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What variables explain differences in coaching salaries for Division I women's sports?

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WHAT VARIABLES EXPLAIN DIFFERENCES IN COACHING SALARIES FOR DIVISION I WOMEN'S SPORTS?

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Abstract

This paper examines the possibility of discrimination based on gender and/or race in NCAA Division-I coaching. High-profile male coaches earn higher salaries than female coaches, which could reflect labor-market discrimination. This paper investigates the determinants of coaches' compensation. Because the number of female coaches in men's sports is trivial, this study is limited to women's sports. Using salary data from the 2012 fiscal year for public universities in three Division-I conferences – Missouri Valley, Big 10, and Big 12 – I look at a variety of revenue and non-revenue generating women's sports. I model head coaches' annual salaries as the dependent variable and numerous career and collegiate statistics as the independent variables. I do not find a statistically significant effect of gender or race with respect to earnings.

I. Introduction

Wage discrepancy exists in the environment of collegiate head coaching, particularly at the Division I level. Male coaches earn a noticeably higher wage than female coaches. Brook and Foster (2010) find a statistically significant difference in coaching compensation between genders. The difference alone, however, is not evidence of discrimination. The difference could result from a difference in markets. There is typically a higher demand for male sports than female sports, demonstrated by much larger revenues (Brook and Foster 2010). Another explanation for possible discrimination is the fact that athletic administration is highly male dominated in Division I sports. The majority of athletic directors are male, and athletic departments have been considered "one of the purest manifestations of 'hegemonic masculinity'" (Welch and Sigelman 2007).

Discrimination in the labor market, particularly coaching, is not limited to gender discrimination. Racial discrimination is also possible. Collegiate female sports provide a mixture of head coaches of different genders and race.

This study examines potential earnings differences in salaries for coaches of NCAA Division I women's sports. Initial regressions find that female coaches earn statistically higher salaries than male coaches. Regressions that incorporate controls for sports, however, show gender and race are not statistically significant variables of coaching salary. I find that athletic variables have more explanatory predictors of head coach salary.

II. Theories of Discrimination

Discrimination can take many different forms: employer, employee, or customer. This paper will focus primarily on employer discrimination, yet it is helpful to understand how other forms of discrimination could exist in college athletics. If an employer is aware of employee or

customer discrimination, the employer may act in a discriminatory manner in an effort to increase profits. Employer discrimination occurs when an employer places a higher cost to hiring an employee based on race or gender (Borjas 2010). In this study, employer discrimination could occur if the athletic director (employer) associates an elevated cost to hiring a head coach (employee) because of the employee's gender or race. Another type of employer discrimination may occur if an athlete, in this case the employee, associates a higher cost to playing for a coach, in this case the employer, due to the coach's race or gender. Employee discrimination occurs when an employee associates a higher cost to working with a fellow employee because of the person's race or gender (Borjas 2010). Employee discrimination may occur in college sports if an athlete associates a higher cost to playing with another athlete based on her race. Customer discrimination occurs when a consumer's purchasing decisions are not based on the price of the good but rather on an adjusted price caused because race or gender affects how the customer values the product (Borjas 2010). Customer discrimination may be witnessed in college athletics if a customer associates a higher cost with consuming a product, which in this case refers to attendees of athletic competition.

There are two reasons discriminatory hiring in general is unprofitable (Borjas 2010). The first reason is that the prejudiced firm will not pay the lowest wage for a certain amount of productivity. If workers are perfect substitutes, a firm could have the same productivity at a lower cost, reducing profits. Additionally, the prejudiced firm would hire the wrong number of workers. A non-prejudiced firm would hire more workers due to the lower wage. By hiring an inefficient number of workers, prejudiced firms impede profits.

Although civil rights have progressed immensely in the past century, it is questionable whether women have the same opportunities as males and whether non-whites have the same

opportunities as whites. Many argue females and minorities are still facing discrimination despite actions such as the Civil Rights Act of 1964 and the Title IX education amendment of 1972. Both acts attempt to reduce discriminatory behavior. The Civil Rights Act of 1964 has a nationwide effect in all areas of employment regarding discrimination by race, gender, religion, and others. Title IX attempts to equalize opportunities for both genders in all educational and government funded activities. Title IX receives much scrutiny regarding collegiate athletics. In compliance with Title IX, schools are required to allocate resources to both male and female athletics in proportion to the demographics of the student body. Opponents of Title IX claim that universities unjustly sacrifice funding men's sports to benefit women's sports.

An argument used to claim discrimination in the workforce is the fact that females earn on average less than males, regardless of race. Black workers earn less than white workers regardless of gender. While these statistics are widely accepted, they do not necessarily prove that discrimination exists. One possible explanation for the wage gap among genders could be the role with children. On average, females are more likely than males to leave or quit their jobs when they have children. Labor-market absences may explain the wage gap if employers place a greater cost to hiring females versus males as males generally do not take leaves when having a child. The lower earnings may also be a result of decreased productivity due to an absence from the work force. This type of discrimination is called statistical discrimination. All else equal, an employer will choose an employee who is less likely to leave. A profit-maximizing employer will decide to hire the male, who has a smaller chance of quitting and/or increased productivity, if the absence of the employee will reduce profits or disrupt objectives of the company (Borjas 2010). No prejudice need be required for statistical discrimination to exist.

In a perfectly competitive labor market, wage dispersion would be a result of differences in the characteristics of jobs or the skills of workers (Borjas 365). When discrimination is prevalent, competitive labor markets do not function as efficiently as possible. Discrimination occurs when differences in earnings and employment opportunities occur not from productivity alone but also as a result of a "worker's race, gender, national origin, sexual orientation, or other seemingly irrelevant characteristics" (Borjas 2010).

In 1972, Title IX was passed in an attempt to end discrimination and is best known for its impact on equality between men's and women's sports at the collegiate level. Athletic programs must dedicate a proportional amount of resource to men's and women's sports. At the time Title IX was instituted, 90 percent of the head coaches of women's Division I teams were females. Since then, this number has fallen drastically to 42 percent in 2006 (Welch and Segelman 2007). Many possible explanations exist. A likely cause of the demographic change is due to the desirability of coaching women's sports. Since Title IX, more resources have been devoted to improve women's sports. Because of the increase in resources and demand for women's sports, coaching women's teams has become more appealing.

Research finds significant gender differences in salaries for NCAA Division I sports. Brook and Foster (2010) find that male and female head basketball coaches are compensated at different levels for similar employment. In order to determine if the wage differential was a result of a difference in labor markets or gender discrimination, Brook and Foster isolate women's basketball (2010). Their study analyzes the wage determinants of coaches in women's and men's sports. They consider revenues, winning percentage, strength of schedule, coaching experience, power conference, and number of assistant coaches. After controlling for these variables, they find that men receive higher pay. They find strength of schedule to be the

strongest determinant of wage, indicating the high-profile conferences compensate their coaches more. Additionally, Welch and Sigelman (2007) find a positive correlation between the athletic prestige of a school and the percentage of female coaches within female sports. Their findings suggest that females may in fact be preferable to male head coaches in the realm of women's sports. Welch and Sigelman (2007) also find women to most likely coach in "visible" sports such as basketball and volleyball.

In addition to differences in average salaries, there are differences in employment. Men have occupied nearly 75 percent of coaching jobs since 1999 (Welch and Segelman 2007). The correlation between the mean number of women's sports per school in a given year and the proportion of women coaches is -0.81 between 1978 and 2006 (Welch and Sigelman 2007). This negative correlation indicates that the more popular women's sports are, the more often male coaches enter women's sports.

Historically, conditions for black workers have undoubtedly improved. To illustrate, in 1967, the black-white wage ratio for males was a meager 0.65. Since then, the male ratio has increased to 0.81 in 2005 while the female ratio stood at 0.90. There are many possible explanations of this trend. The first explanation involves school quality and quantity among black individuals. Human capital among blacks has risen dramatically in the past century as a result of more schooling. In 1940, the typical 30-year-old white male had 9.9 years of schooling compared to 6.0 years for a comparable black male. By 1980, white males were averaging 13.6 years of schooling compared to 12.2 years of schooling for black males. In addition to the years of schooling, the quality of schools black students were attending was also improving relative to white students (Borjas 390). A large contributor to this increase was the 1964 Civil Rights Act, which prohibits employment discrimination on the basis of race and sex (Borjas 390). This act is

enforced by its ability to wager expensive class action suits against employers guilty of such discrimination as well as its ability to compensate workers discriminated against in the past. It is widely believed these are main driving factors behind the increase in the black-white wage ratio. It is possible, however, that all of this change cannot be explained by these events alone (Borjas 390).

III. Model

The empirical model used to describe determinants of head coach salaries for women's Division I sports is as follows:

$$[1] \qquad \ln S = B'X + e,$$

where the dependent variable is the natural log of head coach salary. The independent variables contain a variety of personal, athletic, and academic variables. Specifically, the natural log of salary is a function of *gender, race, win percentage, volleyball, basketball, Big 10, Big 12, and APR.* An additional regression adds variables for *female basketball* coaches and *female volleyball* coaches.

I run a variety of regressions based on the model in Equation (1). The first two regressions do not include controls for sport and conference. The difference between the two regressions is the substitution of GSR and APR. Although APR and GSR are both academic measures, APR is believed to be a predictor of GSR. I substitute these variables to determine which academic measure has more explanatory power. The following two regressions use APR as an academic proxy while also including control variables for sport, conference, as well as variables for *female* coaches of *basketball* and *volleyball* in the final regression.

I use age to measure experience in earlier, unreported regressions. Age is no longer used in this study because the years of head-coaching experience proved a more sufficient measure of experience.

IV. Data

The data set for this study contains 102 observations from a variety of sources. The schools in this study include three different Midwest Division I conferences: Missouri Valley, Big 10, and Big 12. I restrict the data set to include only coaching salaries for Division I women's head coaches. I choose women's sports because of the sufficient combination of race and gender among head coaches. I exclude interim and first year head coaches from this study. Team variables come from eight different women's sports that compete in head-to-head competition, as these sports provide a binary outcome of competitive events. These sports are listed in Table 1 with the mean, maximum, and minimum salary for each sport. Two sports, hockey and lacrosse, have a limited number of observations but are included due to their similarity to the other sports.

Table 1
Salaries by Sport

	Mean	Min	Max
Basketball	$359,459	$115,000	$673,000
Hockey	128,132	102,000	154,264
Volleyball	142,573	80,000	350,000
Soccer	112,180	44,950	199,840
Softball	115,672	59,481	228,657
Lacrosse	79,250	63,500	95,000
Tennis	79,148	49,000	147,811
Swimming	81,776	57,173	117,412

Table 1

Head coach salary and winning percentage data is obtained from a collegiate database for the fiscal year 2012. I use academic data from fiscal 2011 and earlier (for multi-year variables) because a coach's salary could be influenced by past academic (and/or athletic) performance.

Personal and career coaching statistics are gathered from statistical archives and head coach biographies from each coach's respective team website. Additional data is obtained from the athletic websites of previous Division I school(s) where the head coach was employed. These variables include age, gender, race, win percentage, head coach experience at current school, and overall Division I head coaching experience.

Academic statistics are gathered from the National Collegiate Athletic Association's database. I use two academic variables in this study: Academic Progress Rate (APR) and Graduation Success Rate (GSR). APR is a value between 0 and 1000, measuring student-athlete eligibility of a team. APR is computed as follows:

> A team's APR is calculated each year for those student-athletes receiving athletic financial aid (walk-ons are not included). APR is a one-year snapshot of the team's retention and eligibility. Each student-athlete in a cohort is eligible for two points each semester, so most students are eligible for four points each year. A student-athlete earns one point each semester if he/she is eligible to participate for the following semester and another point each semester if he/she returns to the team the following semester. (There are exceptions for student-athletes who turn pro in their sports, transfer to another school with a GPA of 2.60 or higher, etc.). GSR is a measure of the success rate of student-athletes within a six year period

> of attendance at the school. Both APR and GSR only measure student-athletes who receive financial aid from the school (Jepsen 2012).

APR is used by the NCAA as an indicator of GSR, which is measured for the most recent academic year using a six-year time cohort. GSR is computed as follows:

> Graduation rates are based on the IPEDS-GRS which is defined as a six-year proportion of those student-athletes who graduated versus those who entered an institution on institutional aid. In addition to the student-athlete data in the graduation-rates data, the GSR accounts for student- athletes who transfer into an institution while discounting student-athletes who separate from the institution and would have been academically eligible to compete had they returned (Jepsen 2012).

The dependent variable for the model is the natural log (*ln salary*) of the head coach's salary for the most recent year. I use the natural log because salaries may often be non-linear. As shown in Table 2, the average head coach salary for this study is $161,169.

Table 2
Descriptive Statistics

	Mean	Standard Deviation
Salary	161,169	131,568
Male	0.43	0.50
White	0.85	0.36
Career Win %	60.87	11.65
Head Coach Experience	13.07	8.09
Current Coach Experience	9.95	7.48
APR	984.93	12.50
GSR	92.83	8.77
Basketball	0.22	0.42

Volleyball	0.20	0.40
Big 10	0.42	0.49
Big 12	0.43	0.50
Female BB	0.18	0.39
Female VB	0.08	0.28

Personal characteristics include gender and race. *Gender* is a dummy variable with a value of 1 for male coaches and 0 for female coaches. Forty-three percent of coaches in this study are male. *Race* is also a dummy variable with a value of 1 for white coaches and 0 for non-white coaches. Eighty-five percent of coaches in this study are white, providing a relatively small sample of non-white coaches.

Career coaching statistics include overall Division I winning percentage, overall Division I head coaching experience, and head coaching experience at the current school. *Win percentage* has a mean of nearly 61 percent. Despite schools playing primarily within their own conference, the winning percentage is higher than 50 percent due to their high level of non-conference success. Head coaches in this study have been coaching for an average of 13.1 years at the Division I level and 9.95 years at the current school.

Academic performance variables, *APR* and *GSR*, are shown in Table 2. The average score for APR among these women's sports teams is 985, while the average graduation rate is 92.83 percent for these female student-athletes.

Additional variables include controls for conference and sport. *Big 10* and *Big 12* variables are added as dummy variables with a value of 1 if the team was in the conference in 2012 and a value of 0 if not. Forty-two percent of the observations in this study come from Big 10 schools, and 43 percent of the observations come from Big 12 schools. *Basketball* and *volleyball* are two additional dummy variables with a value of 1 if the team is in the respective

category and a value of 0 if not. Table 2 shows that 22 percent of the coaches in this sample coach for basketball teams, while 20 percent coach for volleyball teams. These variables are added to control for possible variations in salary correlated to a high profile conference and/or sport. *Female basketball* and *female volleyball* variables are added to the final using a dummy variable with a value of 1 for female head basketball/volleyball coaches and a variable of 0 for male head basketball/volleyball coaches.

IV. Predicted Effects

Literature suggests that men typically earn more than females in the aggregated work force. Brook and Foster (2010), however, find a possible premium for females in the market of head coaches in women's sports. This may potentially result from employee discrimination on behalf of a team's female athletes. A possibility that females prefer playing for a coach of the same gender could explain such a premium. Additionally, if higher-visibility teams employ more female coaches, and also compensate more, a premium for female coaches could result.

Race is not likely to have an impact on a head coach's salary in this study. Wage differentials based on race converge as skill level and education increase. Thus, little difference is expected between white and non-white head coaches. However, because whites earn more on average than non-whites, we may see a positive coefficient for race without the presence of discrimination. Win percentage is likely positively related to coaching compensation, assuming wage is positively correlated with athletic success. Volleyball and basketball are likely positively related to a head coach's compensation as a result of being a public figure of a higher profile/revenue-generating sport.

Brook and Foster (2010) find strength of schedule to be one of the most highly significant variables of coaching compensation. Since teams play a majority of games within their

conference, it is safe to claim the teams in more powerful conferences have a higher strength of schedule. Thus, teams belonging to the Big 10 and Big 12 are likely to have a higher level of compensation than the Missouri Valley Conference based on a difference of conference level. Additionally, these high-major conferences earn and spend more money on average than mid-major conferences, such as the Missouri Valley Conference. All else equal, high major conferences provide more resources to women's sports. Big 10 and Big 12 variables are expected to have positive coefficients in this study. APR and GSR will both have a positive coefficient, likely correlated with one another, if schools reward a coach for the ultimate and intermediate academic performance of his or her student-athletes.

Table 3—OLS Regression
Dependent Variable: Log of Coaching Salary

	Coefficient	**Standard Error**
Constant	0.40	5.26
Gender (male=1)	-0.21*	0.13
Race (white=1)	0.04	0.18
Win Percentage	0.02*	0.01
Total Head Coach Experience	0.02*	0.01
Academic Progress Rate	0.00	0.01

Adjusted R-squared=0.16 n=102
*significant at the 0.05 percent level

Table 4—OLS Regression
Dependent Variable: Log of Coaching Salary

	Coefficient	**Standard Error**
Constant	5.58*	0.76

Gender (male=1)	-0.28*	0.13
Race (white=1)	0.03	0.17
Win Percentage	0.02*	0.01
Total Head Coach Experience	0.03*	0.01
Graduation Success Rate	-0.02*	0.01

Adjusted R-squared=0.23 n=102
*significant at the 0.05 percent level

Table 5—OLS Regression
Dependent Variable: Log of Coaching Salary

	Coefficient	Standard Error	p-value
Constant	-1.12	2.50	0.655
Male	-0.07	0.06	0.191
White	-0.13	0.09	0.146
Win %	0.01*	0.003	0.004
Head coach experience	0.01*	0.004	0.001
Volleyball	0.29*	0.07	0.000
Basketball	1.19*	0.08	0.000
Big 10	0.36*	0.08	0.000
Big 12	0.62*	0.09	0.000
APR	0.01	0.003	0.068

Adjusted R-squared=0.75 n=102
*significant at the 0.05 percent level

Table 6—OLS Regression
Dependent Variable: Graduation Success Rate

	Coefficient	Standard Error	p-value

Constant	137.92	66.67	0.041
APR	-0.05	0.07	0.500

Adjusted R-squared=0.01 n=102

*significant at the 0.05 percent level

Table 7—OLS Regression
Dependent Variable: Log of Coaching Salary

	Coefficient	Standard Error	p-value
Constant	-1.04	2.40	0.666
Male	-0.13	0.08	0.111
White	-0.13	0.09	0.142
Win %	0.01*	0.003	0.001
Head coach experience	0.01*	0.004	0.002
Volleyball	0.35*	0.10	0.001
Basketball	1.32*	0.16	0.000
Big 10	0.35*	0.09	0.000
Big 12	0.61*	0.09	0.000
APR	0.005	0.002	0.060

Adjusted R-squared=0.78 n=102
*significant at the 0.05 percent level

V. Results

The above tables report the regression results. Tables 3 and 4 illustrate the regressions before control variables for sport and conference are added. The regression reported in Table 4 is similar to the regression reported in Table 3 with the exception of measuring academic success using GSR rather than APR. The higher adjusted R-squared suggests GSR is a better proxy for academic success in this scenario. Contrary to expectations, GSR is negatively correlated with a coach's salary. This potentially results from a premium for athletic success relative to academic success.

The first regression (Table 3) finds gender, win percentage, and overall head coaching experience to be statistically significant. The second regression (Table 4) finds gender, win percentage, overall head coaching experience and graduation success rate to be statistically

significant, consistent with expectations. Because the results are similar aside from academic significance, I will focus on the second regression (Table 4) that includes GSR as the academic proxy.

As Welch and Sigelman (2007) suggest, there appears to be a premium for female head coaches. The coefficient of -0.28 suggests that being male decreases salary by 32 percent. (Because the dependent variable is the natural log, the size of the coefficient can be interpreted as e^x- 1.) In other words, this regression shows male head coaches earn 68 percent of what female head coaches earn. Winning percentage is positive, as expected from the assumption that wages are positively correlated with athletic success, indicating winning is especially important in determining a coaches compensation. For instance, an increase in winning percentage from 60 to 61 percent would be correlated with a 2 percent increase in salary.

Overall I find head-coaching experience to be positive and significant in this study. Interestingly, head-coaching experience at a current school is not significant in earlier (unreported) regressions; thus I omit in subsequent regressions. This may result from highly compensated coaches at larger, higher profile schools working as head coaches at other Division I schools/conferences prior to being hired. Additionally, a lag in a coach's productivity may be present as it often requires up to four years or longer to recruit and form a team as the head coach sees fit. As a result, a head coach's winning percentage at his/her current school, particularly if the coach is relatively new to the program, may not represent his or her true value.

Graduation success rate, unlike APR, is significant with a coefficient of -0.02. The negative coefficient suggests that coaches with higher GSRs have lower salaries. For example, the difference between a 91 and 92 percent graduation rate is associated with a 2 percent lower

salary. A possible explanation for such a negative coefficient could be a result of programs placing a larger focus on athletic success, even if ultimately sacrificing academic success.

Table 5 shows regression results after the following control variables are added: basketball, volleyball, Big 10, and Big 12. Schools may prefer female rather than male coaches for high-visibility sports such as basketball and volleyball. The mean salaries (Table 1) suggest that the salaries for basketball and volleyball are much higher than the other sports, likely due to their ability to generate significantly higher revenue. Also, schools in the Big 10 and Big 12 conferences may pay higher salaries because their athletic departments have more resources to attract better talent than Missouri Valley schools. A similar, unreported regression was run replacing GSR as the academic proxy rather than APR. In this and all subsequent regressions, GSR provides less explanatory power than APR as measured by their respective r-squared figures, thus APR is a stronger indicator of a coach's salary when using control variables for conference and sport. Recall Table 4 shows GSR is negatively correlated to a coach's salary, which may also indicate more focus is placed on APR. To better understand the correlation between the two academic proxies, Table 6 illustrates a regression run with GSR as the dependent variable, using APR as the only independent variable. I run this regression because the NCAA uses APR as a preliminary indicator of GSR, the ultimate measure of a student-athletes academic success. Interestingly, the regression output provides an adjusted r-squared of roughly zero, and the effect of APR is not statistically significant. The results suggest APR is not indicative of future graduation success; potentially the most important goal for any athletic program as well as its student-athletes. Additionally, as APR provides stronger explanatory power in determining a head coach's salary, it is alarming that such a proxy of academic progress appears to have no bearing on a program's graduation rate.

Once controls for conference and sport are implemented, as shown in Table 5, the adjusted r-squared increases to 0.77. This regression finds six statistically-significant variables: career win percentage, overall head coaching experience, basketball, volleyball, Big 10 and Big 12. Once I control for sport and conference, gender is no longer statistically significant. This indicates a possibility that the premium for female coaches is explained by female coaches being placed in high-profile coaching jobs in high-major conferences that compensate at a higher level. All control variables (basketball, volleyball, Big 10, and Big 12) are also significant. This indicates that schools in bigger conferences compensate coaches more. Interestingly, neither academic proxy is significant when the control variables for sport and conference were added.

Table 7 provides results from a final regression, with the addition of female basketball and female volleyball as independent variables. These variables are added to control for the female coaches placed in higher profile, higher-paying positions of the revenue generating sports of basketball and volleyball. The regression shown in Table 7 results in significance of the same six independent variables (career win percentage, overall head coaching experience, basketball, volleyball, Big 10 and Big 12) as they relate to a head coach's salary. The inclusion of these additional variables result in a higher adjusted r-squared of 0.78, indicating a higher level of explanatory power. The additional variables render the effects of gender and race to be insignificant. APR is also insignificant in determining a head coach's salary.

VI. Conclusion

I use data from three Midwestern conferences, The Missouri Valley, Big 10, and Big 12, to study differences in the earnings of coaches of women's teams. I do not find evidence of a statistically significant wage premium for females after controlling for conference and sport. Although females may earn more than males in coaching women's sports, once I control for

female coaches placed in highly visible, revenue-generating sports, there is no evidence that females earn more than male coaches. Additionally, race does not appear to be a significant determinant of compensation among head coaches. Athletic success, as measured by win percentage, is a significant determinant of compensation. As expected, athletic programs appear to place a premium on a coach's ability to win games. APR possesses a higher explanatory power than GSR as a proxy of academic success. Despite APR's use as an indicator of GSR, APR is not significant and provides minimal explanatory power in determining a team's GSR. A lack of correlation suggests APR is an imperfect measurement in determining a team's overall academic health and ultimate goal of graduation.

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