Women Helping Women, Men Helping Women? Same-Gender Mentoring, Initial Job Placements, and Early Career Publishing Success for Economics PhDs

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Women have been traditionally underrepresented within the ranks of academic economists. As such, the graduate education and early career success of female economists is an important concern for members of the profession. Within the sciences, a commonly proposed method for fostering the growth of female scholars is the pairing of female PhD students with female dissertation advisors. As proof of the scientific community's commitment to the concept of same-gender mentoring, the Committee on the Status of Women in the Economics Profession (CSWEP) has twice received funding from the National Science Foundation to "implement and evaluate a series of mentoring workshops for junior economists, focusing particularly on issues relevant to women economists at the beginning of their careers" (Francine D. Blau 2004, 531). While funding such programs may be intuitively appealing, assessing their impact is fundamentally an empirical concern. Surprisingly, we are aware of one study by David Neumark and Rosella Gardecki (1998) which attempts to quantify the potential impact of same-gender mentoring on the early-career outcomes of PhD students.

We add to this sparse literature by analyzing a sample of 1,900 individuals receiving economics PhDs from the top-30 programs between 1990 and 1994. Our source for the student's advisor, PhD year, and PhD program is the *Dissertation Abstracts* database. We collect individual-specific, peer-reviewed publication data as of December 2002 from *EconLit,* and define research productivity by two common metrics: the total number of journal publications listed in *Econlit,* and the total number of publications in the top-five economics journals (Loren C. Scott and Peter M. Mitias 1996). We rank economics programs according to John J. Siegfried and Wendy A. Stock's (2001) three-tier breakdown of programs in the 1995 NRC rankings (1–6, 7–15, and 16–30, respectively). We classify dissertation advisors as either ranked among the worldwide top 250 ("*star*" advisors), between 251 and 1,000 ("*lower ranked*" advisors), or unranked in Tom Coupe's (2003) global top 1,000 economist rankings.[1] Finally, we determine a student's first post-graduation job from either the self-reported information contained in the American Economic Association's Directory of Members or from the author affiliation in *EconLit* for the first article published after the student received his or her PhD.

These data allow us to examine the differential impact of each of the four possible mentorship configurations (female student–female advisor, female student–male advisor, male student–female advisor, and male student–male advisor) on both initial job placements and early-career research productivity. In addition, the richness of our data allows us to address a number of issues related to the supply of potential female advisors through our access to information on both the reputation of the student's PhD program and the relative research productivity of his or her dissertation advisor.

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[1] This classification might seem somewhat arbitrary. We did explore a multitude of other categorical breakdowns (every 100, every 200, etc.), as well as the inclusion of a continuous measure of advisor rank. Every alternative specification yielded similar results, and thus we believe that the results presented here are highly robust.

TABLE 1—DOES MENTORSHIP CONFIGURATION MATTER FOR FIRST JOB PLACEMENT (COLUMNS 1–3) OR RESEARCH PRODUCTIVITY (COLUMNS 4–7)?

	First job research-oriented			Research productivity			
	(1)	(2)	(3)	Total articles	Top-five articles	Total articles	Top-five articles
Mentor configuration							
(Student-advisor)							
Female-female	0.0704	0.1015	0.1281	−1.534**	−0.202**	−.461**	−0.043
	(0.0895)	(0.0915)	(0.0921)	(0.623)	(0.066)	(0.226)	(0.075)
Male-female	0.0236	0.0630	0.0687	−0.876	−0.152*	0.006	−0.042
	(0.0815)	(0.0846)	(0.0851)	(0.702)	(0.085)	(0.205)	(0.067)
Female-male	0.0786**	0.0928**	0.0927**	−1.193**	−0.057	− 0.323**	−0.036
	(0.0317)	(0.0323)	(0.0324)	(0.285)	(0.048)	(0.079)	(0.024)
Program rank							
Tier 1	—	0.1908**	0.1601**	—	—	0.244**	0.230**
	—	(0.0316)	(0.0333)	—	—	(0.079)	(0.051)
Tier 2	—	0.1227**	0.1105**	—	—	0.030	0.032
	—	(0.0286)	(0.0289)	—	—	(0.069)	(0.030)
Advisor rank							
Star advisor	—	—	0.1029**	—	—	0.403**	0.267**
	—	—	(0.0328)	—	—	(0.079)	(0.054)
Ranked advisor	—	—	0.0934**	—	—	0.191**	0.161**
	—	—	(0.0294)	—	—	(0.070)	(0.039)
Student's first job							
Research position	—	—	—	—	—	4.104**	0.263**
	—	—	—	—	—	(0.235)	(0.027)
Log likelihood	−1,192.8	−1,173.2	−1,166.2	−4,670.4	−1,265.7	−4,449.6	−1,136.2
Alpha				1.661	5.255	1.162	2.471
				(0.071)	(0.519)	(0.056)	(0.291)

Notes: The first three columns represent marginal effects for logit regressions on first job placement type. The other columns represent marginal effects for a negative binomial regression on the number of articles or top-five publications. The sample size for all regressions is 1,900 observations. Other controls that are not reported are whether the student is international, the student's dissertation field, and the number of years since PhD receipt.

** Represent statistical significance at a 5 percent level

* Represent statistical significance at a 10 percent level.

I. Descriptive Analysis

Summary analysis suggests that between 1990 and 1994 female students were fairly evenly distributed across the different program tiers and advisor ranks, with the respective percentages falling between 17 and 22 percent. Overall, we observed 748 faculty lead-supervising at least one dissertation between 1990 and 1994. Among these advisors, less than 2 percent were females at tier 1 programs and only 0.08 percent were females ranked within Coupe's worldwide top 250. While confirming Robin L. Bartlett and Andrea L. Ziegert's (2005) contention that "at major research-oriented institutions there are few women in senior positions," our data add that the lack of potential female advisors appears especially acute in terms of superstar researchers. Turning to the gender configuration of our student-advisor matches, roughly 9 percent of female students chose to work with a female dissertation advisor, while 91 percent chose to work with a male advisor. At the same time, the likelihood of same-gender mentoring appears inversely related to program tier and advisor rank. Overall 5 percent of female students at tier 1 schools, and 11 percent of female students at each of tier 2 and tier 3 schools chose to work with female advisors. One percent of female students chose to work with a star advisor, 7 percent chose to work with ranked advisors, and 16 percent chose to work with unranked female advisors. Together, these data might suggest that in the early 1990s supply effects were driving the decisions of many high-potential women to work with male advisors.

While the previous summary analysis focuses on the PhD student's choice of dissertation advisor, it is potentially informative to consider the student-advisor match from the advisor side. Between 1990 and 1994, we observed 39 women and 709 men lead-supervising at least one dissertation. Overall, 55 percent of the students we observed being advised by women were female, while 18 percent of those we observed being advised by males were female.

II. Empirical Results

The goal of our empirical analysis is to estimate the effect that different observable factors have on a student's first-job type and his or her early-career research productivity. Following standard form, our estimation equation can be written as

$$R_i = B_0 + B_1 M_i + B_2 A_i + B_3 Q_i + \boldsymbol{B}_4 \boldsymbol{X_i} + \varepsilon_i, \tag{1}$$

where R_i is either a dummy variable indicating whether the student's first job was research-oriented or a count measure of research productivity, M_i is a series of dummy variables indicating a student's gender-based mentorship configuration (male-male omitted), Q_i is the reputation rank of the student's PhD program (tier 3 omitted), A_i is the relative research productivity rank of the student's dissertation advisor (unranked omitted), $\boldsymbol{X_i}$ is a vector of individual characteristics, and ε_i is an error term. The individual characteristics we consider are whether the student is international, dissertation field, and the number of years since PhD receipt. We estimate the first-job function as a maximum likelihood logit because the dependent first-job variable is a dichotomous indicator of the student's first job. We estimate the productivity functions with the negative binomial regression model because the research productivity measure is a count variable truncated at zero.[2]

The estimated marginal effects from our first-job functions contained in the first three columns of Table 1 indicate that in the early 1990s female students with male advisors were significantly more likely to receive research-oriented first jobs than male students with male advisors, *ceteris paribus.* At the same time, contrary to Neumark and Gardecki (1998), who estimate a marginally significant negative effect for female students working with female advisors relative to female students working with male advisors, we do not find evidence of statistical differences between the two groups. In fact, in columns 2 and 3 of Table 1, the estimated coefficients become larger for female students with female advisors than for female students with male advisors, although the differences are not statistically different. By sequentially adding the program tier and advisor rank variables, we are able to explore the role that differences in the relative supply of potential mentors might have played in the first job outcome. Overall, the results suggest that both factors have significant positive effects on the likelihood of initially obtaining research-oriented placements.

Turning to research productivity, our estimated marginal effects in column 4 suggest that female students working with either male or female advisors publish significantly fewer articles than male students working with male advisors, *ceteris paribus.* At the same time, there are no statistical differences between male students working with female advisors and female students working with either male or female advisors. Comparing results as we sequentially add controls for program tier, advisor rank, and first-job type sheds light on several potential causes of these estimated differences. Specifically, in the specifications that control only for differences in mentorship configuration (in addition to individual characteristics), the statistically significant estimated shortfalls are −1.54 and −1.19 articles for female students with female and male advisors, respectively, relative to male students with male advisors. By contrast, in the fully specified model where we control for

[2] A well-known problem with the Poisson distribution is the presumed equality of the conditional mean and variance functions (equidisperion). If this assumption is violated the negative binomial is considered the more appropriate distribution, as it accounts for the skewness of the data without requiring equality between the conditional mean and variance.

program rank, advisor rank, and whether the student's first job was a research position, the estimated differences drop to −0.46 and −0.32, respectively. In other words, our findings seem to suggest that a primary factor in the relative lack of early-career publishing success for early 1990s female economics PhDs was their relative lack of access to the most prominent dissertation advisors.

In terms of publications within top-five economics journals, in our simplest specifications we estimate statistically significant shortfalls for female students with female advisors and marginally significant shortfalls for male students with female advisors relative to male students with male advisors. The statistical significance of these estimated differences disappears and the magnitude of the coefficients is reduced to nearly zero once we add controls for program tier, advisor rank, and whether the student's first job was research-oriented. In other words, it appears that publishing in the very best journals is affected by factors other than the simple gender matching between students and advisors.

III. How Have Things Changed since 1994?

While our findings represent a snapshot of the academic environment in the early 1990s, there have been well-documented changes in the relative supply of female economists in the academic pipeline since that time (Donna K. Ginther and Shulamit Kahn 2004; Siegfried and Stock 2001). A natural question is how such changes affected observed student-advisor matchings in the late 1990s and early 2000s. Coupe (2003) hints at the likelihood for profound changes by reporting that among the 48 women listed in the top-1,000 published economists during the 1990s, one received her PhD in the 1950s, 10 did so in the 1970s, 9 in the first half of the 1980s, 18 in the second half of the 1980s, and 10 in the first half of the 1990s.

To address the impact that such demographic changes might have been having on the decisions of PhD students, we extend our dataset to include those PhD recipients (both male and female) between 1995 and 2004 who had their dissertations directed by female advisors. Doing so adds 316 students to the 98 students working with female advisors in our 1990–1994 sample, giving us a sample of 414 students working with female advisors between 1990 and 2004. Of these 414 students, 156 (or 37.7 percent) were female while 258 (or 62.3 percent) were male. Comparing across time periods, we observe 36 female students working with female advisors between 1990 and 1994, 43 female students working with female advisors between 1995 and 1999, and 77 female students working with female advisors between 2000 and 2004. Perhaps more significantly, we find only six female students working with female advisors ranked in the top 1,000 economists between 1990 and 1994, while we observe 20 students doing so between 1995 and 1999, and 39 students between 2000 and 2004. In other words, our summary data suggest that the relative increase in the number of female faculty in the upper echelons of the profession were likely translating into increased access for female PhD students to the most prominent dissertation advisors.

Summary data for this expanded sample paint the picture that might be expected to result from such structural changes. Namely, throughout our 15-year time frame, female students with female advisors have become more likely to receive academic positions within top US programs, with the number doubling from the 1990–1994 period to the two successive half-decades.

IV. Conclusions

This paper asks whether there are systematic differences in the types of first jobs accepted and the early career research productivity of economics PhD recipients depending on their gender-based relationship to their advisors. We find that female students with male advisors are significantly more likely to accept research-oriented first jobs than male students with male advisors, *ceteris paribus*. Contrary to Neumark and Gardecki (1998), we do not find evidence of statistical differences between female students working with female advisors and female students working with male advisors. With respect to research productivity, we find that female students, regardless of the gender of their advisors, average significantly fewer early career publications than male students working with male advisors, and that most of the estimated shortfall can be explained by relative differences in the reputation of the student's PhD program, the rank of the student's dissertation advisor, and whether the student's first job was research oriented. We further document potentially important changes in the supply of women into the upper echelons of the profession in the late 1990s and early 2000s that are affecting the decisions of female students. Namely, we observe more than twice as many female students working with female advisors between 2000 and 2004 than we did between 1990 and 1994, and more than six times as many of those students working with an advisor ranked among the top 1,000 economists. More research is needed to explore recent changes in the effects of same-gender mentoring on initial job placement and early career research productivity.

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