Career Implications of Having a Female-Friendly Supervisor

By: Steven Bednar, Dora Gicheva

Bednar, S., & Gicheva, D. (2018). Career implications of having a female-friendly supervisor. *ILR Review, 71*(2), 426-457. Copyright © 2018 The Authors. DOI: 10.1177/0019793917703973

Abstract:

The authors study how variations in supervisors' attitudes toward working with females generate gender differences in workers' observed career outcomes. The employment records of athletic directors and head coaches in a set of NCAA Division I programs provide longitudinal matched employer–worker data. Supervisors are observed at multiple establishments, which allows the authors to construct a measure of revealed type and to examine its role for the performance and turnover of lower-level employees. The authors observe that the careers of male and female workers progress differently depending on supervisor type in a way that is consistent with a type-based mentoring model. The results suggest that more focus should be placed on managerial attitudes revealed through actions in addition to observable attributes such as gender.

Keywords: labor transitions | linked employer–employee data | gender | wage determination model | labor productivity

Article:

Supervisor attributes, such as race or gender, are thought to play an important role in employee hiring, career advancement, and turnover even in the absence of discrimination. For example, a supervisor may be better able to infer the true ability of a worker if he or she has a common attribute with the worker, or it could be that mentoring is an important determinant of employees' career trajectories and is more effective if the workers and supervisors have similar characteristics. Embedded in this idea are important policy implications for alleviating the gender wage gap and other adverse career outcomes for females.

In our article, we introduce a mentoring model of worker productivity and turnover in which human capital production is contingent on the worker's gender and the supervisor's "type." We allow for a flexible definition of "type" based on the supervisor's attitude toward working with females. Using a data set in which workers with a high level of managerial responsibility are observed at multiple establishments over time, we construct a measure of revealed supervisor female-friendliness[1] above and beyond the institution-specific culture by comparing changes in the gender composition of workers at lower levels of the firm. We use this measure to test the predictions of our mentoring model against a model of taste-based discrimination.

We add to the literature by proposing that it may be necessary to be more flexible when defining "type" in the mentoring relationship. We argue that, in addition to demographics, supervisors can be characterized by a more complexly defined inherent attitude toward working with and mentoring females, which can vary within observable supervisor characteristics, and that the existing literature has left unexplored areas by limiting its focus on leaders' observable characteristics. Implementing our definition of female-friendliness empirically requires us to use a novel data set with information on both supervisors and lower-level workers, in which high-level managerial employees are followed across establishments. We link the theoretical idea of type-based mentoring to observed career outcomes and test whether females are more likely to benefit in terms of career progression when matched with a supervisor with a more favorable attitude toward mentoring.

Literature Review

On the one hand, the persistence of the gender wage gap is well-documented empirically (e.g., Altonji and Blank 1999; Blau and Kahn 2000) but is far from fully accounted for by observables. On the other hand, a type-based mentoring model such as the one developed in Athey, Avery, and Zemsky (2000) can predict a narrower gap in female-led firms; however, a formal empirical link between the two has not been established. The existing literature has explored the relationship between supervisor gender (and to a lesser degree race) and career outcomes for female (or minority) workers, but the evidence has been mixed, and the mechanisms have not been examined in sufficient detail. Several studies have found positive career effects for female workers when more women have leadership roles within a firm. Bell (2005) showed that in Standard and Poor's ExecuComp database, the gender gap between female and male executives is narrower in companies with a female CEO. In studies of firms in the United States (Tate and Yang 2015) and Portugal (Cardoso and Winter-Ebmer 2010), female firm leadership was also associated with a lower wage gap among lower-level employees. Women at the top were further found to increase the share of females at lower levels of the firm in the United States (Bell 2005; Kurtulus and Tomaskovic-Devey 2012) and Norway (Matsa and Miller 2011). Giuliano, Levine, and Leonard (2009, 2011) found similar positive effects for workers in one large retail firm if their manager shares the same race or ethnicity.

Other studies indicate that females may have no positive impact on or may even hinder the career progression of other women. For example, Bagues and Esteve-Volart (2010) found that greater female representation on a recruiting committee negatively affected female applicants for positions with the Spanish Judiciary. Bertrand, Black, Jensen, and Lleras-Muney (2014) found no evidence that a quota system for boards in Norwegian firms had positive effects on the female workforce, except for those at the very top levels of the firm. Further, Hensvik (2014) argued that unobserved heterogeneity and worker sorting could account for the associations between women holding top positions within a firm and the gender wage gap, as these effects disappeared when worker fixed effects were included. Grissom, Nicholson-Crotty, and Keiser (2012) used nationally representative data on public school teachers and principals to show that in a model with school fixed effects, male teachers had higher turnover rates when working for a female principal, but female teachers' separations were unrelated to the principal's gender.

In higher education settings, where mentoring is likely to play an important role, there has been little indication that students perform better when matched with a same-sex teacher or

advisor. Canes and Rosen (1995) and Bettinger and Long (2005) found no evidence that increasing female faculty representation in the sciences had an effect on the likelihood that female college students major in the field, while Hoffmann and Oreopoulos (2009) found a positive but small effect on the course completion and performance outcomes of incoming undergraduate students from having an instructor of the same sex. Female economics PhD students did not seem to benefit from working with a female advisor (Neumark and Gardecki 1998; Hilmer and Hilmer 2007). However, a noticeable positive impact of having a teacher of the same sex has been found among eighth graders (Dee 2007).

A few papers look beyond basic demographics such as gender or race, incorporating several observable characteristics into a composite measure of social proximity to examine the role that sharing a type plays in relationships within the labor market. Behncke, Frölich, and Lechner (2010) found that in Switzerland, the unemployed are more likely to find a job if they share gender, age, education, and nationality with their caseworker. Bandiera, Barankay, and Rasul (2009) exploited manager and worker similarities across nationality, residential location, and employment start date to show that social connections between lower-level workers and their manager matter less when the manager's goal is to maximize firm performance. Moving beyond observable characteristics, Glover, Pallais, and Pariente (2015) evaluated the discriminatory attitudes of supervisors in a large French grocery chain by administering an Implicit Association Test to store managers. Using a difference-in-differences framework, they found that minority cashiers performed worse when working for relatively more biased managers. Non-minority workers performed similarly under supervisors of different types. Evidence suggests that the mechanism at play was lower levels of interaction between biased supervisors and minority workers.

Our study also contributes to the literature on gender differences in turnovers. In early work, Viscusi (1980) and Blau and Kahn (1981) showed that most of the difference in quits rates between male and female workers was accounted for by job characteristics and to a lesser degree by personal characteristics. More recently, Frederiksen (2008) used a large matched firm–worker data set of all Danish workers to show that workplace characteristics account for most of the gender gap in job separations. Using personnel data from a large insurance company, Sicherman (1996) found that after the early tenure years, men and women have similar turnover rates once personal and job characteristics are taken into consideration; however, on-the-job training and other career considerations matter more for male mobility than for female mobility. Royalty (1996) showed that turnover and formal training were related, in that formal company training was negatively associated with the predicted probability of turnover, particularly job-to-nonemployment transitions, which were more likely to be discharges. We observe in our data that men and women have overall similar turnover patterns, but women experience more separations at any level of tenure. The gender gap in turnover is lower under more female-friendly supervisors. The supervisor's female-friendliness appears to make the most difference when performance is below average and separations are more likely to be discharges. In relation to Royalty's (1996) work, we examine the negative association between turnover and informal mentoring, rather than formal company training.

Previous work has analyzed the question of whether one's propensity to hire women in the college coaching market is related to the gender of the decision maker (Bednar and Gicheva 2014). Building on our previous work, in this article we analyze the collegiate athletics labor market to determine whether the female-friendliness of supervisors affects the career progression of female workers, with a particular emphasis on performance growth and turnover. In addition,

we improve on the measure of female-friendliness in Bednar and Gicheva (2014) by addressing the potential endogeneity with respect to worker outcomes.

Collegiate Athletic Administration as a Labor Market

We utilize a novel data set of athletic director–head coach–university matches for the National Collegiate Athletic Association (NCAA) Division I programs that span the period from the 1992–1993 to the 2009–2010 academic years. The structure of the data makes it possible to observe supervisor–worker matches, to track individuals across institutions, and to compare outcomes at a set of workplaces where the internal hierarchy is homogeneous, mobility is fairly high, and a consistent quantifiable measure of performance exists. Studies of a single employer, such as those by Giuliano et al. (2009, 2011), cannot difference out firm-specific factors. Other existing matched worker–firm data, such as the Longitudinal Employer Household Dynamics (LEHD) panel, contain establishment-level firm characteristics but do not follow supervisors across establishments, so it is again impossible to separate out institutional from management factors. Studies such as Bertrand and Schoar (2003), which followed upper-level managers at different firms, did not observe the outcomes of individual lower-level employees. The structure of our data is most similar to school personnel administrative records used in articles such as Jacob and Lefgren (2008), in which the corresponding mentoring relationship is between principals and teachers.

Our empirical approach requires that athletic directors are responsible for personnel decisions and have some level of discretion into how much focus the school places on each sport's success—for example, through decisions about how much effort to put into fund-raising to improve training facilities. Online Appendix A (available at http://journals.sagepub.com/doi/suppl/10.1177/0019793917703973) shows two sample job postings for open athletic director positions at Eastern Michigan University and West Virginia University, both of which compete in NCAA Division I athletics. The postings suggest that the athletic director is responsible for the hiring and mentoring of coaches.

The decisions made by athletic directors have extensive impact, as the performance of athletic programs has implications beyond the realm of the NCAA. Previous studies have shown that athletics matter for other aspects of university performance, for example, SAT scores of entering students (McCormick and Tensley 1987), retention and graduation rates (Mixon and Trevino 2005), or alumni donations (Holmes, Meditz, and Sommers 2008; Meer and Rosen 2009). Carroll and Humphreys (2000) modeled the actions of NCAA athletic directors as agents who maximize utility, which is a function of the athletic department's total staff, prestige, and budget.

Our theoretical model presented in the following section is based on the assumption that the objective of head coaches is to maximize performance (team-winning percentage), whereas athletic directors are able to increase productivity through mentoring, either directly or by creating an environment that actively promotes success.

Theoretical Framework

We consider a firm with two job levels, supervisor and worker; exactly one employee works under each supervisor. In the context of the empirical application in this article, the two positions are athletic director and head coach, and the analysis is conducted at the team level

since most teams in the data have a single head coach. Each worker j is characterized by an inherent ability parameter a_j and type s_j, both of which are common knowledge.[2] In our study, worker type is given by sex, so $s=\{m, f\}$. A fraction r of all workers in the population are male, and 1–r are female. The parameter a has a cumulative distribution function G(a). For simplicity, we assume that the distribution of a does not differ by type s. Supervisors are characterized by their type d, which determines their ability or willingness to mentor female workers. Over time, male workers have a comparative advantage for improvement under supervisors with lower values of d, and female workers acquire human capital more quickly under supervisors with higher d.

We consider two periods in the model. Observed performance in period t for worker j whose tenure under supervisor i equals $\tau = \{1, 2\}$ is given by[3]

$$w_{ijt}(\tau) = a_j + (\tau - 1)\,\theta(d_i, s_j) + \varepsilon_{ijt}$$

where ε_{ijt} is a mean-zero i.i.d. noise term with distribution given by $F(\varepsilon)$ and corresponding density function $f(\varepsilon)$. Our model incorporates Athey, Avery, and Zemsky's (2000) idea of type-based mentoring since the rate of learning $\theta \geq 1$ depends on s and d: $\partial\theta(d, m)/\partial d < 0$ and $\partial\theta(d, f)/\partial d > 0$. When the distribution of d is symmetric around 0, a normalization such as $\theta(0,m)=\theta(0,f)$ can ensure that on average, male and female workers have the same rate of learning-by-doing. This model is built around specialization: supervisors have a comparative advantage in mentoring workers of one type.

Inherent ability a and mentoring are similarly additively separable in the model proposed by Athey et al. (2000), but this assumption is not crucial here. The human capital production function in Equation (1) is also similar to Gibbons and Waldman's (1999) model of productivity growth, in which the speed of learning-by-doing differs by worker type.

Period 1: Workers are assumed to be randomly assigned to supervisors. This assumption reflects the fact that when a new supervisor is hired, she initially inherits the firm's existing employee pool.

Nonrandom matching of supervisors to organizations would violate the assumption, but the model's predictions about the dynamics of performance and turnover would still be valid in most cases. For example, universities may hire athletic directors with established records of mentoring females when they need to promote a more female-friendly environment to comply with Title IX regulations. Then the starting fraction of male workers could be positively correlated with d. This scenario would not affect predictions 2 and 3 below, on which the main empirical analysis is based. The predictions may not hold, however, if inherent ability a_j and the return to tenure $\theta(d_i,s_j)$ are not additively separable in Equation (1) and if, in addition, a_j and $\theta(d_i,s_j)$ are negatively correlated. The latter can describe an environment in which a university with poorly performing female coaches hires an athletic director who has a comparative advantage in mentoring females. The validity and implications of the random matching assumption are discussed further in the Empirical Analysis and Alternative Explanations sections below.

After observed performance $w_{ij1}(1)=aj+\varepsilon_{ij1}$ is realized, the supervisor decides whether to retain the worker or to dismiss her and hire a new worker before the start of the second period. The decision to dismiss a worker cannot be revoked. A pool of n replacement workers are available as potential new hires whose abilities are independent draws from the distribution F(a)

and who are male with probability r. Supervisors know n but do not observe the type and ability parameters of the available replacement workers until after terminating the current worker's employment.[4] The expected value of a worker hired by supervisor i in period 2 is a˜2, which is a function of the distribution function G.[5]

Workers are retained if their ability exceeds a reservation value

$$a_{ij}^{*} = \tilde{a}_2 - \theta\left(d_i, s_j\right),$$

so the probability of separation, conditional on $\theta(d_i,s_j)$ and observed performance w_{ij1}, is

$$P\left(\text{Separate} \,|\theta\left(d_i, s_j\right), w_{ij1}\right) = 1 - F\left(w_{ij1} + \theta\left(d_i, s_j\right) - \tilde{a}_2\right).$$

Period 2: If the initial worker is retained, output in period 2 is $w_{ijt}(2)=a_j+\theta(d_i,s_j)+\varepsilon_{ij2}$. If supervisor i makes the decision to hire a new worker in period 2, she observes a vector of n ability parameters and chooses the worker with the highest ability, regardless of type s because there will be no benefits from mentoring. The probability that the newly hired worker is of type m equals r for all supervisors. If a new worker k is hired in period 2, observed performance in period 2 is $w_{ik2}(1)=a_j+\varepsilon_{ik2}$.

The model yields the following empirical predictions:

1. The ex ante probability that the worker observed in period 2 is of type m is decreasing in d.

   Let pit denote the ex ante probability that a worker of type m is working under supervisor i in period t. By assumption, $p_{i1}=r$, and

   $$p_{i2} = r\left(1 - G\left(\tilde{a}_2 - \theta\left(d_i, m\right)\right)\right) + r\left(rG\left(\tilde{a}_2 - \theta\left(d_i, m\right)\right) + \left(1 - r\right)G\left(\tilde{a}_2 - \theta\left(d_i, f\right)\right)\right),$$

   so that

   $$\frac{\partial p_{i2}}{\partial d_i} = r\left(1 - r\right)\left(\frac{\partial G\left(\tilde{a}_2 - \theta\left(d_i, f\right)\right)}{\partial \theta}\frac{\partial \theta\left(d_i, f\right)}{\partial d} - \frac{\partial G\left(\tilde{a}_2 - \theta\left(d_i, m\right)\right)}{\partial \theta}\frac{\partial \theta\left(d_i, m\right)}{\partial d}\right) < 0.$$

   More workers of type m and fewer workers of type f are discharged as a supervisor's female-friendliness parameter d increases.

2. The rate of improvement of worker performance over the course of the worker–supervisor match is increasing in d for female workers and decreasing in d for male workers.

   This follows from Equation (1), given that $\frac{\partial 2 \text{wijt}}{\partial \tau\, \partial \theta} > 0$.[6]

3. The probability of separation, conditional on tenure, is decreasing in observed performance. When a large proportion of worker–supervisor matches are characterized by relatively high values of θ, which translates into a low observed separation rate, the relationship between performance and turnover is less negative at higher values of θ.[7]

   It follows from (2) that

$$\frac{\partial P\left(\text{Separate}\,|\theta\left(d_i, s_j\right), w_{ij1}\right)}{\partial w} = -f\left(w_{ij1} + \theta\left(d_i, s_j\right) - \tilde{a}_2\right) < 0.$$

   Furthermore,

$$\frac{\partial^2 P\left(\text{Separate}\,|\theta\left(d_i, s_j\right), w_{ij1}\right)}{\partial w \partial \theta} = -f'\left(w_{ij1} + \theta\left(d_i, s_j\right) - \tilde{a}_2\right).$$

The expected sign of Equation (4) is positive for most distributions (for example, when the density function f(·) is bell-shaped) as long as the value of mentoring tends to be relatively large, so that $w_{ij1} + \theta\left(d_i, s_j\right) - \tilde{a}_2$ is likely to fall in the downward-sloping portion of the distribution. Separations will be relatively uncommon in this case.

Last, note that the expression in Equation (4) is only weakly positive in the right tail of the distribution—at high values of w_{ij1}—where f'(·) is close to zero. Intuitively, the relationship between performance and the probability of separation is weak for high-performing workers, regardless of the quality of the mentoring match, because most such workers are retained by supervisors of all types.

The prediction that better-performing workers are less likely to be discharged in the mentoring model, with the relationship being weaker for female workers paired with more female-friendly supervisors and performance mattering less for turnover for high-performing workers, is tested in Empirical Analysis. In the same section, we also test the second empirical prediction, that worker performance improves more quickly when workers are matched with supervisors who are relatively more effective at mentoring them. Testing these predictions requires a measure of the female-friendliness parameter d. We describe the way our measure is constructed, based on the first empirical prediction presented above, after we provide more details about the data that we use.

Data

Sample Construction

To identify the influence of supervisors separately from institution-level factors, which are likely to be important on their own for the success of female workers, we use a panel data set that tracks athletic directors across programs. We take a relatively conservative identification approach, in which we use only observations for which the athletic director occupies the top position at multiple programs during the sample period, which spans the 1992–1993 to 2010–2011 academic years. Of the 138 administrators who are observed in the top position at multiple

schools, 18 work at three different schools and three are observed at four schools. Using the subsample of directors observed at multiple programs allows us to identify athletic director fixed effects separately from institutional trends, as fixed effects for athletic directors who do not switch schools are indistinguishable from period-specific school effects. We use data for one men's and six women's sports: basketball (men and women), field hockey, lacrosse, soccer, softball, and volleyball. Years in which a given team did not participate in Division I athletics are excluded. Although atypical, there are some cases in which only a subset of the sports within a program are played at the Division I level and are included in the sample.

The gender of each athletic director and tenure at their current school are identified through web searches. At the team level, we use information about the gender of the head coach, current tenure, and the season winning percentage. Some specifications also include coach fixed effects.8 These records are provided by the NCAA (accessed online in Archived Team-by-Team Final Statistics 2014). We focus our analysis on women's sports, because for the men's Division I sports for which the NCAA provides head coach and season-by-season performance data, the fraction of female coaches is either equal to or very close to zero; more detailed statistics are provided in the NCAA Member Institutions' Personnel Report (2011). Men's basketball is included for comparison, but our main results are based on the part of the sample that has variation in the gender of potential mentees.

We record the starting month, when available,[9] and the year for each athletic director–university pair, including directors who are observed in the position in the 1992–1993 year, which allows us to construct an accurate measure of tenure. To improve the precision of the tenure variable, we take into account the exact months when administrators assumed and vacated their positions and the months during which different sports are played. Field hockey, soccer, and volleyball seasons take place during the fall; basketball is a winter sport; and lacrosse and softball are spring sports. An athletic director is assigned the fall season if her start date is before September 1, the winter season if the start date is before November 1, and the spring season of a given academic year if she started in January of that school year or earlier. In the rare cases when a coach separates from the school mid-season (0.4% of all observations), we record separately the winning percentage and coach information for both subsets of the season. We exclude observations for which coach tenure equals zero, which eliminates coaches who are with the team for a single season. Individuals who coached 10 or fewer games in a given season are excluded, a restriction that applies to 0.3% of all observations. Overall, 831 male and 821 female head coaches are working under one of the 129 male and 9 female athletic administrators observed at multiple schools.

Descriptive Statistics

Table 1 shows the female fraction of head coaches by sport and the number of teams in the sample that compete in each sport. The fraction of female coaches, excluding men's basketball for which it is 0, ranges from 0.37 for soccer to 0.76 for softball and exceeds 0.9 for lacrosse and field hockey. Because the latter two sports are coached by females almost by default and men's basketball is always coached by males, it is likely that for these coaches the athletic director's inherent attitude toward working with females has different implications compared to other sports in the data, similar to how the career progression of female workers seems to be driven by different factors in female- compared to male-dominated occupations (e.g., Blau and Kahn 2000). In our Empirical Analysis section we perform the analysis both with and without lacrosse,

field hockey, and men's basketball and show that the results are stronger in the restricted sample.[10]

Table 1. Female Fraction of Head Coaches by Sport

Sport	**N**	**Fraction female coaches**
Basketball (Men)	1,514	0
Soccer	1,255	0.369
Volleyball	1,488	0.546
Basketball	1,548	0.665
Softball	1,175	0.759
Lacrosse	318	0.943
Field hockey	421	0.967
Total	7,719	0.506

Gender distribution in our sample is similar to the labor market more generally if a parallel is drawn between the athletic director position and that of top corporate executives, on the one hand, and head coaches and lower-level managers, on the other. Matsa and Miller (2011) reported that in their sample of publicly traded US companies, the share of females among the firm's top five executives increased from 3.2% to 6% between 1997 and 2009, and Bertrand and Hallock (2001) pointed out that 41.4% of firm managers (occupation codes between 3 and 22) in the Current Population Survey were female in the early to mid-1990s. In our data, the fraction of female athletic directors increases gradually from 3% in 1992–1993 to 8% in the last year of the panel, and the fraction of female head coaches (excluding lacrosse, field hockey, and men's basketball) decreased from 65% to 55% during the same period.

Table 2 displays summary statistics of the variables used in the analysis; the sample is split by head coach gender and tenure. The sample statistics for female coaches are shown in columns (1) and (3). Columns (1) and (2) show sample means and standard deviations for coaches with eight or fewer years of tenure, and the observations summarized in columns (3) and (4) are for coaches with nine or more years of tenure. The 75th percentile of the tenure distribution is eight years, which is how the cutoff is chosen, but the results are robust to variations in the cutoff. Given that tenure in the sample includes up to 48 years, and we believe that the mentoring model should have more predictive power early on during a worker's career, we analyze high-tenure observations separately in the Empirical Analysis section.

Table 2. Descriptive Statistics

	Coach tenure between 1 and 8 years			*Coach tenure 9 years or more*	
	Female coach	*Male coach*		*Female coach*	*Male coach*
Variable	*(1)*	*(2)*		*(3)*	*(4)*
Winning %	0.49 (0.184)	0.529 (0.181)		0.571 (0.181)	0.584 (0.189)
$Winning_t$ -$Winning_{t-1}$	0.007 (0.162)	0.009 (0.162)		-0.014 (0.160)	-0.012 (0.156)
Last season with team	0.147	0.137		0.112	0.121

Winning % (last season)	0.395 (0.184)	0.454 (0.191)		0.469 (0.174)	0.476 (0.191)
$Winning_t$ -$Winning_{t-1}$ (last season)	-0.0251 (0.159)	-0.0269 (0.159)		-0.03411 (0.141)	-0.042 (0.168)
Tenure	3.560 (2.160)	3.560 (2.140)		14.300 (4.960)	14.100 (5.640)
AD tenure	4.170 (3.440)	4.150 (3.510)		4.630 (3.810)	4.710 (3.780)
Female-friendliness	-0.003 (0.980)	-0.057 (0.977)		0.033 (0.969)	-0.104 (0.951)
Number of observations	2,781	2,853		1,122	963
Number of schools	194	198		133	130
Number of coaches	730	746		238	221

Notes: Standard deviations in parentheses. Sample includes 138 athletic directors, 201 schools, 821 female head coaches, and 831 male head coaches. Last season refers to the season before a separation from the school.

Performance, measured by winning percentage, improves with tenure, which is consistent with models of learning-by-doing and job matching. By this measure, male coaches tend to be slightly more successful than females, especially when tenure is lower. The average observed winning percentage in the sample exceeds 0.5 because of the exclusion of observations with newly hired workers and because some Division I teams play, and are more likely to win, against non-Division I opponents. The 10th and 90th percentiles for winning percentages are 0.26 and 0.76, respectively, and half of all observations fall in the interval between 0.395 and 0.661. This finding suggests that for most teams in the sample there is ample room for improvement or worsening in performance between one season and the next, and the left- and right-censoring of the performance variable affects very few observations. Table 2 also shows that performance and the change in performance between consecutive periods are considerably lower in the last year before a turnover is observed.

Annual turnover rates are between 11% and 15%, and they decrease with coach tenure, particularly for females. Average head coach tenure does not vary by gender: it is 3.6 years in columns (1) and (2) and 14 years in columns (3) and (4). Tenure of athletic directors averages between 4 and 5 years for all four groups. The measure of athletic director female-friendliness that we use, discussed in the following section, is higher for female coaches, and the difference between the samples of male and female coaches is larger for coaches who have been with the team longer.

Measure of Female-Friendliness

Our measure of female-friendliness is modified from our earlier Bednar and Gicheva (2014) study, in which we examined gender variations in the fixed-effect estimates from a regression of the fraction of females coaching women's sports at school m in academic year t under athletic director i. The sample for this part of the estimation is expanded to include athletic directors observed at a single program, but the fixed effects are constructed only for movers when the employment spell lasts more than two years. Athletic directors who head a program for fewer than two years are likely to be interim and as such may have comparatively less decision

power. Our main modification to the analysis in Bednar and Gicheva (2014) is to make the female-friendliness measure sport-specific. We estimate

$$pct\_female_{imt,-s} = \gamma_m + \eta_t + \delta_{is} + \zeta_{imst},$$

where s stands for sport, and the index -s is used to denote the sample that includes all sports with the exception of men's basketball, lacrosse, field hockey, and sport s, if different from the first three. We exclude men's basketball, lacrosse, and field hockey because of the gender homogeneity in these sports. We also exclude the athletic director's first year at school m, when the outcome variable is most likely to reflect decisions of previous administrators.

The dependent variable measures the fraction of females coaching sports in the set -s at school m in academic year t under athletic director i. Female-friendly athletic directors are defined as those who employ more women than the institution and year average, and thus female-friendliness is measured by the parameter $\hat{\delta}_{is}$.[11] This definition is in line with the first prediction of the type-based mentoring model presented above. We use the fixed-effect estimates $\hat{\delta}_{is}$ as explanatory variables in regressions of performance and turnover, and personnel decisions are endogenous. Therefore, we may obtain biased estimates if female-friendliness was estimated based on the gender composition of the coaches of all sports, including sport s, and was then used to explain, for example, the probability of the coach of team s separating from the team. We can avoid the problem when our measure of female-friendliness is independent of what happens with sport s.

As mentioned earlier, the relationship between supervisor type and the observed share of female coaches may be spurious under nonrandom assignment of athletic directors to schools. This concern is alleviated by the finding in Bednar and Gicheva (2014) that spending on women's sports relative to team revenues is an increasing function of the estimated female-friendliness. This result provides some external validity that the fixed effects in the regression in Equation (5) correspond to a more broadly defined definition of female-friendly attitudes and practices. We address nonrandom assignment further in the Alternative Explanations section.

Because the estimated coefficients are used as explanatory variables below, they are adjusted to account for the additional estimation variance. The adjustment is based on Bayesian shrinkage (Morris 1983) and is similar to the approach typically taken by studies of teacher and principal performance (e.g., Jacob and Lefgren 2008; Leigh 2010; Branch, Hanushek, and Rivkin 2012).

Let $\hat{\delta}_{is}^{OLS}$ be the estimated fixed effect from the regression in Equation (5), constructed to have a mean of zero. The true fixed effect is $\hat{\delta}_{is}$, and e_{is} is measurement error because ordinary least squares (OLS) does not estimate the coefficients precisely. Under the classical measurement error assumptions, $\hat{\delta}_{is}^{OLS} = \delta_{is} + e_{is}$ and Var(δ)= $\mathrm{Var}(\delta) = \mathrm{Var}\left(\hat{\delta}^{OLS}\right) - \mathrm{Var}(e)$. When the fixed effects are included in second-stage regressions, the measurement error attenuation bias is given by

$$\text{plim } \widehat{\beta} = \beta \left(\frac{\text{Var}(\delta)}{\text{Var}\left(\hat{\delta}^{OLS}\right)} \right).$$

To adjust the estimated fixed effects, we estimate $\text{Var}(\hat{\delta}^{OLS})$ by finding the sample variance of the estimated fixed effects (denoted $\widehat{\sigma}^2_{OLS}$). Var(e) is estimated as the sample average of the squared standard errors of the $\hat{\delta}^{OLS}$ parameters (denoted $\widehat{\sigma}^2_e$). Then $\widehat{\sigma}^2_\delta = \widehat{\sigma}^2_{OLS} - \widehat{\sigma}^2_e$ and the adjusted fixed effects are given by

$$\hat{\delta}^A_{is} = \hat{\delta}^{OLS}_{is} \left(\frac{\widehat{\sigma}^2_\delta}{\widehat{\sigma}^2_\delta + \widehat{se}^2_{is}} \right),$$

where $\widehat{se}^2_{is}$ is the standard error of the first-stage parameter estimate for the i[th] athletic director and for sport s. The resulting $\hat{\delta}^A$ parameters are standardized for each sport to have mean 0 and standard deviation of 1 in the sample of 138 athletic directors observed at multiple programs. The purpose of this normalization is to ease the interpretation of the coefficients from the second-stage models when the estimated fixed effects are used as regressors. Even though the estimates are sport-specific, they are highly correlated: the coefficients of correlation between sports range from 0.61 to 0.85. For the rest of the analysis we drop the s subscript and refer to an athletic director's female-friendliness parameter as if it is unique and sport-invariant in order to streamline the exposition. The standardized adjusted fixed effects are denoted by $\hat{\delta}^*$.

Empirical Analysis

Performance and the Length of the Worker-Supervisor Match

According to the second empirical prediction outlined previously, coach performance improves more quickly over the course of the worker–supervisor match when female coaches are paired with female-friendly athletic directors and when male coaches work under administrators who have comparative advantage in mentoring male workers. We investigate whether an athletic director's attitude toward working with females is related to the variation in performance of coaches over time. Under a type-based mentoring hypothesis in the context of our study, performance, measured by team-winning percentage, would improve faster for female mentees (head coaches) when the mentor (athletic director) is of a female-friendly type. For male coaches, performance would improve more slowly when the athletic director is more female-friendly. A mentoring relationship is expected to become weaker for coaches who have held the position for a long period of time.

We estimate the following regression for the performance w_{ijt} of coach j in year t working under athletic director i:

$$w_{ijt} = \gamma_0 + \gamma_1 \hat{\delta}_i^* + \gamma_2 \,\mathrm{FemCoach}_j + \gamma_3 T_{ijt} + \gamma_4 \,(\mathrm{FemCoach}_j \times T_{ijt}) + \gamma_5 \,(\mathrm{FemCoach}_j \times \hat{\delta}_i^*) + a_1 \,(\mathrm{T}_{ijt} \times \hat{\delta}_i^*) + a_2 \,(\mathrm{FemCoach}_j \times T_{ijt} \times \hat{\delta}_i^*) + \mathrm{Z}_{ijt}\Gamma + \eta_t + \eta_{ms} + \nu_{ijt}$$

The variable T measures the number of years the coach has worked under the current athletic director and η_{ms} is a team (school m and sport s) indicator. When the director's tenure exceeds the tenure of the head coach, T equals the coach's tenure; otherwise T is set to equal the tenure of the athletic director. The variables contained in the vector Z include quadratics in the athletic director's and coach's tenure and their interactions with coach gender, as well as athletic director gender and its interactions with $\mathrm{FemCoach}_j$,T_{ijt} and $\mathrm{FemCoach}_j \times \mathrm{T}_{ijt}$. We estimate Equation (6) separately for coaches with one to eight years of tenure and coaches with nine or more years of tenure. Some of the specifications replace η_{ms} with separate school, sport, and coach indicators. We also include the previous season's winning percentage $w_{ij,t-1}$ in some models to account for the potential for past inputs into team success. We show results with all sports in the sample and results without lacrosse, field hockey, and men's basketball. The coefficients of interest are a_1 and a_2; the theory in our framework section predicts that $a_1 < 0$ and $a_1 + a_2 > 0$.

The estimation results corresponding to the model in Equation (6) are shown in Table 3. Gender interactions are presented so that each coefficient is compared to zero rather than comparing, for instance, the results for male coaches to zero and the results for female coaches to those for males. Overall, results are consistent with the type-based mentoring framework in which individual administrators have a comparative advantage in mentoring coaches of a certain type. The results in Panel A are for the observations with lower levels of tenure, and the sample used for Panel B has longer tenure.

Table 3. Supervisor Type and Change in Performance over Time

Dependent variable: Winning % at t					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*
A. Coaches with 8 or fewer years of tenure					
Male coach x Female-friendliness	-0.002	-0.004*	-0.004*	-0.005**	-0.005**
x Years match	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Female coach x Female-friendliness	0.003	0.003	0.004*	0.005**	0.005**
x Years match	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male coach x Female-friendliness	0.003	0.006	0.009	-0.004	-0.008
	(0.007)	(0.009)	(0.009)	(0.015)	(0.016)
Female coach x Female-friendliness	-0.020***	-0.019***	-0.021***	-0.012	-0.014
	(0.007)	(0.007)	(0.008)	(0.011)	(0.011)
Female coach	-0.016	-0.022	-0.032		
	(0.020)	(0.022)	(0.023)		
Winning % at *t*-1					0.035*
					(0.019)

N	5,634	4,423	3,877	3,877	3,729
Adjusted *R*-squared	0.414	0.430	0.426	0.563	0.567
B. Coaches with 9 or more years of tenure					
Male coach x Female-friendliness x Years match	0.0002	-0.0024	-0.0021	-0.0018	-0.0013
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Female coach x Female-friendliness x Years match	-0.0003	-0.0006	0.0006	-0.0001	-0.0004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male coach x Female-friendliness	-0.0003	0.0070	0.0096	0.0184	0.0137
	(0.019)	(0.022)	(0.022)	(0.023)	(0.024)
Female coach x Female-friendliness	-0.022	-0.023*	-0.018	-0.017	-0.016
	(0.013)	(0.014)	(0.014)	(0.014)	(0.015)
Female coach	-0.107	0.212**	-0.217**		
	(0.091)	(0.101)	(0.101)		
Winning % at *t*-1					0.095***
					(0.030)
N	2,085	1,782	1,589	1,589	1,532
Adjusted *R*-squared	0.530	0.526	0.520	0.522	0.524
Fixed effects	Team	Team	Team	Sport, school, coach	Sport, school, coach
Lacrosse & Field hockey	Yes	Yes	No	No	No
Men's basketball	Yes	No	No	No	No

Notes: Models include the length of the coach–director match as well as quadratics in coach and athletic director tenure interacted with coach gender, interactions between athletic director and coach gender, and triple interactions between athletic director gender, coach gender, and the length of the match. Year indicators are also included. Observations with 0 years of coach tenure are excluded.
*p < 0.10; **p < 0.05; ***p < 0.01.

The results in column (1) are for the full set of sports in the data. As predicted, the point estimate for a_1 is negative and the point estimate for a_1+a_2 is positive in Panel A, but their absolute values are small and not statistically significant. Once men's basketball is excluded from the sample (column (2)), $\widehat{a_1}$ approximately doubles in absolute value for coaches with fewer than nine years of tenure and becomes statistically significant at the 10% level. Similarly, the interaction between the length of the match and the supervisor's female-friendliness becomes positive and statistically significant for female coaches, once lacrosse and field hockey are also excluded from the sample (column (3)). The estimates increase slightly in absolute value and become significant at the 5% level when the team fixed effects are replaced with separate sport, school, and coach fixed effects (column (4)). Including lagged performance (column (5)) does not have an impact on $\widehat{a_1}$ and $\widehat{a_2}$. The estimates in column (5) suggest that on average, a female coach hired by an athletic director whose assigned fixed effect is one standard deviation above the mean experiences an annual improvement in performance of one percentage point higher than a similar female coach working under a supervisor whose measured female-friendliness is one standard deviation below the mean; by contrast, a male coach hired by an athletic director whose assigned fixed effect is one standard deviation above the mean experiences an annual improvement in performance of one percentage point lower than a similar male coach working

under a supervisor whose measured female-friendliness is one standard deviation below the mean. This effect is not large—if a team plays 30 games in a given season, which is typical for basketball and volleyball, this translates to winning one-third of an extra game—but as Table 2 shows, the average annual change in performance is also small (0.7 points for women and 0.9 points for men in the lower-tenure sample). A five-year mentoring relationship in which performance increases from 0.45 to 0.5 would improve the coach's rank in the estimation sample from the 39th to the 50th percentile of the distribution.

The estimates in columns (1) to (3) suggest that female coaches start off with worse performance during the early years of the coach–director relationship when their supervisor is female-friendly. This estimate may be suggestive of differences in hiring practices based on a supervisor's female-friendliness. The coefficients for athletic director gender are not shown in Table 3 because of space constraints, but they provide no indication that a same-gender coach–athletic director match is advantageous. Because only nine female administrators appear in the data, this evidence is not conclusive that supervisor gender does not matter.

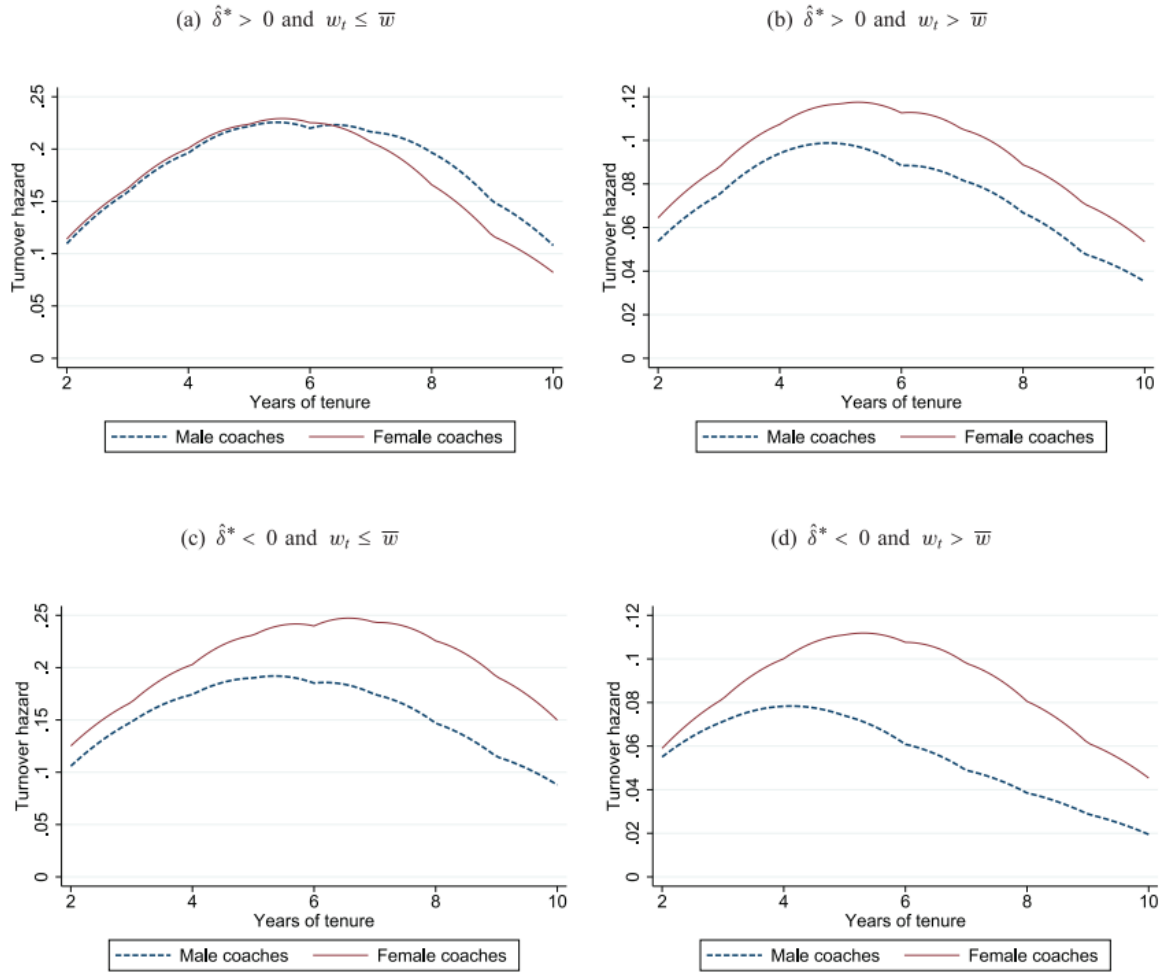
Results in Panel B of Table 3 imply that any improvement in coach performance over time is unrelated to the attitudes of the athletic director when the coach's tenure is in the top quartile of the distribution. The coefficients on the interaction $T_{ijt} \times \hat{\delta}_i^*$ are statistically indistinguishable from zero in all specifications for both men and women, and the magnitude of the point estimates is considerably lower compared to the estimates presented in Panel A.

Performance and Turnover

The relationship between worker performance, supervisor attitudes, and turnover is examined descriptively in Figure 1. We show smoothed plots of the estimated baseline hazard of separation, measuring time as years of tenure. We focus on the four main sports used in the analysis—women's basketball, soccer, volleyball, and softball—and show the hazard separately for male and female coaches. The top two panels, (a) and (b), pool all observations for which the athletic director's z-score $\hat{\delta}^*$ is positive, whereas the bottom two graphs, (c) and (d), depict the tenure-turnover relationship when $\hat{\delta}^* < 0$. Panels (a) and (c) show graphs for which period t performance is weaker than the team's average prior to t; observed separations in this subsample are more likely to be discharges. Performance is stronger than the team's average for the observations used in panels (b) and (d), which makes separations more likely to be quits.

All four plots show that the relationship between turnover and tenure has an inverted U-shape peaking after about five years.[12] Comparing panels (a) and (c), in which performance is below average, to (b) and (d), in which performance is above average, reveals that the hazard is about twice as high when performance is comparatively poor. Women are more likely to separate than men when performance is above average regardless of whether the athletic director is female-friendly or not, but the gap between the male and female hazard curves is larger in panel (d) after the first three years of tenure. Female coaches are also more likely than male coaches to separate when winning percentage is below the team's average and the athletic director's female-friendliness parameter is below 0. In panel (a), however, in which performance is relatively poor but the athletic director is comparatively female-friendly, the male and female hazard rates are for the most part identical for the first seven years, after which the male turnover hazard is slightly higher. Thus, Figure 1 suggests that female-friendly athletic directors may be more likely to retain a poorly performing coach who is female than an otherwise similar coach who is male.

Figure 1. Turnover Hazard by Gender and Supervisor Female-Friendliness



Notes: Smoothed plot of the estimated hazard contribution for each of the first 10 years of tenure. The variable w_t denotes current winning percentage, and $\bar{w}$ is the team's average winning percentage up to time t. We use a modified (boundary) Epanechnikov function and bandwidth equal to 4. Field hockey, lacrosse, and men's basketball are excluded from the sample.

Our theoretical model implies that the value of retaining a worker increases with the observed performance measure w_{ijt}, and therefore we expect to see an inverse relationship between w_{ijt} and the probability of separation, especially among workers who are not top performers. When athletic directors, in their role of mentors in the context of our study, differ in the value they add to mentees (coaches) over time, we will see a difference in the rate at which coaches are dismissed following a bad season. In particular, female-friendly athletic directors will be less likely than directors with low values of $\hat{\delta}^*$ to dismiss a female coach based on poor current season performance.

To explore how a supervisor's female-friendliness affects worker turnover in the data, we estimate a linear probability model in which the dependent variable is an indicator for the current season being a coach's last year with the team:

$$\text{LastSeason}_{ijt} = \beta_0 + \beta_1 \hat{\delta}_i^* + \beta_2 \text{FemCoach}_j + \beta_3 w_{ijt} + \beta_4 (\text{FemCoach}_j \times w_{ijt})$$
$$+\beta_5 \left(\text{FemCoach}_j \times \hat{\delta}_i^*\right) + \tau_1 \left(w_{ijt} \times \hat{\delta}_i^*\right) + \tau_2 \left(\text{FemCoach}_j \times w_{ijt} \times \hat{\delta}_i^*\right)$$
$$+Z_{ijt}B + \mu_t + \mu_{ms} + \epsilon_{ijt}$$

Similar to Equation (6), the explanatory variables contained in Z include quadratics in the athletic director's and the coach's tenure and their interactions with coach gender, as well as athletic director gender and its interactions with $FemCoach_j$, w_{ijt} and $FemCoach_j \times w_{ijt}$. We again show additional results from specifications in which school, sport, and coach fixed effects are included separately in place of μ_{ms}. The theory predicts that the coefficient of interest τ_1 should be negative and $\tau_1+\tau_2$ should be positive.

The estimation sample is split based on whether current performance is stronger than the team's average performance between the 1992–1993 season and the current season[13]($\overline{w}_{mst}$):

$$\overline{w}_{mst} = \frac{1}{t} \sum_{l=1}^{t} w_{l.}$$

Dividing the sample based on performance relates to the theory discussed above. When the value added by mentoring is relatively high, performance is expected to matter less for turnover under all supervisors.

Similar to the previous section, results in Table 4 are presented so that all gender interactions are compared to zero rather than to one another. Panel A shows estimation results for the observations for which the measure of performance in the current period is lower than the team's average: $w_{ijt} < \overline{w}_{mst}$. The first column includes all sports in the data. Consistent with the model, current winning percentage has a strong negative relationship with turnover for both genders; at the mean level of female-friendliness, $\hat{\delta}^* = 0$, the estimated coefficients on w_{ijt} are negative and significant at the 1% level for both genders and in all specifications. The fact that winning percentage is consistently negatively associated with separations for coaches with below-average performance supports the interpretation that most of the separations for this group are coming from dismissal rather than quits. The coefficient on the interaction between performance and female-friendliness in the first column of panel A is positive for female coaches and negative for male coaches, but the magnitudes are small and we cannot reject the null hypothesis that the true coefficients equal zero. Excluding men's basketball (column (2)) increases the magnitude of $\hat{\tau}_1$ for men but not enough for statistical significance. Excluding lacrosse and field hockey in column (3) almost doubles the point estimate of the coefficient on the interaction between performance and supervisor female-friendliness for female coaches, resulting in significance at the 5% level. For a female coach whose athletic director's female-friendliness is one standard deviation below the mean, a five point decrease in winning percentage increases the probability of turnover by (−0.675 − 0.252)*(−0.05), or 4.6 percentage points. When a female coach works under a director whose estimated female-friendliness parameter is one standard deviation above the mean, a five point decrease in her team's winning percentage makes her 2.1 percentage points more likely to leave, since (−0.675 + 0.252)*(−0.05)

= 0.021. Given that the annual turnover rate in the low-performance sample is 19%, the latter effect represents an 11% increase.

Table 4. Performance and Turnover

Dependent variable: Indicator for last season with team				
	(1)	*(2)*	*(3)*	*(4)*
A. Winning percentage less than team's observed average prior to current season				
Male coach x Winning % x Female-friendliness	-0.040	-0.117	-0.123	0.159
	(0.098)	(0.121)	(0.122)	(0.137)
Female coach x Winning % x Female-friendliness	0.143	0.138	0.252**	0.237**
	(0.098)	(0.096)	(0.109)	(0.122)
Male coach x Winning %	-0.368***	-0.382***	-0.395***	-0.369**
	(0.113)	(0.134)	(0.136)	(0.155)
Female x Winning %	-0.553***	-0.548***	-0.675***	-0.462***
	(0.109)	(0.106)	(0.119)	(0.132)
Male coach x Female-friendliness	-0.001	0.062	0.062	0.007
	(0.047)	(0.058)	(0.059)	(0.083)
Female coach x Female-friendliness	-0.142***	-0.129***	0.186***	-0.143**
	(0.047)	(0.047)	(0.052)	(0.068)
N	3,233	2,596	2,298	2,298
Adjusted *R*-squared	0.078	0.077	0.085	0.251
B. Winning percentage greater than team's observed average prior to current season				
Male coach x Winning % x Female-friendliness	0.053	0.072	0.075	-0.116
	(0.079)	(0.099)	(0.100)	(0.109)
Female coach x Winning % x female-friendliness	-0.044	-0.044	0.029	-0.006
	(0.067)	(0.066)	(0.077)	(0.089)
Male coach x Winning %	-0.180**	-0.168*	-0.152	0.093
	(0.081)	(0.099)	(0.099)	(0.109)
Female coach x Winning %	-0.229***	-0.223***	-0.240***	-0.074
	(0.077)	(0.077)	(0.086)	(0.095)
Male coach x Female-friendliness	-0.025	-0.045	-0.044	0.072
	(0.050)	(0.064)	(0.065)	(0.078)
Female coach x Female-friendliness	0.046	0.043	-0.006	-0.015
	(0.042)	(0.042)	(0.047)	(0.057)
N	3,802	3,061	2,689	2,689
Adjusted *R*-squared	0.108	0.103	0.098	0.297
Fixed effects	Team	Team	Team	Sport, school, coach
Lacrosse & Field hockey	Yes	Yes	No	No
Men's basketball	Ye	No	No	No

Notes: Models also include quadratics in coach and athletic director tenure interacted with coach gender, as well as athletic director gender interacted with coach gender and with coach gender and current winning percentage. Year indicators are also included. Observations with 0 years of coach tenure are excluded. *p < 0.10; **p < 0.05; ***p < 0.01.

The estimated coefficients do not change substantially when team fixed effects are replaced with separate sport, school, and coach indicators; the standard errors increase slightly. These estimates are shown in column (4) of Table 4. The estimates of $\hat{\tau}_1$ for men are not statistically significant in any of the specifications in panel A, but their signs are negative, consistent with the last theoretical prediction in our framework section. The signs of $\hat{\tau}_1$ and $\hat{\tau}_2$ are in line with the predictions of the type-based mentoring model.

The female-friendly measure has a negative and highly significant association with turnover for female coaches and is positively related to turnover for males coaching women's sports, but the point estimates for this group are small and not statistically different from zero. The results in column (3) imply that for coaches whose performance is fairly weak, w_{ijt}=0.25, one standard deviation increase in $\hat{\delta}^*$ decreases the probability of turnover by approximately 12 percentage points for females (significant at the 0.1% level) and increases it by 3 percentage points for males, the latter result being fairly noisy. For better-performing coaches, w_{ijt}=0.5, a standard deviation increase in $\hat{\delta}^*$ decreases the probability of turnover by 6 percentage points for women (p value of 0.03) and is associated with no change in turnover for men (p value of 0.99). Because the measure for sport s was constructed without accounting for the gender of that team's coach, the result suggests that more female-friendly athletic directors are less likely to dismiss relatively poor-performing female coaches, all else equal. This finding is consistent with the first theoretical prediction of our model.

When performance is better than the team's average from previous years in the data, all factors discussed above play a lesser role for turnover. These results are shown in panel B of Table 4. In particular, the coefficients on winning percentage in panel B are smaller in magnitude, and the interactions with supervisor attitude are statistically indistinguishable from zero for coaches of both genders.

The implications from the results in Table 3 in the previous section should be considered in combination with the findings from the turnover model. The fact that, conditional on observed performance, matches are more likely to survive if a female coach is matched to a female-friendly supervisor makes the length of the match T_{ijt} in Equation (6) endogenous. Consider Equation (8) below, in which the specification in Equation (6) has been modified to set $FemCoach_j = 1$:

$$w_{ijt} = (\gamma_0 + \gamma_2) + (\gamma_1 + \gamma_5)\,\hat{\delta}_i^* + (\gamma_3 + \gamma_4)\,T_{ijt} + (a_1 + a_2)\left(\mathrm{T}_{ijt} \times \hat{\delta}_i^*\right) + \mathrm{Z}_{ijt}\Gamma + \eta_t + \eta_{ms} + \nu_{ijt}.$$

The standard approach when addressing the endogeneity of tenure (e.g., Altonji and Shakotko 1987; Topel 1991) is to decompose the stochastic error term ν_{ijt} into a time-invariant individual-specific component μ_i, a match-specific component μ_{ijt}, and a random shock ξ_{ijt}. Further, we can write

$$\mu_{ijt} = b_0 + b_1\hat{\delta}_i^* + b_2 T_{ijt} + b_3\left(T_{ijt} + \hat{\delta}_i^*\right) + u_{ijt}.$$

The estimate of a_1+a_2 in Equation (8) will be biased when $b3 \neq 0$ because $E[\hat{a}_1 + \hat{a}_2] = a_1 + a_2 + b_3$. The findings we report in Table 4 suggest that $b_3 < 0$ since female-friendly administrators are less likely to dismiss female coaches based on poor performance. Then the results in Table 3 underestimate the mentoring effect on performance growth. In the case of discrimination-based sorting when $a_1+a_2=0$, we should in fact observe a relative decline in the observed average performance of females working under female-friendly supervisors.[14]

Conversely, the results in Table 4 rule out the concern that the performance growth of female coaches is faster under female-friendly supervisors not because of mentoring but because high-quality female coaches are less likely to quit when the athletic director expends more effort on retaining females; by contrast, the results rule out that the performance growth of male coaches is slower under female-friendly supervisors not because of mentoring but because high-quality male coaches are more likely to quit when the athletic director is more female-friendly. This would require the coefficient $\tau 2$ to be negative, which we do not find to be the case.

Robustness Checks

We perform several robustness checks and present the results in Tables 5 (for performance) and 6 (for turnover). We consider the specifications in column (3) of Tables 3 and 4 to be our main findings and base the robustness checks on these results. For the performance models in Table 5, we use only the subsample of coaches with eight or fewer years of tenure, corresponding to panel A in Table 3. The sample sizes in Table 4 are smaller to begin with and decrease substantially once we start imposing the additional sample restrictions described in this section, which combined with the relatively large number of team fixed effects in the model results in imprecise estimates. For this reason, we combine the subsamples in panels A and B of Table 4 and show pooled results.[15] Column (1) of Table 6 shows the estimates from the main model in column (3) of Table 4 for the pooled sample. The coefficient on the triple interaction between gender, winning percentage, and female-friendliness is positive and highly significant for women; the interactions between the coach's gender and the team's winning percentage are negative and also highly significant. The magnitudes of the estimated coefficients fall between those in panels A and B of Table 4, as expected.

First, we address the issue of assortative matching of coaches and athletic directors by estimating the models in Equations (6) and (7) on the sample of coaches who purportedly have no experience as a head coach prior to being hired at their current institution.[16] The assignment of coaches to schools is much more likely to be random when individuals have not held the position in the past because it introduces more uncertainty about their ability. The NCAA data provide information about the number of years of experience of the team's head coach, but we found a number of instances in which the information was inaccurate and did not take into account other jobs observed in the data. We believe the measurement error should be independent of other variables in the models, such as the coach's gender or the athletic director's female-friendliness. The point estimates in column (1) of Table 5 have the same signs and similar magnitudes as those from our main specification, suggesting that the availability of prior observations of a head coach's ability is not essential for the relationship between performance improvements and supervisor female-friendliness. Similarly, the results in columns (1) and (2) of Table 6 do not differ much. In fact, the point magnitudes of the triple interactions with winning percentage and supervisor type are higher in absolute value for both genders in the restricted sample in column (2). We interpret these results as evidence that our results are likely not driven

by nonrandom matching of athletic directors and head coaches for the sports we consider in our analysis.

Table 5. Robustness Checks: Performance

Dependent variable: Winning % at t			
	(1)	*(2)*	*(3)*
Male coach x $\hat{\delta}$* x Years match	-0.007** (0.003)	-0.016** (0.006)	-0.001 (0.004)
Female coach x $\hat{\delta}$* x Years match	0.005* (0.003)	-0.006 (0.005)	0.009*** (0.003)
Male coach x $\hat{\delta}$*	0.012 (0.014)	0.017 (0.014)	-0.014 (0.020)
Female coach x $\hat{\delta}$*	-0.020* (0.011)	-0.009 (0.012)	-0.065*** (0.016)
Female coach	-0.010 (0.033)	0.026 (0.054)	0.150 (0.141)
N	2,151	2,144	1,733
Adjusted *R*-squared	0.460	0.430	0.497
Sample	No prior experience	Tenure ≤ 3	Tenure ≥ 3

Notes: Field hockey, lacrosse, and men's basketball are excluded from the sample. Models include team fixed effects, the length of the coach–director match as well as quadratics in coach and athletic director tenure interacted with coach gender, interactions between athletic director and coach gender, and triple interactions between athletic director gender, coach gender, and the length of the match. Year indicators are also included. Observations with 0 years or more than 8 years of coach tenure are excluded.
*p < 0.10; **p < 0.05; ***p < 0.01.

Table 6. Robustness Checks: Turnover

Dependent variable: Indicators for last season with team				
	(1)	*(2)*	*(3)*	*(4)*
Male coach x Winning x $\hat{\delta}$*	-0.039 (0.053)	-0.069 (0.071)	-0.061 (0.087)	-0.037 (0.071)
Female coach x Winning x $\hat{\delta}$*	0.112* (0.003)	0.170*** (0.060)	0.251*** (0.078)	0.091* (0.055)
Male coach x Winning %	-0.313*** (0.053)	-0.246*** (0.073)	-0.335*** (0.089)	-0.332*** (0.072)
Female coach x Winning %	-0.414*** (0.044)	-0.286*** (0.063)	-0.329*** (0.075)	-0.482** (0.060)
Male coach x $\hat{\delta}$*	0.019 (0.031)	0.036 (0.043)	0.019 (0.051)	0.003 (0.046)
Female coach x $\hat{\delta}$*	-0.074*** (0.025)	-0.100*** (0.035)	-0.121*** (0.041)	-0.066* (0.036)
Female coach	0.035	-0.025	0.090	0.067

	(0.045)	(0.063)	(0.126)	(0.084)
N	5,192	3,047	2,042	3,150
Adjusted *R*-squared	0.100	0.139	0.068	0.233
Sample	All	No prior experience	Tenure ≤ 3	Tenure ≥ 3

Notes: Field hockey, lacrosse, and men's basketball are excluded from the sample. Models include team fixed effects, quadratics in coach and athletic director tenure interacted with coach gender, as well as athletic director gender interacted with coach gender and with coach gender and current winning percentage. Year indicators are also included. Observations with 0 years of coach tenure are excluded.
*p < 0.10; **p < 0.05; ***p < 0.01.

Next, we consider that the relationships we observe during the first four years of a coach's tenure, when the team consists at least partly of players who were recruited by a previous coach, may differ from later years. It is also possible that the mentoring effect is particularly strong right after a coach is hired, which would be another reason to expect the results to differ for observations with very low levels of tenure; this possibility is consistent with the observation from Table 3 that improvements in performance have little or no relationship with the athletic director's type when tenure is nine years or more. The main specifications already exclude the first year after a coach takes over the team, which we refer to as 0 years of tenure.

In columns (2) and (3) of Table 5 and columns (3) and (4) of Table 6 we re-estimate the models on two subsamples based on tenure of one to three years and four to eight years. Differences between the low- and high-tenure groups combine the recruiting and mentoring effects discussed above. The point estimates in Table 5 suggest that the relationship between performance growth and supervisor female-friendliness is more negative for newly hired male coaches than for male coaches with higher tenure; the trend is reversed for female coaches: the relationship is more positive for the higher-tenure group. The mobility specifications show that for female coaches, performance matters less for turnover when tenure is less than four years, but the coefficient on the triple interaction between the female indicator, performance, and athletic director female-friendliness is significant at least at the 10% level both in columns (3) and (4).

One explanation consistent with the findings is that female-friendly athletic directors are especially protective of newly hired female coaches and dismissal based on poor performance is rare for these supervisor–worker matches. When poor performers are more likely to be retained, observed average performance growth is relatively low, which would explain the findings in Table 5. At the same time, the relationship is still present in the higher-tenure group, so our mentoring model still conforms with the data when coaches are fully responsible for the team's roster.

Alternative Explanations

We show in the previous section that the data are consistent with our mentoring model, but there may be other potential explanations for the observed trends. Here we discuss some alternative theories and the degree to which they fit the data.

Consider a taste-based discrimination model in which, holding ability constant, supervisors are less likely to retain workers of a certain type but the rate of improvement in performance does not depend on the match between the worker's and the supervisor's types.

Using the notation from our Theoretical Framework, suppose that $w_{jt}(\tau)=a_j+(\tau-1)\theta_j+\varepsilon_{jt}$ and the probability of dismissal after the first period has a random component. Specifically, in this basic discrimination model, supervisors are assumed to discharge workers at the end of period 1 if $d_i<\nu_{ij}$ for workers of type f and if $-d_i<\nu_{ij}$ for workers of type m, where ν_{ij} has a random distribution. This discrimination model and the mentoring model in our framework section make similar predictions about the probability of separation of female workers at the end of period 1 and the fraction of workers of type m observed in period 2. A discrimination model with these features, however, does not support the observation in Table 3 that worker performance increases more quickly for female workers paired with female-friendly supervisors. In addition, the model predicts no correlation between performance and the probability of separation, and this is true across the whole distribution of d. In other words, the findings in Table 4 are not consistent with pure taste-based discrimination either.

Another possibility consistent with some of the empirical trends we observe is that more female-friendly supervisors can make better inferences about the unobserved ability of female workers. This idea is similar to the framework developed in Cornell and Welch's (1996) seminal work. It is possible that we observe steeper performance growth for female workers paired with female-friendly supervisors if there is heterogeneity in the rate of learning θ and if some supervisors have more information about workers' rate of learning, depending on the worker's and the supervisor's types. Furthermore, female-friendly supervisors paired with female workers may learn less about workers' unobserved ability based on bad performance in a single period, in which case separation rates may vary less with performance for such matches. If female-friendly supervisors have an advantage in judging the unobserved ability of female workers, we would also expect that on average they would hire less-experienced female coaches because unobserved ability is revealed over time. In a regression of $\hat{\delta}^*$ on the experience level of newly hired coaches, we find no correlation between experience and supervisor type for new hires of either gender.[17]

A third discrimination-related hypothesis is that worker effort, rather than the rate of learning, varies with the supervisor's type. Coaches who are placed in an unsupportive environment may exert less effort and thus have lower performance growth rates than those who are matched with a nondiscriminating athletic director. Although this theory is consistent with the positive coefficient documented in Table 3 on the triple interaction between the female indicator, $\delta\hat{}*$, and the length of the coach–director match, we would not expect to see a negative and statistically significant coefficient on the interaction between the female indicator and $\hat{\delta}^*$. If female workers tend to exert less effort under less female-friendly supervisors, it is likely that the difference in performance becomes apparent from the start of the match, in which case the coefficient on the double interaction ($\mathrm{FemCoach}_j \times \hat{\delta}_i^*$) should be positive. Our simple mentoring model assuming random matching in the first period does not make predictions about differential hiring by worker and supervisor type, but if we add more periods then under a plausible set of assumptions the model can yield the prediction that female-friendly supervisors have lower ability cutoffs when hiring female workers relative to male workers.

The assumption of random matching of workers to supervisors is key for the theory presented in our framework section, but in many sports-related settings it is more realistic to assume that the labor market consists of a finite number of participants with at least partially observed heterogeneity in ability. Programs then have to solve an assignment problem that matches coaches to the team for which they are the best fit. Such an assignment problem is more

plausible for sports that generate high revenues, such as football or men's basketball. In these sports, head coaches are more likely to have revealed much of their ability prior to being hired by a team. The teams in our main sample, however, are very often coached by individuals who have no experience as head coach prior to assuming their current position. Of newly hired male coaches whom we observe in the data (Tenure = 0), 52.5% have no prior head coaching experience. The fraction increases to 60.8% if men's basketball is removed from the sample. Of newly hired female coaches, 60.5% have no previous experience.18 Furthermore, the robustness checks in column (1) of Table 5 and column (2) of Table 6 suggest that our results are not weakened by restricting the estimation sample to coaches with no prior experience.

Another central assumption of our theory is that the athletic director's attitude matters beyond the institution-specific culture. Our empirical model is based on the assumption of time-invariant school characteristics that can be accounted for by program fixed effects. It is not unlikely that the university-level support provided to female employees varies over time: there may be periods when a university commits to fostering a more female-friendly culture. This trend may cause the institution to hire athletic directors who have a record of retaining more female coaches, and at the same time the university may provide more resources to women's sports and to athletic teams coached by females. In other words, some of the relationships we observe may be attributable to nonrandom assignment of workers to supervisors driven by establishment-level trends. Unfortunately, there is no reliable test of the random matching assumption in this context.

As one falsification test, we consider the timing of hiring of the athletic director. If a university's administration commits to fostering a female-friendly culture, observed support for female athletics may precede slightly the hiring of a female-friendly athletic director. We use data on team revenues and expenditures for the period 2002–03 to 2010–11 reported by Division I institutions in accordance with the Equity in Athletics Disclosure Act (EADA) to construct the ratio of expenses to revenues for each team.19 For the athletic directors in our sample who were hired between 2003 and 2010, we observe that $\hat{\delta}^*$ has statistically significant positive correlation with the ratio of expenses to revenues for women's teams in the two years after the director assumed the position; the relationship is not statistically significant in the two years prior to the athletic director taking over.20 These results offer some support of the claim that athletic directors have an influence beyond university-level initiatives to improve the organization's female-friendliness.

Policy Implications

Finding an impact of supervisors' attitudes on the career outcomes of female employees raises two related policy questions. First, we have treated female-friendliness as purely exogenous throughout the analysis, but to what degree is this assumption plausible? And second, given that a mentor's attitude is much more difficult to discern than visible attributes such as gender, are there feasible policy recommendations similar, for example, to the gender ratio board quotas implemented in Norway that can be effective in providing higher levels of mentoring to females when needed? Without observing employment history and understanding other institutions' cultures, it is virtually impossible to infer when hiring a high-level manager whether an individual is truly female-friendly or if he or she acquired a female-friendly record by toeing the company line with a previous employer.

Providing in-depth answers to the questions above is beyond the scope of this article, but if female-friendliness is found to be correlated with more easily observable characteristics, either inherent or acquired, it can provide a clue as to whether the degree of female-friendliness can be augmented in incumbent managers and inferred in the case of new hires. For this purpose, we examined the biographies of the 138 administrators in our data for commonly available elements that may be correlated with our measure of female-friendliness. Bednar and Gicheva (2014) did not find evidence that gender is linked to female-friendliness, but the variation in this characteristic is limited given only 9 females in the sample of 138 supervisors. The variation observed in the female-friendliness measure among male athletic directors, however, motivates looking beyond a correlation with gender. More variability is linked to educational attainment: according to information from web searches, 21 of the administrators in the sample have a doctorate degree, 72 have a master's as their highest degree attained, and 45 have no graduate degree. On the one hand, we find no difference in the estimated fixed effects representing female-friendliness for master's degree holders compared to directors with no graduate degree; on the other hand, holding a PhD is associated with a noticeable increase in the magnitude of the $\hat{\delta}*$ parameters.[21]

This result should not be interpreted to mean that companies that desire to create a more female-friendly culture should hire more-educated supervisors. The sample we use for the analysis is small and drawn from a specific labor market setting, and the likelihood that unobserved factors are driving the relationship between education and revealed attitudes is high. We provide the result, however, as a starting point to illustrate that it may be possible to find other, more easily observable choices that individuals make that are related to being female-friendly.

Conclusion

A growing body of literature originating with Bertrand and Schoar (2003) has established that managerial style matters for firm performance. In particular, several recent papers (e.g., Ahern and Dittmar 2012; Matsa and Miller 2013) showed that the gender composition of top-level managers and observed firm practices and performance are likely to be related. We propose that limiting the analysis to easily observable leader attributes may leave out interesting dimensions of leadership style. Further, we extend the literature on type-based mentoring. Athey et al. (2000) pointed out that traditionally used data sets do not contain enough information about a rich set of matched worker–employer pairs observed over time, and that it is difficult to derive consistent measures of the hierarchy within heterogeneous firms; for both of these reasons, they concluded, empirical research should expand into alternative data sources to learn more about type-based mentoring.

In this article, we use a panel data set of athletic directors and head coaches at NCAA Division I programs to investigate whether, and how, female workers' careers progress differently based on their supervisor's attitude toward working with females. We show several trends consistent with a type-based mentoring model. We observe that females who are hired by a female-friendly supervisor experience more rapid improvement in performance over the course of the worker–supervisor match. The relationship is reversed for males. These trends are considerably weaker for workers with nine or more years of tenure, which is suggestive that mentoring is particularly important early on. We also find support for the prediction that female-friendly supervisors are more likely to retain a female worker conditional on observing poor

performance than are mentors whose type falls at the other end of the distribution. Overall, our empirical findings indicate that career progression differs between male and female workers dependent on the inherent propensity, assumed to be exogenous, of their supervisors to work with and to mentor females.

We study a very specific labor market setting; nonetheless, the results indicate that type-based mentoring is likely to be important for the career advancement of women and has the potential to account for part of the gender wage gap. In addition, our study introduces a new definition of mentor type, one that is more complex than easily observable attributes such as gender or race. Deriving other new measures of inherent supervisor attitudes can potentially reveal more about the mechanisms through which employment matches matter in the workplace.

Acknowledgements

We thank Ebonya Washington, Justin Wolfers, and participants at the CSWEP session of the 2014 ASSA Annual Meeting and seminar participants at Appalachian State University, North Carolina State University, and the University of South Carolina for helpful comments.

Additional results and copies of the computer programs used to generate the results presented in the paper are available from the corresponding author at sbednar@elon.edu.

Notes

1. By female-friendliness we mean that supervisors are supportive of women's presence in, and contribution to, the workforce.
2. The full-information assumption is made to streamline the model.
3. Performance can be modified to include a time-invariant firm-specific component without altering the main predictions of the model.
4. These assumptions would not be realistic for typically high-profile sports such as football or men's basketball, for which the labor market for coaches is more likely to have a well-defined set of participants with known ability, and the hiring process resembles more closely an assignment problem. For the sports we consider in the main part of the analysis, the pool of potential hires appears to be large and characterized by a higher level of unobserved ability. For instance, individuals with no previous experience are more likely to be risky hires. The data we use provide a measure of an individual's experience as head coach, but the information is somewhat inconsistent because some coaches' previous employment is not recorded. We do not use this information in the empirical estimation because of measurement error concerns, but a descriptive analysis suggests that for five of the six women's sports in the data, the median experience of new hires is 0 years. The average experience of newly hired men's basketball coaches is about 5.4 years in the sample, compared, for example, to 1.5 years for field hockey and 2.2 years for soccer.
5. Since mentoring does not play a role for workers hired in period 2, and assignment of workers is random in period 1, the simple model we present here does not yield predictions about differential hiring by worker and supervisor type. We do not observe a sufficient number of newly hired workers to obtain reliable within-team empirical estimates regarding directors' hiring practices.

6. When the model is extended to more than two periods, observed performance at a point in time is not necessarily increasing in θ because workers of lower initial ability may be hired or retained when the value added through mentoring is high.
7. In this study, we do not make the distinction between voluntary and involuntary turnovers, and our model treats all separations as dismissals. For an empirical investigation of the relationship between having an unsupportive supervisor and voluntary turnover see Cottini, Kato, and Westergaard-Nielsen (2011).
8. The coach fixed effects are sport-specific, so individuals who coach multiple sports are assigned a separate fixed effect for each sport. In the unlikely case that two people coach the same sport and have the same first and last names, they would incorrectly be treated as the same person. We believe that such occurrences are uncommon and not systematically related to other variables in the analysis, so they do not affect the results.
9. We were able to find information on the exact start date for 78% of the director–school pairs in the sample. For all others, we assumed that the employment spell started during the summer, which is most common: among the start dates we observe, 33% are in June, July, or August.
10. Men's basketball differs from most other sports in the data in terms of publicity and revenues. Men's basketball coaches' salaries can occasionally exceed their athletic director's pay, or the two positions may be held by the same person. For these reasons, the mentoring model developed in the Theoretical Framework section is expected to have weak or no predictive power for men's basketball. We include this sport in the data to provide a more complete picture of the scope and limitations of the mentoring model.
11. The analysis is similar in structure to Bertrand and Schoar (2003), who follow managers across firms to estimate the impact of managers on firm policies.
12. Seasons in which a coach has more than 10 years of tenure are not used in the analysis because such observations are few and the estimates are noisy. The first year of tenure is also excluded in order to rule out interim coaches.
13. We thus have to exclude the 1992–1993 season for these specifications because previous performance is not available. In addition, we cannot use the last year in which we observe a team in the data because the value of the dependent variable is unknown.
14. The signs of b_1 and b_2 are less clear. The sign of b_2 could be negative if quits play an important adjustment role in this labor market, which we do not have evidence of but cannot rule out. Since we do not have a clear theoretical interpretation of γ_1 and γ_5 in Equations (6) and (8), it can be argued that the coefficients already incorporate b_1.
15. Performance results for coaches with more than eight years of tenure and turnover results for the subsamples of relatively strong and relatively poor performers are available on request. These results are noisier but follow similar patterns to the ones presented here.
16. Descriptive statistics for the subsample of coaches with no prior experience are presented in Table B.1 in the online Appendix (available at http://journals.sagepub.com/doi/suppl/10.1177/0019793917703973). About 65% of the female coaches and 58% of the male coaches in the data are observed in a position for which they were hired with no prior experience. These coaches have slightly worse performance and higher turnover rates.
17. The results are not included in the article but are available from the authors on request.

18. As we mention earlier, we believe that the experience measure is underreported, so the actual fraction of coaches with zero years of experience may be somewhat lower than the numbers presented here.
19. Similar data are used in Bednar and Gicheva (2014), in which the data set is described in more detail.
20. The results are not reported in the article but are available on request. Since the sample for these regressions is restricted to newly hired athletic directors in the period 2003–2010, the sample sizes are small (fewer than 300 team-level observations).
21. For most of the 138 administrators, we were also able to find information on the number of male and female children. Washington (2008) showed that conditional on the number of children, having more daughters increases a congressman's tendency to vote liberally on reproductive rights issues. We did not find any relationship between our measure of female-friendliness and having daughters.

Reference

Ahern, Kenneth R., and Amy K. Dittmar. 2012. The changing of the boards: The impact on firm valuation of mandate female board representation. Quarterly Journal of Economics 127: 137–97.

Altonji, Joseph G., and Rebecca M. Blank. 1999. Race and gender in the labor market. Handbook of Labor Economics 3: 3143–259.

Altonji, Joseph G., and Robert A. Shakotko. 1987. Do wages rise with job seniority? Review of Economic Studies 54(3): 437–59. Archived Team-by-Team Final Statistics. Accessed at http://web1.ncaa.org/stats/StatsSrv/careersearch 2014 (July 23, 2014).

Athey, Susan, Christopher Avery, and Peter Zemsky. 2000. Mentoring and diversity. American Economic Review 90(4): 765–86.

Bagues, Manual F., and Berta Esteve-Volart. 2010. Can gender parity break the glass ceiling? Evidence from a repeated randomized experiment. Review of Economic Studies 77(4):1301–28.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul. 2009. Social connections and incentives in the workplace: Evidence from personnel data. Econometrica 77(4): 1047–94.

Bednar, Steven, and Dora Gicheva. 2014. Are female supervisors more female-friendly? American Economic Review 104(5): 370–75.

Behncke, Stefanie, Markus Fro¨lich, and Michael Lechner. 2010. A caseworker like me: Does the similarity between the unemployed and their caseworkers increase job placements? Economic Journal 120(549): 1430–59.

Bell, Linda A. 2005. Women-led firms and the gender gap in top executive jobs. IZA Discussion Paper No. 1689. Bonn, Germany: Institute for the Study of Labor.

Bertrand, Marianne, and Kevin F. Hallock. 2001. The gender gap in top corporate jobs. Industrial and Labor Relations Review 55(1): 3–21.

Bertrand, Marianne, and Antoinette Schoar. 2003. Managing with style: The effect of managers on firm policies. Quarterly Journal of Economics 118(4): 1169–208.

Bertrand, Marianne, Sandra E. Black, Sissel Jensen, and Adriana Lleras-Muney. 2014. Breaking the glass ceiling? The effect of board quotas on female labor market outcomes in Norway. NBER Working Paper No. 20256. Cambridge, MA: National Bureau of Economic Research.

Bettinger, Eric P., and Bridget Terry Long. 2005. Do faculty serve as role models? The impact of instructor gender on female students. American Economic Review 95(2): 152–57.
Blau, Francine, and Lawrence Kahn. 1981. Race and sex differences in quits by young workers. Industrial and Labor Relations Review 34(4): 563–77.
Blau, Francine D., and Lawrence M. Kahn. 2000. Gender differences in pay. Journal of Economic Perspectives 14(4): 75–99.
Branch, Gregory F., Eric A. Hanushek, and Steven G. Rivkin. 2012. Estimating the effect of leaders on public sector productivity: The case of school principals. NBER Working Paper No. 17803. Cambridge, MA: National Bureau of Economic Research.
Canes, Brandice J., and Harvey S. Rosen. 1995. Following in her footsteps? Faculty gender composition and women's choices of college majors. Industrial and Labor Relations Review 48(3): 486–504.
Cardoso, Ana Rute, and Rudolf Winter-Ebmer. 2010. Female-led firms and gender wage policies. Industrial and Labor Relations Review 64(1): 143–63.
Carroll, Kathleen A., and Brad R. Humphreys. 2000. Nonprofit decision-making and social regulation: The intended and unintended consequences of Title IX. Journal of Economic Behavior & Organization 43(3): 359–76.
Cornell, Bradford, and Ivo Welch. 1996. Culture, information, and screening discrimination. Journal of Political Economy 104(3): 542–71.
Cottini, Elena, Takao Kato, and Niels Westergaard-Nielsen. 2011. Adverse workplace conditions, high-involvement work practices and labor turnover: Evidence from Danish linked employer employee data. Labour Economics 18(6): 872–80.
Dee, Thomas S. 2007. Teachers and the gender gaps in student achievement. Journal of Human Resources 42(3): 528–54.
Frederiksen, Anders. 2008. Gender differences in job separation rates and employment stability: New evidence from employer-employee data. Labour Economics 15(5): 915–37.
Gibbons, Robert, and Michael Waldman. 1999. A theory of wage and promotion dynamics inside firms. Quarterly Journal of Economics 114(4): 1321–58.
Giuliano, Laura, David I. Levine, and Jonathan Leonard. 2009. Manager race and the race of new hires. Journal of Labor Economics 27(4): 589–631.
———. 2011. Racial bias in the manager-employee relationship: An analysis of quits, dismissals, and promotions at a large retail firm. Journal of Human Resources 46(1): 26–52.
Glover, Dylan, Amanda Pallais, and William Pariente. 2015. Discrimination as a self-fulfilling prophecy: Evidence from French grocery stores. NBER Working Paper No. 22786. Cambridge, MA: National Bureau of Economic Research.
Grissom, Jason A., Jill Nicholson-Crotty, and Lael Keiser. 2012. Does my boss's gender matter? Explaining job satisfaction and employee turnover in the public sector. Journal of Public Administration Research and Theory 22(4): 649–73.
Hensvik, Lena. 2014. Manager impartiality? Worker-firm matching and the gender wage gap. ILR Review 67(2): 395–421.
Hilmer, Christiana, and Michael Hilmer. 2007. Women helping women, men helping women? Same-gender mentoring, initial job placements, and early career publishing success for economics PhDs. American Economic Review 97(2): 422–26.
Hoffmann, Florian, and Philip Oreopoulos. 2009. A professor like me: The influence of instructor gender on college achievement. Journal of Human Resources 44(2): 479–94.

Holmes, Jessica A., James A. Meditz, and Paul M. Sommers. 2008. Athletics and alumni giving: Evidence from a highly selective liberal arts college. Journal of Sports Economics 9(5):538–52.
Jacob, Brian A., and Lars Lefgren. 2008. Can principals identify effective teachers? Evidence on subjective performance evaluation in education. Journal of Labor Economics 26: 101–36.
Kurtulus, Fidan Ana, and Donald Tomaskovic-Devey. 2012. Do female top managers help women to advance? A panel study using EEO-1 records. Annals of the American Academy of Political and Social Science 639(1): 173–97.
Leigh, Andrew. 2010. Estimating teacher effectiveness from two-year changes in students' test scores. Economics of Education Review 29(3): 480–88.
Matsa, David A., and Amalia R. Miller. 2011. Chipping away at the glass ceiling: Gender spillovers in corporate leadership. American Economic Review 101(3): 635–39.
———. 2013. A female style in corporate leadership? Evidence from quotas. American Economic Journal: Applied Economics 5(3): 136–69.
McCormick, Robert E., and Maurice Tensley. 1987. Athletics versus academics? Evidence from SAT scores. Journal of Political Economy 95(5): 1103–16.
Meer, Jonathan, and Harvey S. Rosen. 2009. The impact of athletic performance on alumni giving: An analysis of microdata. Economics of Education Review 28(3): 287–94.
Mixon, Franklin, and Len J. Trevino. 2005. From kickoff to commencement: The positive role of intercollegiate athletics in higher education. Economics of Education Review 24(1):97–102.
Morris, Carl N. 1983. Parametric empirical Bayes inference: Theory and applications. Journal of the American Statistical Association 78(381): 47–55.
NCAA Member Institutions' Personnel Report. 2011. Technical Report. Indianapolis, IN: National Collegiate Athletic Association, February.
Neumark, David, and Rosella Gardecki. 1998. Women helping women? Role model and mentoring effects on female Ph.D. students in economics. Journal of Human Resources 33(1): 220–46.
Royalty, Anne Beeson. 1996. The effects of job turnover on the training of men and women. Industrial and Labor Relations Review 49(3): 506–21.
Sicherman, Nachum. 1996. Gender differences in departures from a large firm. Industrial and Labor Relations Review 49(3): 484–505.
Tate, Geoffrey, and Liu Yang. 2015. Female leadership and gender equity: Evidence from plant closure. Journal of Financial Economics 117(1): 77–97.
Topel, Robert H. 1991. Specific capital, mobility, and wages: Wages rise with job seniority. Journal of Political Economy 99(1): 145–76.
Viscusi, W. Kip. 1980. Sex differences in worker quitting. Review of Economics and Statistics 62(3): 388–98.
Washington, Ebonya L. 2008. Female socialization: How daughters affect their legislator fathers. American Economic Review 98(1): 311–32.