NBER WORKING PAPER SERIES

CAN MENTORING HELP FEMALE ASSISTANT PROFESSORS? INTERIM RESULTS FROM A RANDOMIZED TRIAL

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Working Paper 15707
http://www.nber.org/papers/w15707

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2010

We are grateful to the many women who have volunteered their time to participate in this experiment. We are indebted to Henry Farber, Claudia Goldin, Mark Lopez, Rhonda Sharpe, Sandy Darity, and participants in the session on "Evidence on AEA and NSF Mentoring Programs" at the American Economics Association Annual Meetings, Atlanta, January 2010, for helpful comments and suggestions; to the National Science Foundation (SBE-0317755) and the American Economic Association for their financial support; and to Daniel Newlon, Alice Hogan, and John Siegfried for supporting this program. David Munroe, Sarah Frazelle, Patricia Oslund, Joshua Goodman, Christine Pal, Johannes Schmeider, and Kerry Watson provided excellent research assistance. Gwyn Loftis, and Pat Fisher provided invaluable help with implementing the workshops. Any errors are our own responsibility. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 15707
January 2010
JEL No. A11,C93,I2,J16,J24,J44

ABSTRACT

While much has been written about the potential benefits of mentoring in academia, very little research documents its effectiveness. We present data from a randomized controlled trial of a mentoring program for female economists organized by the Committee for the Status of Women in the Economics Profession and sponsored by the National Science Foundation and the American Economics Association. To our knowledge, this is the first randomized trial of a mentoring program in academia. We evaluate the performance of three cohorts of participants and randomly-assigned controls from 2004, 2006, and 2008. This paper presents an interim assessment of the program's effects. Our results suggest that mentoring works. After five years the 2004 treatment group averaged .4 more NSF or NIH grants and 3 additional publications, and were 25 percentage points more likely to have a top-tier publication. There are significant but smaller effects at three years post-treatment for the 2004 and 2006 cohorts combined. While it is too early to assess the ultimate effects of mentoring on the academic careers of program participants, the results suggest that this type of mentoring may be one way to help women advance in the Economics profession and, by extension, in other male-dominated academic fields.

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Since its inception in 1971, the American Economic Association (AEA) Committee on the Status of Women in the Economics Profession (CSWEP) has tracked the number of women at various ranks in the profession. CSWEP's statistics indicate a "leaky pipeline" from PhD programs into tenured academic jobs. The significant under-representation of women in economics at the tenured level prompted CSWEP to establish the CSWEP Mentoring Program (CeMENT) with the support of the National Science Foundation's (NSF) ADVANCE program and the AEA. The program is aimed at assisting female junior faculty to prepare themselves for the tenure hurdle.

We are evaluating the success of the program using a randomized trial. Applicants were randomly assigned to be treatments (mentees who attended the workshop) or controls who did not participate. Our study will compare the academic performance (i.e., papers, grants) of these two groups. To our knowledge, this randomized trial of a mentoring program is unique in academia.[1]

There have now been three cohorts of program participants, in 2004, 2006, and 2008. A fourth cohort will begin in January 2010 and another is planned for January 2012. This paper thus presents an interim assessment. We find that CeMENT significantly increased publication rates and successful grant applications. While it is too early to tell what the eventual effect on tenure will be, the results suggest that this program may be a useful way to help women advance in the economics profession.

I. Background

[1]An earlier, one-shot, CSWEP mentoring effort was offered and evaluated in 1998, but did not use random assignment. See Robin Bartlett and Andrea Ziegert (2000).

Using data from the 1973-2001 Survey of Doctoral Recipients, Donna K. Ginther and Shulamit Kahn (2004) find gender differences in promotion to tenure in economics of 21 percentage points. A separate analysis of a sample of AEA members that controls for publications and citations finds a 14 percentage point gender gap in the probability of promotion to tenure. Moreover, they show that women are significantly less likely to be promoted in economics than in political science, statistics, life science, physical science and engineering. John M. McDowell, Larry D. Singell and Mark Slater (2006) suggest that one possible cause of women's failure to advance in economics may be a lack of *research networks*. As one indicator of limited networks, they find that while co-authorship is common in economics, female economists are less likely to coauthor than their male colleagues, even after controlling for publication rates. Francine Blau, Marianne Ferber and Anne Winkler (2010) suggest a second possible cause, a lack of role models and informal relationships between young academics and those who are more senior.

II. The CeMENT Intervention

The national CeMENT workshops were designed to expose participants to role models (senior female economists), to transmit information about what it takes to get tenure, and to build peer networks of female junior faculty working in similar research areas. Each workshop lasted two days, and was held in conjunction with the American Economic Association annual meetings. The workshops brought together junior and senior faculty mentors from various institutions, arranged into small groups (4-5 participants and 1-2 mentors) based on research interests. The workshops were widely advertised and aimed at faculty in research departments.[2]

[2]CSWEP also ran "regional" workshops associated with the meetings of regional economics associations. These workshops, organized by KimMarie McGoldrick were aimed at faculty in

Each participant circulated a research paper or other related work (like a grant proposal) before the workshop. During the workshop, the small groups met to discuss and provide feedback on each participant's work (approximately one hour for each participant). In addition to the small group meetings, plenary sessions were held consisting of panels of the senior mentors. Topics included research and publishing, getting grants, professional exposure, teaching, the tenure process and work-life balance. At the end of each workshop an exit survey was distributed. On a scale of 1-7, where 1 is "not at all helpful" and 7 is "extremely helpful," the average rating of the workshop over all three years was 6.63. Anecdotal evidence based on discussions with former participants suggests that many women stayed in touch with other women whom they met through the program, and that these women became an important support network.

More than 80 people applied for each workshop. After eliminating incomplete or inappropriate applications, applicants were divided into groups by research area. Applicants were then randomly assigned to treatment or control status *within* each group. We selected more treatments than controls in an effort to maximize access to the program. For example, in a group of eight, we would select five to be treatments and three to be controls. Both controls and participants were told that we had received more applicants than we could accommodate, and that we had randomly selected participants from the pool of eligible applicants.

This interim evaluation focuses on information that has been systematically coded from vitae of participants and controls. These vitae were either obtained directly from the individual or downloaded from the web. If no current vita was available (as of the follow-up date), we

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teaching institutions, and were not evaluated using random assignment.

searched public data bases for published articles and federal grants in order to update these outcomes. Most people who were missing recent vitas had left the tenure track.

III. Interim Results

We have data after one year for all three workshops; after three years for 2004 and 2006; and after five years for 2004. Table 1 shows a comparison of selected "pre-intervention" characteristics of treatments and controls based on information submitted as part of the initial applications for the workshops.

On average, applicants were about three years from their PhDs. Fewer than half were U.S. citizens. However, most applicants obtained the PhD in a U.S. school, and the majority were employed by U.S. institutions.[3] A little over half were married or living with a partner, and about a fifth had children. Overall, treatments were significantly more likely to have children; this was driven by treatments in

Table 1: Pre-treatment Means

	Treatment	Control
Observations	126	91
Age	33.37	32.64
	(0.332)	(0.419)
US Citizen	0.429	0.505
Married/Living with Partner	0.640	0.600
Any Children	0.240*	0.144
Years Since PhD	3.05	2.90
	(0.159)	(0.191)
PhD At Top 10	0.357	0.308
Intends To Be In Academia In 10 Years	0.924*	0.978
Has Mentor	0.659	0.567
Job At Phd Granting Institution	0.754	0.747
Job At Top 10 Department	0.135*	0.055
Any Top-Tier Publications	0.111**	0.023
Total Publications	2.94	2.67
	(0.311)	(0.466)
Total NSF Grants	0.087	0.055
	(0.025)	(0.024)
Total NIH Grants	0.079	0.077
	(0.037)	(0.032)
Total Grants	0.476	0.626
	(0.075)	(0.191)

*p<.1; **p<.05

[3]In order to be included in the pool eligible for random assignment, the applicant needed to have a North American PhD or be employed at a North American research institution.

cohort 2 (the 2006 workshop) who were also significantly older. 92.4 percent of the treatments and 97.8 percent of the controls planned to be in academia 10 years from the time of their initial application. Most of the applicants were in academic jobs, and 75% were in PhD granting institutions.

Table 1 indicates that there are no significant differences in number of grants or total number of publications before the workshops. However, we do find that treatments were significantly more likely to hold a job at a top 10 department[4] and to have a publication in a top-tier journal.[5] The estimates by cohort show that these differences arose in cohort 2, where, by unfortunate chance, all of the applicants from top 10 departments were selected for the treatment. Treatments in cohort 2 had more publications and were significantly more likely to have a publication in a top-tier journal. We therefore present our results by cohort, as well as for the pooled cohorts.

Table 2 shows our main results. Each entry in the table is a coefficient from a separate regression of an outcome (indicated by the column heading) on a constant and an indicator for whether or not the woman was in the "treatment" group. The first four rows suggest that one year after the treatment, the program had had little impact, as one would expect given delays in

[4]We defined department rank using Pantelis Kalaitzidakis, Theofanis P. Mamuneas, and Thanasis Stengos (2003) because it included non-North American schools. The top 10 departments were Harvard University, University of Chicago, Massachusetts Institute of Technology, Northwestern University, University of Pennsylvania, Yale University, Princeton University, Stanford University, University of California at Berkeley, and New York University.

[5]We defined the top-tier journals as the *American Economic Review*, the *Journal of Political Economy*, the *Quarterly Journal of Economics*, and *Econometrica*.

grant writing and publications. The main exception is the second cohort treatments who were also more likely to have top-tier publications and more publications pre-treatment.

The next three rows suggest that the intervention had a positive effect on publications in both Cohort 1 and Cohort 2 after three years. Since there was no pre-treatment difference in publications in Cohort 1, this result is encouraging. The estimates suggest that by three years after the intervention, workshop participants were 20 percentage points more likely to have a top-tier publication, and had two more publications than controls. There is also a positive effect on successful grants in the pooled cohorts.

Table 2: Regressions of Outcomes on Treatment (Coefficients on Treatment)[a]

		Total NSF or NIH Grants	Any Top-Tier Publications	Total Publications
1-year	All Cohorts	0.069	0.109**	0.583
		(0.084)	(0.039)	(0.652)
	Cohort 1	0.179	0.067	1.099
		(0.166)	(0.074)	(0.834)
	Cohort 2	0.117	0.194**	1.994*
		(0.112)	(0.067)	(1.024)
	Cohort 3	-0.104	0.074	-1.378
		(0.141)	(0.060)	(1.473)
3-year	Cohorts 1 & 2	0.227*	0.195**	1.850**
		(0.125)	(0.058)	(0.861)
	Cohort 1	0.320	0.171*	2.039*
		(0.210)	(0.088)	(1.145)
	Cohort 2	0.117	0.222**	1.628
		(0.112)	(0.070)	(1.312)
5-year	Cohort 1	0.398*	0.252**	2.959**
		(0.241)	(0.103)	(1.472)

[a]Estimated treatment effect from a regression of outcome on treatment and a dummy variable for each cohort (where applicable). Robust standard errors in parentheses. There are 79, 66, and 72 observations in cohorts one, two and three, respectively. *p<.10; **p<.05

Finally, the last row shows the results after five years for Cohort 1. We see positive and significant effects of the workshop on grants, top-tier publication and total publications. Those in the treatment group had .4 more NSF or NIH grants on average. They had 3 additional publications, and were 25 percentage points more likely to have a top tier publication. These results are especially persuasive in that there were no significant pre-treatment differences in outcomes for this cohort.

Given the evidence in Table 1, we have conducted a number of additional analyses to explore whether the estimated treatment effects in Table 2 are driven by pre-existing differences between treatments and controls. Table 3 shows estimates similar to those in Table 2, except that the models included controls for having a pre-treatment job at a top 10 department and for the number of pre-treatment publications in top-tier journals. Adding these controls reduces the estimated effects somewhat, and there are no longer significant effects on grant activity, although all of the year 3 and year 5 estimates remain positive. We still find, however, that at year 5, treatments are 20 percentage points more likely to have a top-tier publication and have 2.7 more publications overall, compared to controls; at year 3, the comparable figures are 9 percentage points and 1.6 publications.

Table 3: Coefficients on Treatment for Regressions of Outcomes on Treatment, Including Pre-Treatment Controls[a]

		Total NSF or NIH Grants	Any Top-Tier Publications	Total Publications
1-year	All Cohorts	0.054 (0.088)	0.023 (0.025)	0.478 (0.674)
	Cohort 1	0.151 (0.176)	0.011 (0.053)	1.032 (0.844)
	Cohort 2	0.126 (0.116)	0.024* (0.013)	1.898 (1.205)
	Cohort 3	-0.117 (0.143)	0.011 (0.050)	-1.480 (1.500)
3-year	Cohorts 1 & 2	0.179 (0.136)	0.090* (0.046)	1.622* (0.890)
	Cohort 1	0.256 (0.221)	0.112 (0.078)	1.843 (1.124)
	Cohort 2	0.126 (0.116)	0.058 (0.037)	1.414 (1.484)
5-year	Cohort 1	0.314 (0.246)	0.200** (0.097)	2.677* (1.461)

[a]Estimated treatment effect from a regression of outcome on treatment, total pre-treatment top-tier publications, having a job at a top-10 school at pre-treatment, and a dummy variable for each cohort (where applicable). Robust standard errors in parentheses. *p<.10; **p<.05

Table 4 asks whether *changes* in outcomes between the pre-intervention and a later date are affected by the intervention. These models are equivalent to including person-specific fixed effects (since the difference in intervention status between time t and time 0 is always 1 or 0).

The year 1 results show that this specification effectively controls for the larger number of top-tier publications in Cohort 2 at baseline. At year 5, we continue to see significant gains in grants and publications for treatments: Treatments were 27 percentage points more likely to have an NSF or NIH grant, 23 percentage points more likely to have any top-tier publication, and they have 2.4 more publications overall. For cohort 1, there are also significant (but smaller) effects on both outcomes at year 3, and effects that are smaller still in year 1. It is conceivable that the differences at year 3 and year 5 could reflect pre-existing differences in trajectories between treatment and control members. However, the much smaller effects of the treatment on grants and top-tier publications after one year provides some evidence that the treatments were not simply on a better trajectory to start. Models excluding applicants with PhDs from top 10 departments, and models excluding applicants with first jobs at top 10 departments produce similar results.

Table 4: Coefficients on Treatment from Regressions of Change in Outcomes between Pre-Treatment and Indicated Year on Treatment[a]

		Total NSF or NIH Grants	Any Top-Tier Publications	Total Publications
1-year	All Cohorts	0.039 (0.037)	0.016 (0.023)	0.308** (0.153)
	Cohort 1	0.045 (0.078)	0.037 (0.048)	0.531* (0.275)
	Cohort 2	0.072 (0.075)	- -	0.361 (0.275)
	Cohort 3	- -	0.007 (0.048)	0.000 (0.238)
3-year	Cohorts 1 & 2	0.134* (0.075)	0.089** (0.042)	0.795 (0.481)
	Cohort 1	0.186 (0.122)	0.141* (0.073)	1.471** (0.670)
	Cohort 2	0.072 (0.075)	0.028 (0.028)	-0.006 (0.682)
5-year	Cohort 1	0.265* (0.158)	0.226** (0.091)	2.387** (1.055)

[a]Estimated treatment effect from a regression of the change in outcomes between pre-treatment and the given year on treatment and a dummy variable for each cohort (where applicable). Robust standard errors in parentheses. The missing estimates correspond to outcomes that do not change between pre-treatment and the one-year follow up. *p<.10; **p<.05.

IV. Conclusions

We find that CeMENT increased top-tier publications, the total number of publications, and the total number of successful federal grants in treated women relative to controls. The effects are monotonic with respect to time from the intervention and robust to several specification checks designed to control for possible pre-existing differences between treatments and controls. These results are encouraging in that publications and grants are important predictors of tenure at most research institutions, and suggest that the intervention had a positive influence on academic productivity. Nonetheless, it is too early to say whether the intervention will have a significant effect on either the probability that women stay in academia, or the probability that they receive tenure.

References

Bartlett, Robin and Andrea Ziegert. 2000. NSF Report. Unpublished.

Blau, Francine, Marianne Ferber and Anne Winkler, 2010. *The Economics of Women, Men and Work.* 6th ed. Upper Saddle River, NJ: Pearson/Prentice-Hall.

Ginther, Donna K. and Shulamit Kahn. 2004. "Women in Economics: Moving Up or Falling Off the Academic Career Ladder?" *Journal of Economic Perspectives,* 18(3): 193-214.

Kalaitzidakis, Pantelis, Theofanis P. Mamuneas, and Thanasis Stengos. 2003. "Rankings of Academic Journals and Institutions in Economics." *Journal of the European Economic Association,* 1(6): 1346-1366.

McDowell, John, M., Larry D. Singell and Mark Slater. 2006. "Two to Tango? Gender Differences in the Joint Decision to Publish and Coauthor." *Economic Inquiry*, 44: 153-168.