

## Are Female Supervisors More Female-Friendly?

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### **Abstract:**

We introduce the idea that easily inferable demographic characteristics such as gender may not be sufficient to define type in the supervisor-employee mentoring relationship. We use longitudinal data on athletic directors at NCAA Division I programs to identify through observed mobility the propensity of top-level administrators to hire and retain female head coaches, above and beyond an organization's culture. We show that supervisor gender appears to be unrelated to female friendliness in this setting. Overall, our findings indicate that more focus should be placed on the more complex manager type defined by attitudes in addition to attributes.

**Keywords:** Demographics | Female | Gender | Mentoring | Management

### **Article:**

Greater representation of females at top levels of a firm has been found to have positive effects on female workers' career outcomes (e.g., Matsa and Miller 2011; Bell et al. 2008). A similar relationship has been established in other settings, such as higher education (e.g., Neumark and Gardecki 1998; Bettinger and Long 2005). When workers and supervisors are similar along an easily observable dimension, such as gender, mentoring may be more effective (Athey, Avery, and Zemsky 2000), or supervisors may be better at inferring employees' unobserved qualities (Cornell and Welch 1996). Others, such as Rothstein (1997), have documented that females often earn higher wages when working under a male supervisor, but in the absence of detailed employer-level information it is not possible to rule out the explanation that supervisor gender is acting as a proxy for job type. Furthermore, the term "Queen bee syndrome," which originates in the academic literature in the 1970s (Staines, Tavriss, and Jayaratne 1974), has been used to describe women who have reached the top ranks of their company, particularly in a male-dominated occupation, and intentionally hinder the career progress of females in lower levels of the job ladder.

Rather than attempting to reconcile these seemingly conflicting ideas, in this paper we introduce the idea that easily inferable demographic characteristics may not be sufficient to define “type” in the supervisor-employee relationship, so that focusing on gender alone leaves out much of what drives the unexplained gender differences in career success. Our approach relies on following both upper- and lower-level workers in a multiple-establishment panel, which allows us to identify through observed mobility the propensity of supervisors to hire and retain female employees, above and beyond the organization’s culture. We then proceed to show that supervisor gender appears to be unrelated to this propensity. Our findings underscore the importance of understanding supervisors’ attitudes in addition to their attributes; studies that focus only on gender (or another demographic characteristic such as race) fail to account for important components of the mentoring relationship, and more focus should be placed on the more complex manager type that goes beyond gender.

## **I. Data and Methodology**

It is likely that the role which institutional culture plays for the share and success of female workers is nonnegligible, regardless of the labor market setting under consideration. We construct a matched athletic director-university panel dataset for members of the National Collegiate Athletic Association (NCAA) who participate in Division I athletics. The panel spans the period from the 1993-1994 academic year to the 2010-2011 academic year. The main advantage of these data is that they follow supervisors across establishments so any institution-specific time-invariant factors can be differenced out to identify the separate influence of athletic directors. Additionally, the hierarchical structure is consistent across institutions, and the athletic director position is associated with similar functions. The structure of our data is similar to Bertrand and Schoar’s (2003) matched manager-firm data with the additional information on gender composition in lower levels of the job ladder. Namely, we use information on the gender of the head coach for four women’s sports: basketball, soccer, softball, and volleyball. These sports are among the most widely represented in NCAA Division I athletics, with almost all programs having a participating team, and the gender distribution of head coaches is fairly balanced.<sup>1</sup> The gender of each athletic director and the position start and end dates were identified through web searches. Head coach names are publicly available on the NCAA website (National Collegiate Athletic Association 1993-2011), and we identified gender through web searches for the names that were ambiguous.

In order to separately identify institution-level fixed effects, we restrict the sample to schools for which at least one of the athletic directors is observed at multiple programs over the course of the sample period. For this subset of schools we use data for all years in which the school participated in Division I athletics with at least one team among the four sports we consider. Observations for which athletic director tenure is equal to zero are excluded from the estimation. Since it is possible that coaching staff adjustments require time, this restriction allows us to use data that are less likely to reflect the previous director’s choices. The estimation sample is an

unbalanced 18-year panel for 200 schools that consists of 3,135 observations. There are 485 unique athletic directors, of which 433 occupy the same position for more than two consecutive years (of these, 42 are female). Athletic directors who are observed in a program for fewer than two years are likely to be interim and as such may have comparatively less decision power. There are 137 administrators who are observed in the top position at multiple schools for more than two years in each school (of these, 9 are female).

Female representation among Division I athletic directors has been increasing, although this effect is concentrated at schools that do not have a football team. The fraction of female athletic directors fluctuates only slightly over time at around 7.5 percent for the schools with a football team, and increases dramatically from 0 in 1995-1996 to 19 percent in the 2010-2011 school year for programs without a football team. The female share of coaches starts out at 65 percent and decreases by about 10 percentage points for programs with a football team and remains constant at around 46 percent for programs without a football team. The difference in the trends motivates the need for both university and time trends in the empirical analysis.

Our measure of “female-friendliness” of athletic directors is based on directors’ heterogeneity in the propensity to hire and retain female coaches beyond any time-invariant school-specific factors. The identification relies on athletic directors observed at multiple programs. We estimate a model of the fraction of females coaching the teams included in our data at school  $j$  in academic year  $t$  under athletic director  $i$  :

$$(1) \text{pct\_female}_{ijt} = \gamma_j + \eta_t + \delta_i + \varepsilon_{ijt} .$$

School and year fixed effects account for differences across institutions and over time in the gender composition of coaching staffs. The variable  $\delta_i$  is an athletic director fixed effect estimated for administrators who are observed holding this position for more than two full seasons during the sample period. It must, however, be pointed out that athletic directors are clearly not randomly assigned to schools, so we are not necessarily identifying a causal effect. Our approach is to pick up systematic differences in the share of female head coaches across programs and over time that we can link to individual athletic directors.

A more conservative approach limits the set of estimated fixed effects to athletic directors who are observed at multiple programs. This allows us to separate the influence of individual administrators from unrelated institution-specific time trends concurrent with their tenure. Since this considerably narrows down the group of athletic directors with estimated fixed effects to 128 males and 9 females, we report both sets of results. We also estimate equation (1) with no director fixed effects in order to show the explanatory power of the  $\delta_i$  parameters. Similar to the analysis in Bertrand and Schoar (2003), we compare the adjusted  $R^2$  of the regressions that do and do not include director fixed effects and report the  $F$ -statistic for the joint significance test of all  $\delta_s$ . We interpret the results as evidence of the importance of athletic director heterogeneity for the gender composition of head coaches above and beyond a school-specific average.

**Table 1.** Importance of Athletic Director Heterogeneity

Adjusted $R^2$	0.49	0.56	0.72
$F$ -statistic	–	4.52	7.08
AD fixed effects	No	Movers	All noninterim
Number of FEs	–	137	433

*Notes:* The dependent variable is the share of females among head coaches for softball and women’s basketball, soccer, and volleyball. All specifications include year and school indicators. Athletic directors who spent more than two full seasons in the same position are defined as noninterim. Observations with director tenure of 0 are excluded. The estimation sample consists of 3,135 school-year observations.

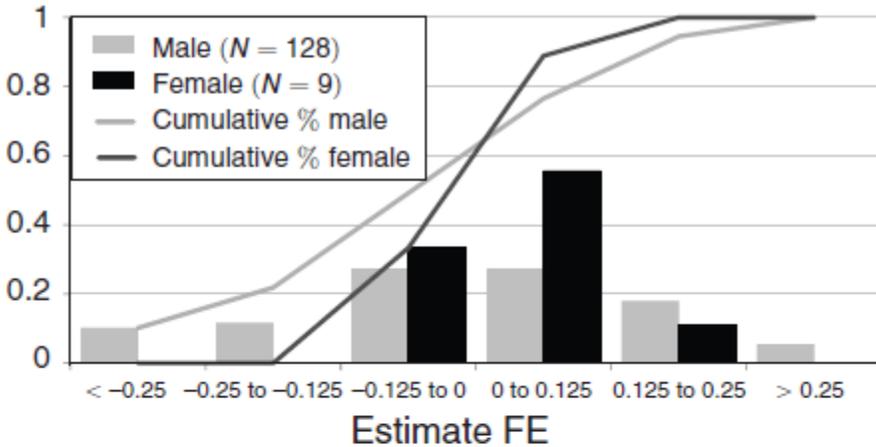
## II. Findings

The estimation results for the model in equation (1) are summarized in Table 1, with column 1 showing the baseline specification with no athletic director fixed effects, column 2 showing results with the more restricted set of fixed effects for directors who moved across programs while in the sample, and estimates based on the broader set of fixed effects in column 3. The estimates show evidence of nonnegligible athletic director effects. The adjusted  $R^2$  increases from 0.49 to 0.56 after the smaller set of fixed effects is included, and the  $F$ -statistic for the set of 137 binary variables is 4.52, allowing us to reject the null hypothesis that all parameters equal zero at a very high confidence level. Including fixed effects for all noninterim athletic directors increases the adjusted  $R^2$  to 0.72 and the  $F$ -statistic for the 433 binary variables is 7.08. Based on the results in Table 1, we can conclude that athletic director heterogeneity matters in a statistically and economically significant way for the gender composition of head coaches, and a comparison of directors’ propensity to hire and retain females is meaningful.

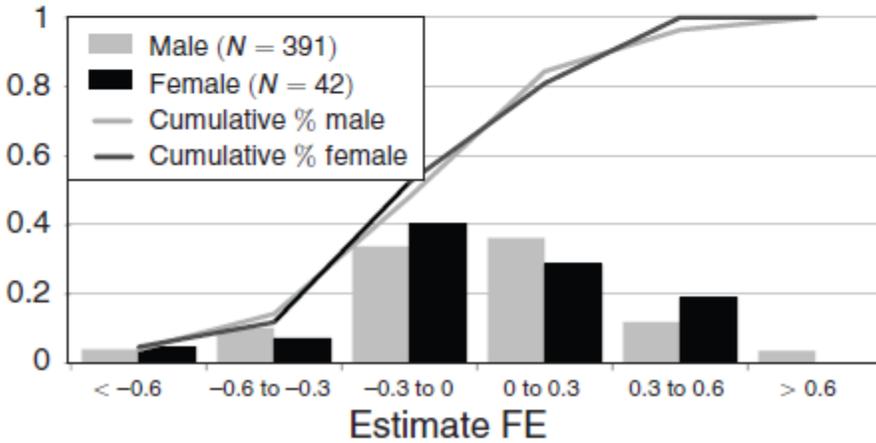
We next proceed to examine in more detail the distribution of the estimated fixed effects by athletic director gender. The distribution of the two sets of  $\delta$  estimates is shown in Figure 1.<sup>2</sup> The most and the least female-friendly administrators tend to be male, and there are no discernible gender differences in the distributions. The null hypothesis that the  $\delta$ s for males and females are drawn from the same distribution cannot be rejected by a Kolmogorov-Smirnov test ( $p$ -value of 0.5 for the smaller sample and 0.8 for the larger sample of athletic directors). To further test for statistically significant differences, we regress the estimated parameters on a gender indicator and a constant term. Table 2 shows results from an OLS specification (column 1) and quantile regressions at the twenty-fifth, fiftieth, and seventy-fifth percentiles (columns 2-4). We weight each observation by the inverse of the OLS variance of the fixed effect estimate so that greater weight is placed on more precisely estimated observations. Panel A of Table 2 shows results for the directors who are observed at multiple programs, while the larger set of fixed effects is used to obtain the estimates in panel B. The gender coefficients are not statistically significant in any of the specifications. The  $R^2$  of the OLS regression in column 1 is low: 0.0016 in panel A and below 0.0001 in panel B of Table 2. The sample of female athletic directors

included in the models in panel A is very limited, but the combined results in panels A and B do not support the claim that supervisor gender and “female-friendliness,” defined as having a high value of  $\delta_{\square}$ , are related in our data.

**Panel A. Movers**



**Panel B. All non-interims**



**Figure 1.** Distribution of Athletic Director Fixed Effects by Gender

**Table 2.** Distribution of the Estimated Athletic Director Fixed Effects

	OLS	Twenty-fifth percentile	Fiftieth percentile	Seventy-fifth percentile
<i>Panel A. Mean and quantile regressions of <math>\delta_{\square}</math> – movers (N = 137)</i>				
Female AD	0.0287 (0.0625)	0.0703 (0.1016)	0.0522 (0.0802)	-0.0323 (0.0923)
Constant	-0.0036 (0.0145)	-0.0943*** (0.0235)	-0.0018 (0.0186)	0.1176*** (0.0214)

$R^2$	0.0016			
<i>Panel B. Mean and quantile regressions of <math>\delta_{\square}</math> – all noninterims (N = 433)</i>				
Female AD	0.0025 (0.0505)	0.0166 (0.0626)	-0.0586 (0.0583)	0.0691 (0.0692)
Constant	0.0190 (0.0148)	-0.1651*** (0.0184)	0.0270 (0.0171)	0.2076*** (0.0203)
$R^2$	0.0000			

*Note:* The inverses of the fixed effect estimation variances are used as weights. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level.

Finally, to provide some external validity of the measure of female-friendliness, we use data on team revenues and expenditures reported by Division I institutions in accordance with the Equity in Athletics Disclosure Act (EADA). We use data on total team expenses and revenues for the period 2002–2003 to 2010–2011 (Office of Postsecondary Education 2002–2011). As stated on the EADA survey form, the expenses category “includes appearance guarantees and options, athletically related student aid, contract services, equipment, fundraising activities, operating expenses, promotional activities, recruiting expenses, salaries and benefits, supplies, travel, and any other expenses attributable to intercollegiate athletic activities.” For each team included in the EADA database, we construct the ratio of expenses to revenues; if a sport is played by both men and women, the ratio is calculated separately by gender. Both expenses and revenues are taken into account in order to track whether administrators provide additional support in terms of expenditures when revenues increase or cut resources disproportionately when revenues fall. We regress this measure on the fixed effects estimated from (1),<sup>3</sup> as well as director gender, year and team (school-by-sport) indicators. We again use the inverses of the fixed effect estimation variances as weights. Separate models are estimated for men’s and for women’s sports.

The results in Table 3 imply that spending on women’s sports relative to team revenues is higher when the athletic director is more female-friendly, while the effect on men’s sports is ambiguous. The results are stronger with the more conservative set of fixed effects. The specifications that focus on administrators observed at multiple programs are less likely to pick up unrelated time-varying institution trends that coincide with a director’s tenure. We interpret the results as evidence that the supervisor type we introduce is not narrowly defined to matter only for the fraction of female coaches at an institution; it appears to be correlated with other female-friendly practices. The coefficient on the indicator for female is negative for both men’s and women’s teams but larger in absolute value and statistically significant in the latter case.

**Table 3.** Female-Friendly Athletic Directors’ Support for Women’s Sports: EADA Data, 2002–2003 to 2010–2011

	All noninterim		Movers	
	Women’s sports	Men’s sports	Women’s sports	Men’s sports
$\delta_{\square}$ (adjusted)	0.4253*	0.1982	1.4486***	-0.5609

	(0.2232)	(0.2058)	(0.5323)	(0.5327)
Female AD	-0.4224*** (0.0860)	-0.0868 (0.0806)	-0.5986** (0.2711)	-0.3434 (0.2347)
Observations	11,079	10,405	5,806	5,544
R2	0.6655	0.6686	0.7214	0.7109
Number of schools	198	198	151	153

*Notes:* The dependent variable in each regression is the ratio of expenses to revenues for a given team. All specifications include year and team fixed effects. The inverses of the fixed effect estimation variances are used as weights. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level.

### III. Conclusion

Previous research has established that individuals at top levels of the firm have strong potential to affect overall performance and turnover. There is a growing body of literature that explores the mechanisms through which leaders matter. In many cases high-level managers make personnel decisions or interact with mid-level managers, possibly in a mentorship role. Managers may be better able to detect the true ability of a subordinate if they share a characteristic, such as gender. Worker-manager type matches may make the role of mentorship more effective or alternatively, there may be discrimination against members of the firm who do not share the same characteristic as the top manager. We extend this literature by allowing supervisors' attitudes in addition to their attributes to drive the level of support for female mid-level managers, which places additional burdens on the data in order to identify the distribution of female-friendliness. We find evidence in our sample of NCAA Division I athletic directors of heterogeneity in the propensity to hire and retain females, which is identified separately from institution-specific factors through observed mobility. We do not find evidence that gender is strongly predictive of a supervisor's female-friendliness. The relationships we document in this specific labor market may not be immediately generalizable to broader labor market settings, but the conclusions we draw are novel and should motivate researchers to go beyond easily observable supervisor characteristics and to explore further the role of less obvious definitions of type in the mentoring relationship.

### Notes

1 See for example the *2005–06 NCAA Gender-Equity Report*. The fraction of female coaches ranges from about one-third for soccer to over two-thirds for softball.

2 For the 137 individuals for whom we estimate two fixed effects, the correlation in the two sets of estimated parameters is 0.53.

3 The estimates are first adjusted to account for the additional estimation variance. The adjustment is based on Bayesian shrinkage (Morris 1983) and is similar to the approach taken by

studies of teacher or principal effectiveness (e.g., Jacob and Lefgren 2008; Branch, Hanushek, and Rivkin 2012). When multiple athletic directors are present at a school during a given season, we use the average fixed effect value.

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