and also make little difference to publication rates. The exception is agricultural economists, who are more likely to receive tenure and more likely to have non-top-10 journal articles. They, as well as macroeconomists, have lower citations controlling for the different kinds of publications. These relationships do not differ by gender, nor do women and men have significant differences in field or quality of Ph.D. department.

When we model men's and women's tenure rates in separate equations (column H), another striking finding appears. The covariates explain far more of the variation in tenure rates for women than for men in the assistant professor data set. Indeed, we cannot say with statistical confidence that the regression as a whole is useful for predicting men's tenure rates, although it is highly significant for women.⁶ It seems that once men have assistant professor status in economics, they get tenure irrespective of their publications, citations or background, while women who are assistant professors of economics only receive tenure based more on observable traits.

⁶ For the male equation, Prob > F = .14. For the female, Prob > F = .002.

Examination of the assistant professor survey indicates that the particular juncture where the women fall off the tenure ladder occurs at a woman's first academic job. The gender difference in being tenured at one's *original* academic institution is very large. By 10 years out, 60 percent of men are tenured at their original department while only 33 percent of women are, a highly significant difference. Women manage to close some of this large gap in tenure rates at the original institution by finding tenured jobs elsewhere. Consistent with this, women in the assistant professor survey moved jobs somewhat more than men. By 10 years after Ph.D., 72 percent had moved from their first employers, compared with 65 percent of men. Limiting the sample to those remaining in U.S./Canadian academia, gender differences in mobility were larger and significant, with 61 percent of women no longer at their first job compared with 47 percent of men. Of course, mobility could either result from nonreceipt of tenure or cause it. The evidence suggests that this mobility was *not* the cause of differential tenure rates at original institutions, since looking at those remaining at their first job, 32 of the 33 men had tenure, but only 19 of the 27 women did.

Another way to evaluate academic careers is to look at the likelihood that economists who began their careers in academia remained in academia but untenured. Women are significantly more likely to be *untenured* in academia in the assistant professor survey. The gender differences are very large and significant, although they do taper off over time: 19 percent after eight years, 16 percent after ten years and 12 percent after twelve years. Once we add controls for initial characteristics, subsequent productivity and reputation and department, the eight- and ten-year differences remain significant and large—14 percent and 12 percent respectively, but the twelve-year difference drops to 7 percent.

The Impact of Personal Characteristics in the SDR Survey

The SDR data include detailed background marriage, family and employer characteristics, and thus they are well-suited for examining these issues. Although male economists are more likely to be married and have children, the effects of marriage and children differ by gender.

In the entire SDR sample, Table 3 indicates in column A that men economists have a 20 percent greater probability of having tenure ten years after Ph.D. receipt than women, a result that is statistically significant at the 1 percent level. Including demographic variables reduces the negative impact of gender by two percentage points (column B). When controls are added for publications, the gender promotion gap is reduced to 17 percent (column C). Additional controls for primary work activity and employer characteristics reduce the promotion gap to 15 percent ten years after doctorate (column D).

We perform a separate analysis for those in U.S. academia—a sample that omits individuals who have left academic careers—in columns E and F. In the SDR, slightly more women have left academia than men. Thus, calculating tenure probabilities dropping those no longer in academia overestimates tenure rates in general and underestimates gender differences in promotion in the SDR sample.

Table 3
Linear Probability Estimates of Promotion to Tenure 10 Years Post-Ph.D., 1973–2001 Survey of Doctorate Recipients

Variables	Full SDR sample				In U.S. academia			
	A	B	C	D	E	F	G Female	H Male
Female	-0.199 (0.058)	-0.181 (0.058)	-0.174 (0.060)	-0.146 (0.058)	-0.201 (0.059)	-0.159 (0.060)		
Age 10 years post-Ph.D.		0.013 (0.005)	0.016 (0.006)	0.009 (0.006)		0.003 (0.006)	0.001 (0.010)	0.010 (0.008)
African American = 1		-0.202 (0.098)	-0.139 (0.102)	-0.079 (0.099)		<u>-0.062</u> (0.104)	0.017 (0.216)	-0.126 (0.118)
Other race = 1		0.024 (0.087)	0.058 (0.089)	-0.010 (0.087)		0.007 (0.088)	-0.018 (0.165)	-0.016 (0.104)
Foreign born = 1		-0.043 (0.071)	-0.048 (0.073)	-0.005 (0.071)		-0.017 (0.071)	0.008 (0.141)	-0.022 (0.085)
Proportion married ^a		0.133 (0.086)	0.117 (0.087)	0.090 (0.084)		0.088 (0.085)	-0.029 (0.148)	0.156 (0.108)
Children = 1 ^a		-0.056 (0.074)	-0.049 (0.074)	-0.035 (0.072)		-0.030 (0.074)	<u>-0.226^b</u> (0.136)	0.030 ^b (0.088)
Young children ^a		<u>0.216</u> (0.111)	0.226 (0.111)	0.214 (0.107)		<u>0.194</u> (0.106)	0.159 (0.250)	<u>0.210</u> (0.122)
Year of Ph.D.		0.007 (0.005)	0.004 (0.006)	0.002 (0.006)		0.004 (0.006)	0.010 (0.011)	-0.005 (0.007)
Papers ^a			-0.002 (0.005)	0.000 (0.005)		-0.001 (0.005)	-0.003 (0.010)	0.002 (0.007)
Publications ^a			0.011 (0.006)	0.018 (0.006)		0.016 (0.006)	0.029 (0.012)	0.016 (0.007)
Proportion private institution ^a				0.095 (0.061)		0.072 (0.062)	0.072 (0.144)	<u>0.270</u> (0.071)
Proportion teaching ^a				0.297 (0.083)		0.264 (0.083)	0.186 (0.181)	0.276 (0.099)
Proportion management ^a				0.132 (0.179)		0.214 (0.181)	0.441 (0.416)	0.005 (0.202)
Number of employers ^a				-0.070 (0.030)		-0.067 (0.030)	<u>-0.115</u> (0.065)	<u>-0.060</u> (0.035)
Government support ^a				-0.074 (0.097)		-0.065 (0.099)	-0.144 (0.202)	-0.131 (0.121)
Intercept	0.664 (0.031)	-0.497 (0.418)	-0.462 (0.474)	-0.098 (0.469)	0.742 (0.031)	0.035 (0.490)	-0.423 (0.995)	0.329 (0.556)
R-squared	0.034	0.106	0.118	0.207	0.038	0.183	0.276	0.190
Sample size	337	330	320	320	298	283	93	227

Notes: Standard errors in parentheses. ^a Variables measured 10 years post-Ph.D. ^b Gender difference significantly different at the 10 percent level. **Bold** indicates significant at 1 percent level. *Italics* indicates significant at 5 percent level. Underline indicates significance at 10 percent level.

As it turns out, the results in the SDR do not differ qualitatively by whether one includes the entire sample or only those who have remained in academia. In both sets of estimates, women are about 15 percent less likely to be promoted to tenure after controlling for all variables. Part of the reason for this similarity is that the SDR sample has already censored people once they leave the United States—which includes a substantial share of those who leave academia. (In contrast, in the assistant professor survey with its more detailed and accurate publication data, the

impact of publications differs when using the entire sample or the sample just in academia.)

Overall, the regressions in columns D and F suggest that along with women, African-Americans and the foreign-born are less likely to be promoted, although the effects are smaller than being female. Young children have a positive and significant effect on tenure as do publications and working primarily as a teacher. Having a large number of employers reduces the likelihood of promotion.

These regressions mask some important gender differences in the impact of these variables on tenure. The last two columns of Table 3 present estimates that allow coefficients on all explanatory variables to differ by sex. (Results in these columns include everyone in the sample, not just academics.) Family variables have a differential impact on men and women. Male economists are more likely to be married and have children. As shown in columns G and H, young children increase men's promotion chances, while both marriage and having children also have positive although insignificant effects. However women's tenure prospects are harmed by marriage and children. The differences in these coefficients increases the probability that men are promoted by nearly 40 percentage points while reducing the probability that a woman is promoted by 10 percentage points. Besides marriage and family, having more employers significantly reduces the probability of promotion for both men and women; however, the negative impact for women is nearly twice as large. Although it is statistically insignificant, the positive coefficient on age is 10 times the size for men than for women. Despite having fewer publications, the positive effect of publications on promotion is almost twice as large for women than for men. This may reflect the fact that women's publications are more likely to be cited.

The difference between estimated male and female salaries can be decomposed using a method developed by Oaxaca (1973) that separates the gender salary gap into two components, the "explained" portion of the gap attributable to differences in observable endowments (such as academic rank and differences in productivity) and the "unexplained" portion of the gap attributable to gender differences in the estimated regression coefficients. The sum of the explained and unexplained portions is the total gender salary gap. The unexplained gap resulting from gender differences in coefficients should equal zero provided that men and women are paid the same for a given level of observable characteristics. These results appear in the first row of Table 4.⁷ The overall gender promotion gap in economics is 21 percent 10 years post-Ph.D., as shown in the first column and is derived from the estimates in columns G and H of Table 3. Only 4–5 of these percentage points are due to differences in observable characteristics. Of the

⁷ We also carried out an Oaxaca decomposition for the assistant professor survey. The size of the gap and the proportion explained by endowments differ considerably depending on which way the decomposition is done (male coefficients or female coefficients). Based on female coefficients, only 6.8 percent of the 21.2 percent gender difference can be explained by different endowments; based on male coefficients, 18 percent of it can.

Table 4
Gender Promotion Gap by Discipline, 10 Years After Ph.D., 1973–2001 Survey of Doctorate Recipients

<i>Discipline</i>	<i>Promotion gap</i>	<i>Male coefficients</i>		<i>Female coefficients</i>	
		<i>Percentage explained by endowments</i>	<i>Percentage unexplained</i>	<i>Percentage explained by endowments</i>	<i>Percentage unexplained</i>
Economics	21.0%	5.3%	15.7%	4.0%	16.9%
Political science	−4.4%	−1.4%	−3.1%	6.6%	−11.0%
Statistics	0.3%	4.4%	−4.1%	15.6%	−15.3%
Physical science	2.8%	1.0%	1.9%	2.2%	0.6%
Life science	−2.2%	0.5%	−2.7%	−1.9%	−0.2%
Engineering	−3.9%	3.8%	−7.6%	2.5%	−6.3%
Social science	8.1%	2.3%	5.8%	1.9%	6.2%

Notes: Includes control variables discussed earlier.

Table 5
Productivity Comparisons, 10 Years After Ph.D., Male and Female Economists, 1973–2001 Survey of Doctorate Recipients

<i>Productivity comparisons</i>	<i>Men</i>	<i>Women with children</i>	<i>Women without children</i>
Papers 10 years post-Ph.D.	6.238	7.210	6.049
Publications 10 years post-Ph.D.	5.799	6.188	3.392

Notes: Numbers in bold indicate averages significantly different at 5 percent level of significance.

Source: 1973–2001 Longitudinal Sample from the SDR.

remaining 16–17 percent “unexplained” gap resulting from coefficient differences, the coefficient differences on age and young children contributed the most to the unexplained promotion gap compared with all other variables in the specification.

It is sometimes argued that the two explanations of publications and family are interrelated; that is, women with children in academia are less productive because of their child-rearing responsibilities. We investigate this possibility in the SDR by comparing the productivity of (all) men and women with and without children and find that this pattern does not hold for economists in Table 5. The average numbers of papers and of publications *are not* significantly different for women with children versus all men. However, men write significantly more papers than women *without* children. This outcome may be the result of self-selection. Women who are less productive in their careers may decide not to have children because of the anticipated impact on their productivity.

Some Comparisons of Results from the Two Data Sets

The results from the assistant professor survey and the SDR in the previous two sections illustrate some difficulties of work in this area. The two data sets have different strengths and weaknesses. The assistant professor survey includes later cohorts on average and also includes more committed and successful academic economists (since they were once in a Ph.D.-granting economics department). The sample sizes are small enough that differences may also occur at random. As we worked with the data using various methodologies, including linear regressions, probit and hazard analysis, variables would sometimes be significant using one method, but not significant using another.

Yet the bottom line is clear. In the assistant professor survey, among those remaining in academia, women are less likely to get tenure and take longer to do so even after controlling for publications, prestige of Ph.D. department, citations and employer. In the SDR data, women are less likely to get tenure and take longer to do so even after controlling for publications, demographic characteristics and employer characteristics in the SDR. Taken together, these results indicate that productivity and background differences alone do not explain the gender gap in promotion. Instead, women and men in economics are systematically treated differently to the disadvantage of women.

Gender Differences in Tenure: Economics Compared to Other Disciplines

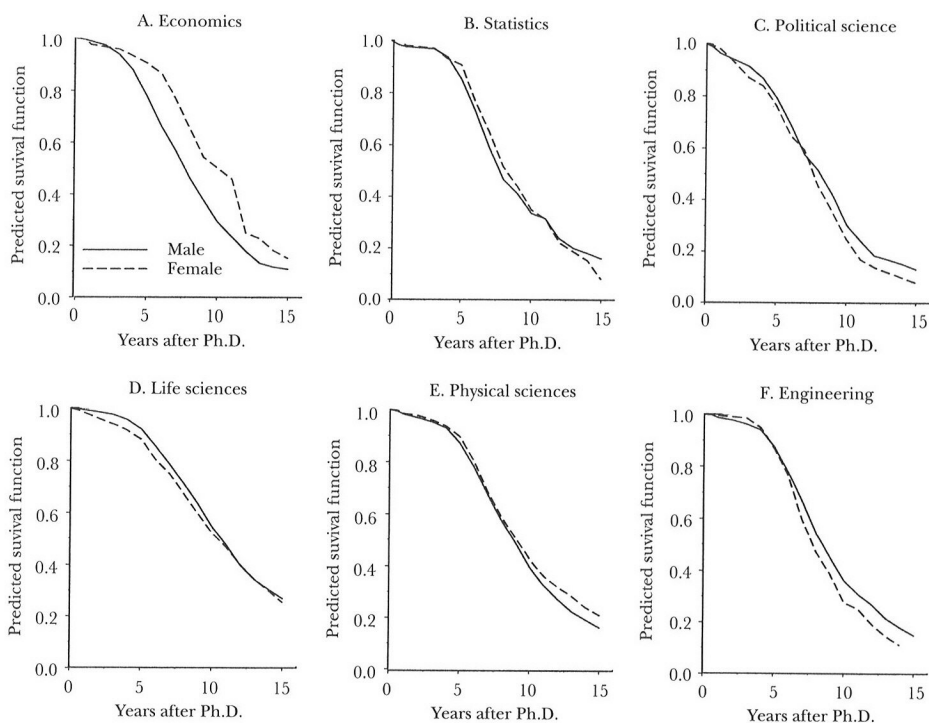
Women economists are 21 percentage points less likely to have a tenured academic job 10 years after Ph.D. receipt. To put this gender difference in perspective, we have decomposed the gender promotion gap in other disciplines in the SDR into the portion due to observable characteristics versus that due to unexplained coefficient differences just as we did for economics, with the results shown in Table 4. The differences between economics and the other disciplines are striking. Economics has by far the largest gender promotion gap of any discipline analyzed. For instance, for engineering there is a -3.9 percent gap that *favours* women, and in the other social sciences fields there is only an 8.1 percent gap.

We also compared economics to other disciplines by using a hazard model that estimates the predicted probability within each discipline of remaining without tenure ten years after receipt of the doctorate *ceteris paribus*. We have graphed these probabilities in Figure 5. There is little difference between men and women in the disciplines of statistics and physical science. In fact, in political science, engineering and the life sciences, a larger proportion of women have received tenure (fewer remain untenured) after ten years than men. These differences are not statistically significant with the exception of engineering. However when we apply this method to economists in the SDR data, the results are very different, as evident in these graphs.⁸ At 10 years past Ph.D., half of women and only 30 percent of men remain without tenure in economics. Among all science and social science disciplines

⁸ Similar to the Assistant Professor Sample, the significance of the gender tenure differential was between the two analyses reported in the text.

Figure 5

Predicted Survival without Tenure Functions, by Gender and Discipline



Source: 1973–2001 Survey of Doctorate Recipients.

analyzed, gender differences in the probability of promotion and the duration to tenure are the largest in economics.

Qualitative Accounts of Gender Differences in Promotion

Surveys were sent to those people in the assistant professor sample with identifiable e-mail addresses who left their 1989 department without tenure. The letter introduced the study briefly, asked people to rank the reasons they left from ten choices plus an “other” category, asked a few questions regarding dates and tenure and then left an optional open-ended question encouraging explanations. More surveys were sent to women than men primarily because more women left their 1989 department without tenure, and their response rates were higher as well. The total number of surveys—45 from women and 23 from men—are too small for systematic analysis, but the patterns and tone of the responses do provide some perspective.

Even though all of the people surveyed left their 1989 institution without tenure, some ranked the primary reason (or reasons) for leaving as being unrelated

to tenure. This proportion was practically identical for men and women. Roughly one-third of both men and women who left academia did not mention being denied tenure or not expecting to receive tenure as their number one reason for leaving, and roughly another quarter did not mention tenure as one of their reasons at all. Of the respondents who left primarily for a non-tenure-related reason, the same proportion of men and women (13–14 percent) listed a family-related reason as the primary motive for change. However, a considerably greater percentage of women listed as their primary reason for leaving that they did not like their job. One-third of female respondents ranked dislike of their job either their primary reason or one of their reasons for leaving, while no men ranked dislike of their job as a primary reason for leaving, and only 13 percent listed it as a reason at all. Moreover, the gender difference here is probably underestimated because of the higher male nonresponse rate, if we believe that nonresponders had fewer complaints about their department than responders.

Gender issues often seem to play a role in this bad feeling about jobs left behind. Of the 80 percent of women who were assistant professors in 1989 and who left that job without tenure, one-third of the women explicitly mentioned gender as having an unfair impact on their likelihood of achieving tenure in some way. Quotes from the survey responses give a sense of these comments:

“There were issues of sexual and general harassment.”

“The department had a history of being inhospitable to women The chair (made) fervent cases against (university-paid) maternity leaves.”

“I filed a lawsuit based on . . . sex discrimination and the university settled out of court with me.”

“I have been wishing for years that CSWEP would truly deal with the problem that female assistant professors face . . . relating to child bearing.”

My present job outside of academia has “much less of the old boy network.”

“An internal tenure and ethics committee found that I had been denied tenure unfairly.”

“The promotion committee promoted three guys to untenured associate and decided to delay the decision on mine because (given my husband’s lucrative job), they did not believe that I would mind having my decision delayed.”

Several women mentioned maternity leave and childbearing as affecting their tenure, whether or not they believed the process was unfair. Other researchers have found evidence that colleges and universities are inhospitable to family concerns. Thornton (2003) evaluated the parental leave policies of a random sample of 81 colleges and universities. She found that 35 percent of the institutions surveyed do not comply with federal parental leave mandates. Rosser and Lane (2002) surveyed women who received NSF grants for Professional Opportunities for Women in Research and Education between 1997 and 2000. Grant recipients in the Division of Social, Behavioral, and Economics Sciences, the majority of whom are economists, ranked balancing work and family responsibilities and the low numbers of women in their fields as the most significant challenges facing women in their careers.

Discussion

Women are less likely to get tenure at their first academic job compared to men. Our evidence allows us to evaluate some possible reasons, although as in all studies of gender differences, the ultimate conclusions involve how to interpret differences that are otherwise unexplained. The analysis here has controlled for the impact of supply-side factors such as publications and fertility choices on women's probability of promotion. However, these supply-side factors fail to explain the gender promotion gap fully. Here, we will summarize and review both arguments that our evidence addresses directly and also arguments that have been made elsewhere in the literature.

First, women economists do publish fewer papers than men—particularly in nontop journals—which explains about 30 percent of the promotion gap (based on the assistant professor data). Indeed, on average and across disciplines, women have traditionally published fewer articles than men (Schneider, 1998). Numerous potential explanations have been offered. For example, perhaps women academics publish less because they are more likely to be in non-tenure-track jobs or to spend more time on teaching, advising and administrative work. Whatever the merits of these arguments for women academics in general, they do not apply to our sample of economists, which is focused on tenure-track economists who do not spend a significantly different amount of time in teaching versus research (SDR) or in their likelihood to leave academia (SDR and the assistant professor sample). However, it is also possible that part of the publication difference traces to a lack of mentors for women or perhaps women have fewer resources, including research assistants and course reductions. Our data do not address these issues.

In science, Xie and Shauman (1998) find that the raw gender publications gap in scientific fields has narrowed over time and that after controlling for age, rank and field, gender differences in publications in the sciences disappeared. The same does not hold true in economics. McDowell, Singell and Stater (2004) used data from the AEA membership surveys between the years 1964 and 1997. After controlling for life-cycle, job placement and cohort effects, they find that women are significantly less likely to publish through the 1980s, but that the gender difference per year was much smaller and insignificant during the 1990s. However, in our assistant professor sample, when we also control for job placement and cohort, we do find significant gender differences in publications during the 1990s.

A second possible explanation involves responsibilities of family and children, young children in particular. This factor appears to have an impact separate from the quantity of papers and publications. One possibility is that women interrupt their careers to follow their husbands. However, this factor does not explain the large tenure differences at first academic jobs. Presence of children may also reduce productivity since women are more likely to be the primary care-givers. Evidence from the SDR suggests that women with children are equally productive as men. Nevertheless, despite the similarity in productivity, these women are less likely to receive tenure.

A third set of arguments suggests that if affirmative action for women is applied in the admissions process to Ph.D. programs and/or at the hiring stage, but *not* at the tenure stage, then this factor might help to explain why fewer women pass the tenure hurdle. Although the differences were not statistically significant at standard levels, the females in assistant professor jobs in Ph.D.-granting economics departments were more likely to come from top-15 Ph.D. programs and initially to be hired at top-15 institutions. In addition, women from the top-15 Ph.D. programs (like the women from other programs) did have significantly lower publication rates in nontop journals than their male counterparts. These facts are all consistent with—although not proving—affirmative action at the best departments.

The impact of affirmative action at earlier stages of academic careers is debatable, but there is no evidence of affirmative action at the stage of tenure. Substantial gender tenure differences remain, particularly in initial departments, even controlling for publications and reputation. In both data sets, if women economists were awarded tenure similarly to men based only on accomplishments and personal choice variables rather than prestige of Ph.D. or employing department, they would have a higher tenure rate than they do. Furthermore, one would expect to observe similar effects of affirmative action in other disciplines because affirmative action is typically a university-wide initiative. However, we do not observe the large gender differences in tenure in other science and social science disciplines that are apparent in economics.

Moreover, tenure outcomes refute the assertion of affirmative action at the best departments in education or first hiring. Affirmative action in education would suggest that women from top-15 departments would do more poorly than other women in terms of tenure progress and publications, and affirmative action in hiring new assistant professors would suggest the same for women starting in top-15 schools. However, the opposite is true: graduates from top departments have much smaller gender differences in tenure rates than graduates from lesser ranked departments, although women from high- or low-prestige departments have similarly low likelihoods of being tenured at their first department. Similarly, women starting in top-15 departments are more likely to receive tenure than women starting in other Ph.D.-granting economics departments, although less likely to receive it at their first departments.

A final reason for tenure differences may relate to women lacking the same professional networks as men, networks that at tenure time mean more adulatory outside reference letters. McDowell, Singell and Stater (2004) find that controlling for publications, women economists in top economics departments were *not* significantly less likely to coauthor during the 1990s, suggesting that they have developed access to social networks and mentors. This finding dovetails with our evidence that women have more citations per publication, also suggesting access to professional networks.

All studies of gender differences come down to the interpretation that one places on an unexplained coefficient on a gender variable or differences in coefficients when estimates are allowed to vary by gender. Such studies always leave

a reader grasping for possible alternative variables, whether potentially observable or not, which might fill the gap and offer an explanation not based in discrimination. Any satisfactory explanation for the gender gap in economics based on women's behavior or choices must account for why it does not apply equally in many other scientific disciplines. We cannot rule out the possibility of such an explanation in the future. But a fair reading of the evidence as it stands is that economists have experienced persistently large and unexplained gender differences in advancement to tenured ranks during the past decade, especially when compared with related academic disciplines. Given that the supply-side characteristics do not adequately explain the gender promotion gap in economics, we are left to wonder whether institutional and departmental behaviors contribute to the gender gap.

■ *We would like to thank Shelly Lundberg, Timothy Taylor and Madeline Zavodny for helpful comments on previous drafts of the paper and seminar participants at the 2002 ASSA meetings. We thank the National Science Foundation for granting a site license to use the SDR data, Robin Bartlett, Joan Haworth and Francine Blau for providing us with the CSWEP data, and Lee Fisher and Mark Dollard for their excellent research assistantship.*

References

- Bartlett, Robin L.** 1999. "Report of the Committee on the Status of Women in the Economics Profession." *American Economic Review*. May, 89:2, pp. 492–98.
- Blank, Rebecca M.** 1996. "Report of the Committee on the Status of Women in the Economics Profession." *American Economic Review*. May, 86:2, pp. 502–06.
- Booth, Alison L., Jeff Frank and David Blackaby.** 2002. "Outside Offers and the Gender Pay Gap: Empirical Evidence from the UK Academic Labour Market." Mimeo, University of Essex.
- Broder, Ivy.** 1993. "Professional Achievements and Gender Differences among Academic Economics." *Economic Inquiry*. 31:1, pp. 116–27.
- Hanson, W. Lee.** 1991. "The Education and Training of Economics Doctorates." *Journal of Economic Literature*. September, 29, pp. 1054–087.
- Kahn, Shulamit.** 1993. "Gender Differences in Academic Career Paths of Economists." *American Economic Review*. May, 83:2, pp. 52–56.
- Kahn, Shulamit.** 1995. "Women in the Economics Profession." *Journal of Economic Perspectives*. Fall, 9:4, pp. 193–205.
- Laband, David N. and Michael J. Piette.** 1994. "The Relative Impacts of Economic Journals." *Journal of Economic Literature*. June, 32:2, pp. 640–66.
- Long, J. Scott, ed.** 2001. *From Scarcity to Visibility*. Washington, D.C.: National Academy of Sciences.
- McDowell, John M., Larry D. Singell Jr. and Mark Stater.** 2004. "Two to Tango? Gender Differences in the Joint Decision to Publish and Coauthor." Mimeo, Arizona State University.
- McDowell, John M., Larry D. Singell Jr. and James P. Ziliak.** 1999. "Cracks in the Glass Ceiling: Gender and Promotion in the Economics Profession." *American Economic Review*. May, 89:2, pp. 397–402.
- McDowell, John M., Larry D. Singell Jr. and James P. Ziliak.** 2001. "Gender and Promotion in the Economics Profession." *Industrial and Labor Relations Review*. 54:2, pp. 224–44.
- Mitchell, Susan B., Ramal Moonesinghe and**

Brenda G. Cox. 1998. "Using the Survey of Doctorate Recipients in Time-Series Analyses: 1989–1995." Mimeo, National Science Foundation.

Neumark, David. 1988. "Employers' Discriminatory Behavior and the Estimation of Wage Discrimination." *Journal of Human Resources*. Fall, 23:3, pp. 279–95.

Oaxaca, Ronald. 1973. "Male Female Wage Differentials in Urban Labor Markets." *International Economic Review*. 14:3, pp. 693–709.

Oaxaca, Ronald and Michael R. Ransom. 1994. "On Discrimination and the Decomposition of Wage Differentials." *Journal of Econometrics*. March, 61:1, pp. 5–21.

Perrson, Inga. 2002. "Gender and Economics in Sweden." Mimeo, Lund University, Sweden.

Rosser, Sue V. and Eliesh O'Neal Lane. 2002. "Key Barriers for Academic Institutions Seeking to Retain Female Scientists and Engineers: Family-Unfriendly Policies, Low Numbers, Stereotypes, and Harassment."

Journal of Women and Minorities in Science and Engineering. 8:2, pp. 163–91.

Schneider, Alison. 1998. "Why Don't Women Publish as Much as Men?" *Chronicle of Higher Education*. 45:3, pp. A14–A16.

Thornton, Saranna. 2003. "Maternity and Childrearing Leave Policies for Faculty: The Legal and Practical Challenges of Complying with Title VII." *University of Southern California Review of Law and Women's Studies*. Spring, 12:2, pp. 161–90.

Waldfoegel, Jane. 1998. "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?" *Journal of Labor Economics*. 16:3, pp. 505–45.

Xie, Yu and Kimberlee A. Shauman. 1998. "Sex Differences in Research Productivity: New Evidence about an Old Puzzle." *American Sociological Review*. 63:6, pp. 847–70.