Career Implications of Having a Female-Friendly Supervisor

Steven Bednar† and Dora Gicheva‡

August 2014

Abstract

We study how supervisors’ perceived attitudes towards working with females generate gender differences in workers’ observed career outcomes. Longitudinal matched employer-worker data in which supervisors are observed at multiple establishments allow us to construct a measure of revealed type and to examine its role for the performance and turnover of lower-level employees. We observe that the careers of male and female workers progress differently depending on supervisor type in a way consistent with a type-based mentoring model. The results suggest that more focus should be placed on revealed attitudes in addition to observable attributes such as gender.

Keywords: type-based mentoring, rate of learning-by-doing, labor turnover, gender in the labor market.

JEL Classification Codes: J24, J44, J71, M51.

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

‡Department of Economics, Elon University, 2075 Campus Box, Elon, NC 27244, USA. E-mail: sbednar@elon.edu. Phone: +1 (336) 278-5935. Fax: +1 (336) 278-5952.

§Department of Economics, University of North Carolina at Greensboro, PO Box 26170, Greensboro, NC 27402, USA. E-mail: d_gichev@uncg.edu. Phone: +1 (336) 334-4865. Fax: +1 (336) 334-5580.
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, supervisors may be better able to infer the true ability of a worker if they have a common attribute (Cornell and Welch 1996) or it could be that mentoring is an important determinant of employees’ career trajectories and is more effective if the workers and supervisors are of the same type (Athey, Avery and Zemsky 2000). Embedded in this idea are important policy implications for alleviating the gender wage gap and other adverse career outcomes for females.

In our paper we introduce and find empirical support for a type-based 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 towards working with female workers. We use a unique matched supervisor-worker longitudinal data set in which individuals with high levels of managerial responsibility are observed at multiple establishments over time, which allows us to construct a measure of revealed supervisor female-friendliness above and beyond institution-specific culture.

While 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 far from fully accounted for by observables, and on the other hand a type-based mentoring model such as the one developed in Athey et al. (2000) can predict a narrower gap in female-led firms, 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 detail. Several stud-
ies have found positive career effects for female workers when more women have leadership roles within a firm. Bell (2005) shows 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 U.S. (Tate and Yang forthcoming) and Portugal (Cardoso and Winter-Ebmer 2010), female firm leadership is also associated with a lower wage gap among lower-level employees. Women at the top are further found to increase the share of females at lower levels of the firm in the U.S. (Bell 2005, Kurtulus and Tomaskovic-Devey 2012) and Norway (Matsa and Miller 2011). Giuliano, Levine and Leonard (2009) and Giuliano, Levine and Leonard (2011) have found similar positive effects for workers in one large retail firm if their manager shares the same race or ethnicity.

However, other studies indicate that females may have no impact on or even hinder the career progression of other women. For example, Bagues and Esteve-Volart (2010) find that greater female representation on a recruiting committee negatively impacts female applicants for positions with the Spanish Judiciary. Bertrand, Black, Jensen and Lleras-Muney (2014) find no evidence that a quota system for boards in Norwegian firms has positive effects on the female workforce, except for those at the very top levels of the firm. Further, Hensvik (2014) argues 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 disappear when worker fixed effects are included.

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) find no evidence that increasing female faculty rep-
representation in the sciences has an effect on the likelihood that female college students major in the field, while Hoffmann and Oreopoulos (2009) find 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 Ph.D. students do 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) find 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) exploit 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.

We add to the literature by proposing the idea 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 towards working with and mentoring females, 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 find evidence that females are more likely to benefit in terms of career progression when matched with a supervisor with a more favorable attitude towards mentoring women.

Our type-based mentoring model yields three main predictions. First, female-friendly supervisors will tend to retain more female workers than the average at their firm. Next, female workers will see a larger increase in the rate at which their performance improves over the course of their tenure under a female-friendly supervisor. Finally, while the probability of separation depends heavily on worker performance, the latter matters less so for a female matched with a female-friendly supervisor. Intuitively, a female-friendly supervisor expects female workers’ performance to progress more quickly under their guidance, so even females with lower initial ability are likely to be more valuable than a new hire of unknown ability and type.

Using a longitudinal data set on collegiate athletic administrators in which workers with a high level of managerial responsibility are observed at multiple establishments over time, we build on Bednar and Gicheva (2014), where we construct a measure of revealed supervisor female-friendliness above and beyond the institution-specific culture by comparing changes in the gender composition of workers at lower levels of the firm. We find support for the predictions of the type-based mentoring model as opposed to a model of pure taste-based discrimination. We show 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 not observed when the worker’s tenure exceeds that of the supervisor, which is suggestive that hiring and mentoring decisions are likely made jointly. 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 the careers of male and female workers progress differently depending on the inherent propensity, assumed to be exogenous, of their supervisors to work with and mentor females.

While our study focuses on a very specific labor market setting, described in the following section, our findings offer strong support for the importance of type-based mentoring in the labor market and in addition should motivate researchers to use broader definitions of “type” that include harder to infer attitudes in addition to directly observable supervisor and worker attributes such as gender.

1 Collegiate Athletic Administration As a Labor Market

We utilize a novel data set of athletic director - head coach - university matches for NCAA Division I programs that spans the period from the 1992-1993 to the 2009-2010 academic years. The structure of the data make 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 Giuliano et al. (2009) and Giuliano et al. (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) that follow upper-level managers at different firms do not observe the outcomes of individual lower-level employees. The structure of our data is most similar to school personnel administrative records used in papers such as Jacob and Lefgren (2008), where the corresponding mentoring relationship is between principals and teachers.

It is important for our empirical approach 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 fundraising to improve training facilities. Appendix A shows two sample job postings for open athletic director positions at Eastern Michigan University (EMU) and West Virginia University (WVU), both of which compete in Division I athletics. The EMU posting suggests that the athletic director is responsible for the hiring and mentoring of coaches, as one of the essential duties listed is:

Strengthen all sports to be competitive at the championship level. Recruit, mentor, support and supervise a diverse pool of strong, ethical and talented coaches to foster success.

Under duties and responsibilities, the WVU posting lists,

Providing leadership and sound decision-making with regard to all athletic department matters, including fiscal affairs, personnel, strategic planning, facilities, public relations, and general operations.

Providing leadership to ensure that the WVU Department of Intercollegiate Athletics has a highly competent and diverse coaching, administrative, and support staff consistent with the mission
of West Virginia University. In addition, the Athletic Director is responsible for supervision of coaches and athletic department personnel, as well as for fostering an environment of success within the department.

The “ability to recruit and hire outstanding coaches and staff” is listed as a desirable credential.

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).

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), while athletic directors are able to increase productivity through mentoring, either directly or by creating an environment that actively promotes success.

2 Theoretical Framework

We consider a firm with two job levels, supervisor and worker; there is exactly one employee working under each supervisor. In the context of the empirical application in this paper, 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.\footnote{The full-information assumption is made in order to streamline the model.} 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. Lower values of \( d \) correspond to having a comparative advantage in improving the performance of male workers over time, and female workers acquire human capital more quickly under supervisors with higher \( d \).

There are 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\(^2\)

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

where \( \varepsilon_{ijt} \) 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 et al.’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 \( \partial\theta(d, f)/\partial d > 0 \). 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. 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 \(^1\) is also similar to Gibbons and Waldman’s (1999) model of productivity growth, where the speed of learning-by-doing differs by worker type.

**Period 1:** Workers are randomly assigned to supervisors. After observed performance \( w_{ij1}(1) = a_j + \varepsilon_{ij1} \) is realized, the supervisor decides whether to retain the worker or dismiss her and hire a new worker before the start

\(^2\)Performance can be modified to include a time-invariant firm-specific component without altering the main predictions of the model.
of the second period. The decision to dismiss a worker cannot be revoked. There is a pool of \( n \) replacement workers 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. The expected value of a worker hired by supervisor \( i \) in period 2 is \( \tilde{a}_2 \), which is a function of the distribution function \( G \).

Workers are retained if their ability exceeds a reservation value

\[
a_{ij}^* = \tilde{a}_2 - \theta(d_i, s_j),
\]

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

\[
P(\text{Separate}|\theta(d_i, s_j), w_{ij1}) = 1 - F(w_{ij1} + \theta(d_i, s_j) - \tilde{a}_2). \tag{2}
\]

**Period 2:** If the initial worker is retained, output in period 2 is \( w_{ij2}(2) = a_j + \theta(d_i, s_j) + \varepsilon_{ij2} \). 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 \( w_{ik2}(1) = a_k + \varepsilon_{ik2} \).

\[^3\text{Since mentoring does not play a role for workers hired in period 2, and assignment of workers is random in period 1, the simple model we present here does not yield predictions about differential hiring by worker and supervisor type. We do not observe a sufficient number of newly hired workers to obtain reliable within-team empirical estimates regarding directors’ hiring practices.}\]
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 \( p_{it} \) 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

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

so that

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

More workers of type \( m \) and fewer workers of type \( f \) are discharged the higher a supervisor’s female-friendliness parameter \( d \) is.

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 \([1]\), since \( \partial^2 w_{ijt}/(\partial \tau \partial \theta) > 0 \).\(^4\)

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 \( \theta \), which translates into a low observed separation rate, the relationship between performance and turnover is less negative at higher values of \( \theta \).\(^5\)

\(^4\)When the model is extended to more than two periods, observed performance at a point in time is not necessarily increasing in \( \theta \) because workers of lower initial ability may be hired or retained when the value added through mentoring is high.

\(^5\)In this study we do not make the distinction between voluntary and involuntary
It follows from (2) that
\[
\frac{\partial P(\text{Separate}|\theta(d_i, s_j), w_{ij1})}{\partial w} = -f(w_{ij1} + \theta(d_i, s_j) - \tilde{a}_2) < 0. \tag{3}
\]
Furthermore,
\[
\frac{\partial^2 P(\text{Separate}|\theta(d_i, s_j), w_{ij1})}{\partial w \partial \theta} = -f'(w_{ij1} + \theta(d_i, s_j) - \tilde{a}_2). \tag{4}
\]
The expected sign of (4) is positive for most distributions (for example when the density function \( f(\cdot) \) is bell-shaped) as long as the value of mentoring tends to be relatively large, so that \( w_{ij1} + \theta(d_i, s_j) - \tilde{a}_2 \) is likely to fall in the downward-sloping portion of the distribution. Separations will be relatively uncommon in this case.

Lastly, note that the expression in (4) is only weakly positive in the right tail of the distribution – at high values of \( w_{ij1} \) – where \( f'(\cdot) \) 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.

A simulation of the type-based mentoring model presented in this section, summarized in Figure 1 helps illustrate its main implications.\(^6\) The predictions from the mentoring model are further compared to those from a taste-based discrimination model, in which the rate of improvement in performance does not depend on the match between the worker’s and supervisor’s 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).

\(^6\)The functional form and parameter value assumptions used for the simulation are as follows: \( a \sim U[0.25; 0.75]; r = 1/3; \theta(d_i, f) = 0.16 + d_i \) and \( \theta(d_i, m) = 0.16 - d_i; \varepsilon \sim N(0, 0.04); n = 1. \) We use the same 10,000 worker draws for each supervisor type.
types. Specifically, in this basic discrimination model supervisors are assumed to discharge workers at the end of period 1 if \( (d_i + \nu_{ij1} < -0.2) \) for females and if \( (-d_i + \nu_{ij1} < -0.2) \) for males, where \( \nu \sim N(0, 0.04) \). All workers in the simulated data are assumed to be female at the beginning of period 1.

Figure 1a shows that the two models make similar predictions for 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. Both the separation rate and the share of male workers are shown for values of the parameter \( d \) ranging between \(-0.1\) and \(0.1\), with solid lines representing the mentoring model and dashed lines corresponding to the discrimination setup. All four lines have negative slopes with respect to \( d \). This figure demonstrates the parallels between the two theories; the differences become apparent from Figure 1b.

The second graph shows the regression coefficients from a linear probability model in which the binary variable indicating a separation is regressed on period 1 performance \( w_1 \). Separate regressions are estimated for the observations that are below the median of \( w_1 \) and for those above the median. The third empirical prediction in this section states that the regression coefficients depicted in Figure 1b should be non-positive, and the values of \( \theta \) used in the simulation are chosen to be sufficiently large so that the slope of the relationships depicted in the figure is generally steeper for below-average performers but positive, or at least non-negative, for both groups (since the workers considered here are all female). In addition, the curve representing the high-performing group lies above the curve for the low-performing subsample. This is consistent with (3) because the values of \( f(w_1 + \theta - \tilde{a}_2) \) decrease in \( w_1 \) when \( w_1 + \theta - \tilde{a}_2 > 0 \), which holds at high values of \( \theta \). The two solid lines in Figure 1b depict the described relationships. In the discrimination model, there is no correlation between performance and the probability of separation,
and this is true across the whole range of values of $d$, as illustrated by the dashed lines in the figure.

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 Section 4. In the same section we also test the second empirical prediction, that worker performance improves faster 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 $d$. The way our measure is constructed, based on the first empirical prediction presented above, is described in Section 3.3 and in Bednar and Gicheva (2014). First we provide more details about the data that we use.

3 Data

3.1 Sample Construction

In order 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 1992-93 to 2010-11 academic years.7 There are 138 administrators who are observed in the top

---

7 The data set is very similar to the one we use in Bednar and Gicheva (2014), but here we extend the panel to include the 1992-93 season. The quantitative results presented in the earlier study change only minimally with the inclusion of the additional year of data.
position at multiple schools, of which 18 work at three different schools and 3 are observed at four schools. Using the subsample of directors observed at multiple programs allows us to separately identify athletic director fixed effects 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. While it is not typical, there are some cases in which only a subset of sports within a program are played at the Division I level, and these observations are included.

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. These records are provided by the NCAA (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 is 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 the main results are based on the part of the sample for which there is variation in the gender of potential mentees.

We record the starting month, when available, and year for each athletic director-university pair, including directors who are observed in the position in the 1992-93 year, which allows us to construct an accurate measure of tenure.

---

We were able to find information on the exact start date for 78 percent 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 percent are in June, July or August.
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 the sports in the data are played. Field hockey, soccer and volleyball are played during the fall season; 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 case where a coach separates from the school mid-season (0.4 percent of all observations), we record separately the winning percentage and coach information for both subsets of the season. We exclude from the sample observations for which coach tenure equals zero, which eliminates coaches who are with the team for a single season. Individuals who coached ten or fewer games in a given season are excluded, but this restriction applies to fewer than 0.2 percent of all observations. Overall, there are 831 male and 822 female coaches working under one of the 129 male and 9 female athletic administrators observed at multiple schools.

3.2 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 where it is 0, ranges from 0.37 for soccer to 0.76 for softball and exceeds 0.9 for lacrosse and field hockey. Since 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 towards working with females has different implications.
compared to other sports in the data, similarly 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 Section 4 we perform the empirical analysis both with and without lacrosse, field hockey and men’s basketball and show that the results are stronger in the restricted sample.\textsuperscript{9}

The gender distribution in our sample is similar to the labor market more generally defined 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) report that in their sample of publicly traded US companies, the share of females among the firm’s top five executives increases from 3.2 percent to 6 percent between 1997 and 2009, and Bertrand and Hallock (2001) point out that 41.4 percent 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 percent in 1992-93 to 8 percent in the last year of the panel, while the fraction of female head coaches (excluding lacrosse, field hockey and men’s basketball) decreases from 65 percent to 55 percent 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 by whether the coach’s tenure exceeds that of the athletic director (that is, whether the coach was hired by the current or previous administrator). More experienced workers perform

\textsuperscript{9}Men’s basketball is also very different 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 Section 2 is expected to have weak or no predictive power for men’s basketball. The reason for including this sport in the data is to provide a more complete picture of the scope and limitations of the mentoring model.
better, in that they have higher winning percentage, consistent with models of learning-by-doing and job matching, and male coaches tend to be slightly more successful than females. The average observed winning percentage in the sample exceeds 0.5 because of the exclusion of observations with newly hired workers. Team winning percentage has a bell-shaped distribution, as seen in the histogram in Figure 2. The 10th and 90th percentiles for the full sample are, respectively, 0.26 and 0.76, and half of all observations fall in the interval between 0.395 and 0.661. This 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 few observations. The mean annual difference in performance is 0.01 for females and 0.014 for males hired by the current supervisor, but the corresponding averages equal -0.006 and -0.005 in the higher-tenured group, suggesting a learning rate that is initially higher but decreases over time. 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 13 and 14 percent and increase somewhat with coach tenure, particularly for males. Average head coach tenure is 3 years for coaches hired by the current athletic director and 10 years for females and 9 years for males in the group hired by a previous supervisor. The tenure of athletic directors averages 6 years when the coach was hired by the current administrator and 3 years otherwise. By construction, 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 bigger for coaches who started under the current director.
3.3 Measure of Female-Friendliness

The measure of female-friendliness used in Section 4 is based on the analysis in Bednar and Gicheva (2014) and utilizes 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 used in 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. The fraction of female coaches is based on the sports in the data excluding lacrosse, field hockey and men’s basketball:

$$pct_{female_{mt}} = \gamma_m + \eta_t + \delta_i + \zeta_{imt}. \quad (5)$$

Female-friendly athletic directors are defined as those who employ more women than the institution and year average.\textsuperscript{10} This definition is in line with the first prediction of the type-based mentoring model in Section 2. Bednar and Gicheva (2014) show that spending on women’s sports relative to team revenues is an increasing function of the inferred female-friendliness, which provides some external validity that the fixed effects in the regression in (5) correspond to a more broadly defined definition of female-friendly attitudes and practices. As discussed in Bednar and Gicheva (2014), we cannot reject the hypothesis that the distribution of the estimated $\hat{\delta}$ coefficients is different for males and females.

\textsuperscript{10}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.
ables, 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 $\hat{\delta}_i^{OLS}$ be the estimated fixed effect from the regression in (5), constructed to have a mean of zero. The true fixed effect is $\delta_i$, and $e_i$ is measurement error because OLS does not estimate the coefficients precisely. Under the classical measurement error assumptions, $\hat{\delta}_i^{OLS} = \delta_i + e_i$ and $\text{Var}(\delta) = \text{Var}(\hat{\delta}^{OLS}) - \text{Var}(e)$. When the fixed effects are included in second-stage regressions, the measurement error attenuation bias is given by

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

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

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

where $\hat{se}_i$ is the standard error of the first-stage parameter estimate for the $i$th athletic director. The resulting $\hat{\delta}_i^A$ parameters are standardized 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. The standardized adjusted fixed effects are denoted by $\hat{\delta}^*$. 

20
4 Empirical Analysis

4.1 Performance and the Length of the Worker-Supervisor Match

According to the second empirical prediction outlined in Section 2, coach performance improves more quickly over the course of the worker-supervisor match when female coaches are paired with female-friendly athletic directors and male coaches work under administrators who have comparative advantage in mentoring male workers. We investigate whether an athletic director’s attitude towards 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 slower the more female-friendly the athletic director is. A mentoring relationship is expected to be stronger when a coach was hired by the current athletic director rather than by a previous administrator.

We estimate separately by gender the following regression for coach $j$ in year $t$ working under athletic director $i$:

$$\text{WinningPct}_{ijt} = \gamma_0 + \gamma_1 \hat{\delta}_i + \gamma_2 \text{FemaleAD}_i + \gamma_3 (T_{ijt} \times \hat{\delta}_i) + \gamma_4 (T_{ijt} \times \text{FemaleAD}_i) + Z_{ijt} \Gamma + \eta_t + \eta_{ms} + \nu_{ijt}. \quad (6)$$

The variable $T$ measures the number of years the coach has worked under the current athletic director and $\eta_{ms}$ 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. We estimate (6) separately for coaches who were hired by the current athletic director (coach tenure is less than or equal to athletic director tenure) and coaches who were hired by a previous director (coach tenure exceeds athletic director tenure). The match length $T$ does not enter the model uninteracted because it equals one of the tenure variables, depending on the sample restriction. We also control for athletic director gender and its interaction with the length of the worker-supervisor match. We show results with and without lacrosse, field hockey and men’s basketball.

The estimation results for the regression in (6) are shown in Table 3. Overall, they are consistent with the type-based mentoring framework in which individual administrators have a comparative advantage at mentoring coaches of a certain type. The results in panel A are for coaches hired by the current athletic director, while panel B shows results for the cases when the coach’s tenure is longer than their supervisor’s. In each case the models in the first two columns restrict the sample to female coaches, and columns 3 and 4 to males. The second column for each gender further restricts the sample by excluding the sports with little gender variation: lacrosse, field hockey and men’s basketball. For females who were hired under the current administrator, performance is initially the same or weaker but improves faster when the athletic director is female-friendly compared to other female coaches working under less female-friendly supervisors. The relationship is stronger when the teams with limited variation in coach gender are excluded from the sample.

On average, a female coach hired by an athletic director whose assigned fixed effect is one standard deviation above the mean experiences annual improvement in performance one point (0.01) higher than a similar female coach working under a supervisor whose measured female-friendliness is a 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 a third of an extra game – but as Table 2 shows, the average annual change in performance is small in the sample. A five-year mentoring relationship in which performance increases from 0.4 to 0.45 would raise the coach’s rank in the estimation sample from the 65th to 54th percentile of the distribution; increasing performance from 0.55 to 0.6 changes the worker’s rank from the 36th to the 25th percentile. The relationship is reversed and larger in magnitude for male coaches, whose performance improves faster when the athletic director they work for is assigned a fixed effect below the mean. Again, the magnitude of the fixed effect is higher in the restricted sample in column 4.

The results do not suggest that a same-gender coach-athletic director match is advantageous. The signs of the estimated coefficients are in fact suggestive that workers’ performance improves faster under supervisors of the opposite gender, but the estimated relationship is statistically significant only in column 4, where it is also relatively large. A male coach working for a female administrator adds on average 0.054 points to his team’s winning percentage per year. These estimates should be interpreted with caution given that there are only 9 female administrators in the data.

The 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 was hired by a previous administrator. The coefficients on the interaction $T_{ijt} \times \delta_i^*$ are statistically indistinguishable from zero in all four specifications, and the magnitude of the point estimates is considerably smaller compared to the estimates presented in panel A. Having a female-friendly athletic director is associated with worse performance for all groups regardless of tenure. Males tend to perform better when the current administrator is
female, but the difference does not magnify or shrink over time.

To verify the robustness of the results, the estimates from two alternative specifications are shown in Table 4. First, we include in the model the one-year lag of performance to account for the potential for past inputs into team success.\(^{11}\) Second, we modify the specification in equation (6) to include coach fixed effects. Table 4 is organized in a similar manner to Table 3, the top panel shows results for the subsample of coaches hired by the current supervisor, and results for females are shown in columns 1 and 2, while results for male coaches are shown in the last two columns. Only the coefficients on the interaction between the female-friendly measure and the length of the worker-supervisor match are shown, so that each cell in the table represents a different regression specification.

Adding lagged performance attenuates the coefficient estimates without altering the patterns in panel A of positive signs for females and negative signs for males, and of smaller magnitudes when the sports without much gender variation are included in the estimation. The coefficient magnitudes are also smaller in panel B of the table, where the estimation sample is comprised of coaches hired by a previous supervisor. The column 2 coefficient for female coaches hired by the current administrator is 0.004 in this specification and significant at the 10 percent level, while the corresponding coefficient for male coaches is -0.007 and significant at the one percent level. Adding coach fixed effects has little impact on the estimates in panel A compared to the results in Table 3. The absolute values of the estimates in panel B increase somewhat.

\(^{11}\)Adding lagged performance naturally excludes the 1992-93 season from the estimation sample, so to make the samples in Tables 3 and 4 the same, this year is also excluded from the sample used to construct Table 4. The estimates including the 1992-93 season, available from the authors on request, do not differ much from the ones we present. The most notable difference is that the estimate for \(\gamma_3\) in column 2 of panel A decreases from 0.005 to 0.004.
when coach fixed effects are included but not enough to make any of them statistically significant.

### 4.2 Performance and Turnover

The theoretical model in Section 2 also 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 to dismiss a female coach based on poor current season performance than directors with low values of \( \hat{\delta}_i \).

To explore how a supervisor’s female-friendliness impacts 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:

\[
\text{LastSeason}_{ijt} = \beta_0 + \beta_1 \hat{\delta}_i + \beta_2 \text{FemaleAD}_i + \beta_3 w_{ijt} + \beta_4 (w_{ijt} \times \hat{\delta}_i) \\
+ \beta_5 (w_{ijt} \times \text{FemaleAD}_i) + \mathbf{Z}_{ijt} \mathbf{B} + \mu_t + h(\mu_m, \mu_s) + \epsilon_{ijt}. \tag{7}
\]

As in (6), the explanatory variables contained in \( \mathbf{Z} \) include athletic director and coach tenure and tenure squared. Lacrosse, field hockey and men’s basketball are excluded from all specifications for conciseness, but the results of interest are weaker across the board when these sports, in which the gender variation in the ratio of male to female workers is negligible, are included in the sample.
We show results from specifications in which school and sport fixed effects are included separately, as well as from a model in which the fixed effects are at the team (school-by-sport) level. The model in (7) is estimated separately for male and female coaches, and the sample is also split based on whether current performance is stronger than the team’s average performance between the 1992-93 and the current season\(^{12}\) (\(\bar{w}_{mst}\)):

\[
\bar{w}_{mst} = \frac{1}{t} \sum_{l=1}^{t} w_l.
\]

Dividing the sample based on performance relates to the theory in Section 2. When the value added by mentoring is relatively high, performance is expected to matter less for turnover under all supervisors.

Panel A of Table 5 shows estimation results for the observations in which the measure of performance in the current period does not exceed the team’s average \(\bar{w}_{mst}\). The first two columns present the estimates for female coaches, first with separate school and sport fixed effect and next with the combined team fixed effects. Columns 3 and 4 show the results from similar specifications for male coaches.

Consistent with the model, current winning percentage has a strong negative relationship with turnover for both genders. The coefficients on the interaction between performance and female-friendliness in panel A of Table 5 are positive and significant at the five percent level in columns 1 and 2, which is in line with the prediction that for female coaches performance matters less for turnover when the athletic director is female-friendly. The corresponding

\(^{12}\)We do not exclude the 1992-93 season for these specifications, but we cannot use the last year in which we observe a team in the data because the value of the dependent variable is unknown. By construction, the team’s average performance for the 1992-93 season equals the value for that year.
coefficient in the male coach regression in column 3 is negative and significant at the 10 percent level, but adding the team fixed effects instead of separate sport and school indicators increases the variability of the estimate enough to make it not significant, although still negative. The negative signs are in line with the predictions of the type-based mentoring model but not the predictions of the pure taste-based discrimination version. No clear relationship emerges between the degree to which performance matters and the supervisor's gender when the coach is female, and for male coaches performance may matter less under female administrators, but the estimates are not statistically significant.

The coefficients on the female-friendly measure are negative and highly significant in both female coach specifications and positive for male coaches but only significant at the five percent level in column 3. The coefficients on the female director indicator are negative in all specifications, although not statistically significant, and larger in magnitude in the male worker specifications suggesting that female athletic directors may be less likely to dismiss coaches regardless of performance. These results are consistent with the way in which the female-friendly measure was constructed following the type-based mentoring model from Section 2.

When performance is relatively good, all factors discussed above play a lesser role for turnover. In particular, the coefficients on winning percentage in panel B are lower in magnitude, and none of the coefficients on the interaction between performance and supervisor attitude are significant. At the same time, the signs of the point estimates follow the pattern from panel A: positive for females and negative for males.

The implications from the results in Table 3 in the previous section should be considered in combination with the findings from the turnover model. Female-friendly administrators are less likely to dismiss female coaches based
on poor performance so holding everything else constant, we should observe a relative decline in the observed average performance of females working under female-friendly supervisors. In fact, we see the opposite trend in Table 3, which leads us to believe that more than a discrimination-based sorting mechanism is needed to explain the observed trends. In this study we have proposed type-based mentoring as the link between Tables 3 and 5.

5 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 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 paper, but if female-friendliness is found to be correlated with more easily observable characteristics, either inherent or acquired, this can give 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. In Bednar and Gicheva (2014) we do not find evidence that gender is linked to female-friendliness, but the variation in this characteristic is not big with only nine females in the sample of 138 supervisors. There is more variability in 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. While we find no difference in the estimated fixed effects representing female-friendliness for Master’s degree holders, Figure 3 shows that holding a Ph.D. is associated with a noticeable increase in the magnitude of the $\delta^*$ parameters. The graph shows the cumulative empirical distribution of the standardized adjusted fixed effect estimates for the 117 administrators without a Doctorate degree and the 21 individuals with higher educational attainment. The latter group is more female-friendly at all points of the distribution. Mean and quantile regression models including other available controls confirm that the difference is statistically significant.\footnote{For most of the 138 administrators, we were also able to find information on the number of male and female children. Washington (2008) shows 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.}

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. However, we provide the result 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.

6 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) show 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) point out that traditionally used data sets do not contain enough information about a rich set of matched workers-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 conclude, empirical research should expand into alternative data sources in order to learn more about type-based mentoring.

This paper uses 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 towards working with females. We show several trends consistent with a type-based mentoring model. Performance increases more quickly for female workers when they are paired with female-friendly supervisors. Females are less likely to be discharged based on observed poor performance when working for a female-friendly administrator. Both trends are reversed for male workers.

While we study a very specific labor market setting, 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 which is more complex than easily observable attributes such as gender or race. Deriving other new measures of supervisor inherent attitudes can potentially reveal more about the mechanisms through which employment matches matter in the workplace.

References


Hoffmann, Florian and Philip Oreopoulos, “A Professor Like Me: The Influence of Instructor Gender on College Achievement,” Journal of Human Resources, 2009, 44 (2).


Simulations based on the mentoring model presented in Section 2. All workers are assumed to be female at the beginning of period 1; $N = 10,000$. The functional form and parameter value assumptions used for the simulation are as follows: $a \sim U[0.25; 0.75]; r = 1/3; \varepsilon \sim N(0, 0.04); n = 1$. The mentoring model assumes that $\theta(d_i, f) = 0.16 + d_i$ and $\theta(d_i, m) = 0.16 - d_i$, while in the discrimination model supervisors discharge workers at the end of period 1 if $d_i + \nu_{ij1} < -0.2$ for females and if $-d_i + \nu_{ij1} < -0.2$ for males, where $\nu \sim N(0, 0.04)$.

Figure 1: Predictions from Models of Type-Based Mentoring and Taste-Based Discrimination
Winning percentage for the full sample, excluding observations with 0 year of coach tenure. There are 7,719 observations for 138 athletic directors observed at multiple programs; 831 male and 822 female coaches at a total of 201 schools.

Figure 2: Distribution of Observed Winning Percentage

Figure 3: Cumulative Distribution of the Estimated Supervisor Fixed Effects by Ph.D. Degree
Table 1: Female Fraction of Coaches by Sport

<table>
<thead>
<tr>
<th>Sport</th>
<th>N</th>
<th>Fraction female coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball (Men)</td>
<td>1514</td>
<td>0</td>
</tr>
<tr>
<td>Soccer</td>
<td>1255</td>
<td>0.369</td>
</tr>
<tr>
<td>Volleyball</td>
<td>1488</td>
<td>0.546</td>
</tr>
<tr>
<td>Basketball</td>
<td>1548</td>
<td>0.665</td>
</tr>
<tr>
<td>Softball</td>
<td>1175</td>
<td>0.759</td>
</tr>
<tr>
<td>Lacrosse</td>
<td>318</td>
<td>0.943</td>
</tr>
<tr>
<td>Field Hockey</td>
<td>421</td>
<td>0.967</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7719</td>
<td><strong>0.506</strong></td>
</tr>
</tbody>
</table>

Table 2: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Coach hired by current AD</th>
<th>Coach hired by previous AD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female Coach</td>
<td>Male Coach</td>
</tr>
<tr>
<td>Winning %</td>
<td>0.475 (0.179)</td>
<td>0.518 (0.181)</td>
</tr>
<tr>
<td>Winning_{t} – Winning_{t-1}</td>
<td>0.010 (0.162)</td>
<td>0.014 (0.163)</td>
</tr>
<tr>
<td>Last season with team</td>
<td>0.137 (0.179)</td>
<td>0.125 (0.201)</td>
</tr>
<tr>
<td>Winning %</td>
<td>0.396 (0.179)</td>
<td>0.450 (0.201)</td>
</tr>
<tr>
<td>(last season)</td>
<td>-0.018 (0.155)</td>
<td>-0.035 (0.157)</td>
</tr>
<tr>
<td>Winning_{t} – Winning_{t-1}</td>
<td>-0.018 (0.155)</td>
<td>-0.035 (0.157)</td>
</tr>
<tr>
<td>Tenure</td>
<td>3.14 (2.44)</td>
<td>2.97 (2.19)</td>
</tr>
<tr>
<td>AD tenure</td>
<td>6.10 (3.52)</td>
<td>6.16 (3.51)</td>
</tr>
<tr>
<td>Female-friendly</td>
<td>0.076 (0.968)</td>
<td>-0.142 (1.030)</td>
</tr>
<tr>
<td>Number of obs.</td>
<td>1764</td>
<td>1724</td>
</tr>
<tr>
<td>Number of schools</td>
<td>166</td>
<td>176</td>
</tr>
<tr>
<td>Number of coaches</td>
<td>500</td>
<td>503</td>
</tr>
</tbody>
</table>

Standard deviations in parentheses. The sample includes 138 athletic directors, 201 schools, 822 female head coaches, and 831 male head coaches. Last season refers to the season before a separation from the school.
Table 3: Performance and Length of Worker-Supervisor Match by Timing of Hiring

<table>
<thead>
<tr>
<th></th>
<th>Panel A. Hired by current AD</th>
<th>Panel B. Hired by previous AD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Dep. variable: Winning % at ( t )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female-friendly (standardized)</td>
<td>-0.007</td>
<td>-0.019</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Fem.-friendly x Yrs. match</td>
<td>0.002</td>
<td>0.005**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Female AD</td>
<td>0.003</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Female AD x Yrs. match</td>
<td>-0.005</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>N</td>
<td>1701</td>
<td>1344</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.576</td>
<td>0.583</td>
</tr>
<tr>
<td>Coach gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All sports</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

|                  |                              |                               |                              |                              |
| Female-friendly (standardized)       | -0.025**                    | -0.027**                      | -0.045***                    | -0.044***                    |
|                                  | (0.010)                      | (0.011)                       | (0.010)                      | (0.014)                      |
| Fem.-friendly x Yrs. match         | 0.002                       | 0.002                         | 0.000                        | -0.001                       |
|                                  | (0.002)                      | (0.002)                       | (0.001)                      | (0.002)                      |
| Female AD                      | 0.020                        | 0.014                         | 0.039                        | 0.140***                     |
|                                  | (0.031)                      | (0.033)                       | (0.028)                      | (0.041)                      |
| Female AD x Yrs. match           | 0.005                        | 0.002                         | 0.003                        | -0.001                       |
|                                  | (0.004)                      | (0.006)                       | (0.005)                      | (0.009)                      |
| N                             | 2048                         | 1722                          | 2008                         | 1249                         |
| R-squared                    | 0.586                        | 0.578                         | 0.630                        | 0.647                        |
| Coach gender                  |                              |                               |                              |                              |
| Female                       |                              |                               |                              |                              |
| Male                         |                              |                               |                              |                              |
| All sports                   | Yes                          | No                            | Yes                          | No                           |

* p<0.10, ** p<0.05, *** p<0.01. The samples exclude observations with 0 years of coach tenure and observations for the 1992-93 season. The samples in columns (2) and (4) exclude lacrosse, field hockey and men’s basketball. The specifications include controls for athletic director tenure and tenure squared, coach tenure and tenure squared, as well as year and school by sport indicators.
Table 4: Performance and Length of Worker-Supervisor Match: Alternative Specifications

<table>
<thead>
<tr>
<th>Dep. variable: Winning % at t</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A. Hired by current AD</strong></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Control for winning % at t - 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fem.-friendly x Yrs. match</td>
<td>0.002</td>
<td>0.004*</td>
<td>-0.003*</td>
<td>-0.007***</td>
</tr>
<tr>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td></td>
</tr>
<tr>
<td>With coach fixed effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fem.-friendly x Yrs. match</td>
<td>0.003</td>
<td>0.005**</td>
<td>-0.003*</td>
<td>-0.008***</td>
</tr>
<tr>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td></td>
</tr>
<tr>
<td>Coach gender</td>
<td>Female</td>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All sports</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

| **Panel B. Hired by previous AD** | (1) | (2) | (3) | (4) |
| Control for winning % at t - 1 | | | | |
| Fem.-friendly x Yrs. match | 0.001 | 0.001 | 0.000 | -0.001 |
| (0.002) | (0.002) | (0.001) | (0.002) |
| With coach fixed effects | | | | |
| Female AD x Yrs. match | 0.006 | 0.003 | 0.002 | -0.002 |
| (0.004) | (0.006) | (0.005) | (0.009) |
| Coach gender | Female | Male | | |
| All sports | Yes | No | Yes | No |

* p<0.10, ** p<0.05, *** p<0.01. The samples exclude observations with 0 years of coach tenure and observations for the 1992-93 season, when lagged winning percentage is not available. The samples in columns (2) and (4) exclude lacrosse, field hockey and men’s basketball. The specifications include controls for athletic director tenure and tenure squared, coach tenure and tenure squared, as well as year and school by sport indicators.
Table 5: The Importance of Performance for Turnover

Panel A. Current winning % ≤ team average

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winning %</td>
<td>-0.616***</td>
<td>-0.572***</td>
<td>-0.538***</td>
<td>-0.404***</td>
</tr>
<tr>
<td></td>
<td>(0.082)</td>
<td>(0.118)</td>
<td>(0.103)</td>
<td>(0.134)</td>
</tr>
<tr>
<td>Winning x Fem.-friendly</td>
<td>0.168**</td>
<td>0.227**</td>
<td>-0.144*</td>
<td>-0.093</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.099)</td>
<td>(0.085)</td>
<td>(0.099)</td>
</tr>
<tr>
<td>Winning % x Female AD</td>
<td>-0.158</td>
<td>0.086</td>
<td>0.668</td>
<td>1.481</td>
</tr>
<tr>
<td></td>
<td>(0.316)</td>
<td>(0.374)</td>
<td>(0.547)</td>
<td>(1.104)</td>
</tr>
<tr>
<td>Female-friendly (standardized)</td>
<td>-0.147***</td>
<td>-0.172***</td>
<td>0.109**</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.052)</td>
<td>(0.050)</td>
<td>(0.060)</td>
</tr>
<tr>
<td>Female AD</td>
<td>-0.090</td>
<td>-0.195</td>
<td>-0.431</td>
<td>-0.947</td>
</tr>
<tr>
<td></td>
<td>(0.144)</td>
<td>(0.170)</td>
<td>(0.285)</td>
<td>(0.643)</td>
</tr>
<tr>
<td>N</td>
<td>1537</td>
<td>1537</td>
<td>966</td>
<td>966</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.202</td>
<td>0.372</td>
<td>0.239</td>
<td>0.433</td>
</tr>
</tbody>
</table>

Coach gender          | Female | Male |
Team FE               | No     | Yes  |
School and sport FE   | Yes    | No   |

Panel B. Current winning % > team average

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winning %</td>
<td>-0.335***</td>
<td>-0.154</td>
<td>-0.206***</td>
<td>-0.055</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.099)</td>
<td>(0.075)</td>
<td>(0.103)</td>
</tr>
<tr>
<td>Winning x Fem.-friendly</td>
<td>0.070</td>
<td>0.006</td>
<td>-0.061</td>
<td>-0.079</td>
</tr>
<tr>
<td></td>
<td>(0.065)</td>
<td>(0.081)</td>
<td>(0.071)</td>
<td>(0.096)</td>
</tr>
<tr>
<td>Winning % x Female AD</td>
<td>0.264</td>
<td>0.532*</td>
<td>0.130</td>
<td>-0.404</td>
</tr>
<tr>
<td></td>
<td>(0.257)</td>
<td>(0.292)</td>
<td>(0.310)</td>
<td>(0.390)</td>
</tr>
<tr>
<td>Female-friendly (standardized)</td>
<td>-0.023</td>
<td>-0.021</td>
<td>0.060</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>(0.042)</td>
<td>(0.052)</td>
<td>(0.051)</td>
<td>(0.067)</td>
</tr>
<tr>
<td>Female AD</td>
<td>-0.273</td>
<td>-0.457**</td>
<td>0.007</td>
<td>0.240</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td>(0.199)</td>
<td>(0.220)</td>
<td>(0.272)</td>
</tr>
<tr>
<td>N</td>
<td>1514</td>
<td>1514</td>
<td>1175</td>
<td>1175</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.172</td>
<td>0.374</td>
<td>0.250</td>
<td>0.457</td>
</tr>
</tbody>
</table>

Coach gender          | Female | Male |
Team FE               | No     | Yes  |
School and sport FE   | Yes    | No   |

* p<0.10, ** p<0.05, *** p<0.01. Results for linear probability model. The dependent variable is indicator for last season with team. The specifications include controls for athletic director and coach tenure and tenure squared. Observations with 0 years of coach tenure are excluded. Lacrosse, field hockey and men’s basketball are also excluded.
A Sample Athletic Director Job Postings

Brief Job Description\textsuperscript{14}
Director of Athletics Duties and Responsibilities
The WVU Director of Athletics is responsible for executive leadership for an NCAA Division I athletic program at the highest level of national standards, including:

- Providing leadership and sound decision-making with regard to all athletic department matters, including fiscal affairs, personnel, strategic planning, facilities, public relations, and general operations.
- Providing leadership to ensure that the WVU Department of Intercollegiate Athletics has a highly competent and diverse coaching, administrative, and support staff consistent with the mission of West Virginia University. In addition, the Athletic Director is responsible for supervision of coaches and athletic department personnel, as well as for fostering an environment of success within the department.
- Providing leadership that adheres to the highest standards of integrity in academic, financial, and business matters, as well as NCAA rules and regulations.
- Maintaining appropriate athletic department policies, procedures, and practices, and ensuring consistency with all University policies, Board of Governors and other regulations that govern the University, NCAA rules and certification requirements, and all state and federal laws, including Title IX.
- Ensuring an environment that promotes student-athlete health and welfare and a commitment to strong academic values.
- Maintaining active participation in University, conference, and NCAA planning systems and professional development opportunities.
- Committing to the key values of intercollegiate athletics and maintaining intercollegiate athletics as an integral part of the educational program through participation and continued leadership in all NCAA Division I certification programs.
- Providing proactive leadership in fundraising and revenue development, within practices that govern WVU and the WVU Foundation.

• Engaging the athletic department’s advisory councils (e.g., Athletic Council, Student-Athlete Advisory Council) and the University’s committee structures in relevant issues.
• Providing continual leadership to sustain a strong commitment to an inclusive environment and diversity and that serves the needs of student-athletes, coaches, staff, and the public.
• Providing maintenance and growth opportunities for community involvement, partnerships, and service initiatives.
• Representing the athletic department and West Virginia University to external constituents, including supporting the athletics and promotion of the entire University, furthering the University’s public interests.
• Serving as a member of the president’s senior leadership team to ensure alignment of the University’s mission and goals with those of the WVU Department of Intercollegiate Athletics.
• Handling other duties and responsibilities as appropriate to maintain a national-caliber athletic program.

The successful applicant will have credentials that reflect the skills and experiences that encompass the following:
• a substantial record of progressive and relevant experience
• an academic background consistent with the nature of the position
• a demonstration of commitment to inclusion, community, diversity, and gender equity
• the capacity to lead comprehensive planning, fund-raising, budget management, and total athletic success
• a demonstration of commitment to academic and fiscal integrity
• a demonstrated commitment to and appreciable knowledge of NCAA rules compliance, and a commitment to sustain the spirit and letter of compliance standards
• a record of distinguished leadership in administration and strategic planning
• an exemplary record of interpersonal and communication skills
• demonstrated success working in intercollegiate athletics or highly related field
• an ability to recruit and hire outstanding coaches and staff
• an understanding of and commitment to the NCAA’s primary purpose of maintaining intercollegiate athletics as an integral part of the educational program and the athlete as an integral part of the student body
• an understanding of contemporary issues in athletic administration
• an ability to shape and build the department’s national reputation
• the vision to help guide the student-athlete experience through a total ath-
letic program
• a master’s degree or equivalency, and at least seven years of progressive and highly relevant experience

**Athletic Director Job Description**

- Provide leadership to plan, organize, direct and control the programs and activities for all areas of Intercollegiate Athletics, including, but not necessarily limited to, strategic planning, budgeting and administrative activities (including public relations and fund-raising responsibilities) necessary to achieve a successful athletic program and student athlete academic excellence, and ensure compliance with University policies and NCAA regulations.
- Responsible for the leadership, development and management of a competitive and high quality Division I-A athletics program. Must ensure the department operates within the mission of the University and in compliance with NCAA, MAC and University rules and guidelines. Willing to embrace and lead the changing nature of compliance in college athletics.

**Essential Duties**

- Strongly support and assure compliance with any and all NCAA, Mid-American Conference and Eastern Michigan University policies, rules, regulations, and operational procedures.
- Advance student well-being and academic success. Ensure Department’s commitment to maximize the educational potential of all student athletes.
- Strengthen all sports to be competitive at the championship level. Recruit, mentor, support and supervise a diverse pool of strong, ethical and talented coaches to foster success.
- Organize and supervise the entire Athletics staff and delegate specific responsibilities to ensure the efficient and productive operation of all administrative and operational business functions of the department.
- Provide strategic leadership toward goals related to competitiveness, student academic achievement, student-athlete experience, compliance, financial management and event attendance that reflect the mission and values of Eastern as a whole.
- Be a visible university leader on campus and in the community and represent the University and Athletic Department to external constituents in a manner that demonstrates personal and professional integrity and promotes Eastern interests.

---

• Represent the University in an exemplary fashion to alumni, friends, prospective students, and the general public, as well as play an active role in the community of Washtenaw County and SE Michigan.
• Develop and oversee a fundraising plan for Athletics to achieve annual goals.
• Develop and oversee implementation of a plan that would allow football and men’s basketball to become substantially more self-supporting and to improve attendance and school spirit at these sports. Increase attendance at all sports as well, and generate overall enthusiasm and excitement for EMU Athletics across campus (among students, faculty and staff) and in the community (including donors and alumni).
• Encourage diversity and inclusion within the Athletic Department with regard to students, staff, administrators and coaches.
• Collaborate with other departments on campus on various projects and work to improve relationships between Athletics and other departments on campus.
• Participate in planning, communication and collaboration with the President and the University’s Executive Council to ensure alignment between the goals of the Athletic Department with the University’s mission and goals.
• Perform related departmental duties as required.

Supervision Exercised
• Administrative supervision is exercised over Athletics program administrators, coaches and professional/clerical/facilities maintenance support staff.

Supervision Received
• Eastern’s Athletic Director reports to the President and serves on the President’s Executive Council.

Qualifications
• Bachelor’s Degree required; Master’s degree or equivalent is preferred.
• Excellent administrative and financial skills and a minimum of five years of progressive experience leading a successful, multifaceted enterprise, preferably in intercollegiate athletics or related field.
• A record of achievement in NCAA Division I athletics administration is recommended but not required.
• Thorough knowledge of NCAA and MAC regulations, requirements and reporting systems is necessary.
• Demonstrated brand marketing, public relations and media experience.
• Strong communication skills with demonstrated record of being a leader and spokesperson for a large organization internally and externally, and ability to articulate a clear vision for the program.
• Excellent interpersonal skills, business acumen and creativity required to generate revenue and allocate and manage resources effectively to achieve results.

Working Conditions
• As a top leader of the University, the position will be visible at athletic events, on campus and in the community, which may require travel and many nights and weekend appearances.