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Abstract

Fifty years after Title IX, inequalities still exist between men's and women's sports. Most sport studies still fail to examine women's sports. This study explores the cross-quality impacts of Division I baseball and softball teams. The softball team win percentage is positively related to softball and baseball game attendance. However, models produce mixed results for the impact of the quality of the baseball team. Therefore, improving the strength of the softball team could increase softball and baseball game attendance, while improving the strength of the baseball team might only increase attendance at baseball games.

Keywords

gender, cross-quality impacts, Division I baseball and softball, home game attendance, Tobit models

1. Introduction

With the recent 50th anniversary of Title IX, much attention has been drawn to this law that brought equity in athletic opportunities for girls and women. The law states that federally financed educational programs cannot discriminate on the basis of sex (U.S. Department of Education, 2020). Colleges and universities comply with the law by ensuring that, proportional to the gender breakdown of their student body, they

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offer as many sport roster positions and scholarship opportunities for women as they do men. However, gaps in athletic expenditure, equipment quality, media presence, viewership, and pay between men's and women's teams and coaches remain large (MacKenzie, 2019; Macur and Blinder, 2021; Flint, 2022).

Many argue that these inequities exist due to the overall differences in demand and revenue generation between men's and women's sport programs. However, football and men's basketball are the only two National Collegiate Athletic Association (NCAA) Division I sport programs in which some teams post positive annual net revenue, while all other men's and women's sport programs post annual net losses each year. For example, while men's baseball teams, on average, generate about four times the revenue of women's softball teams, men's baseball programs post the largest net revenue losses of all collegiate sports (Fulks, 2017).

At the collegiate level, ticket sales rank among the top two athletic revenue-generating sources, second only to donations and media rights at some schools (ESPN, 2018; Steinbach, 2010). During the 2021 season, the top 10 collegiate football bowl subdivision (FBS) teams hosted an average of 96,025 fans at their home games (NCAA, 2022). This, coupled with per-game television viewership in the tens of millions, gives most FBS programs an annual revenue of over $20 million per year (US Department of Education, 2022). Each of the top 34 men's basketball teams, hosted an average of over 10,000 fans per game, and March Madness television viewership has now surpassed 10 million viewers per game as well (Gough, 2022). Men's basketball programs at schools such as the University of Louisville, the University of Kentucky, and Indiana University have all posted net revenues of over $20 million in recent years, which is larger than some men's professional basketball teams (Greer, 2019).

Although these three men's basketball teams have had much success in the NCAA Division I tournament, none has won as many national championships as the University of Connecticut (UConn) women's basketball team. Even with 11 national championship wins and six undefeated seasons, the UConn women's basketball team hosted an average of only 8,892 fans per game in the 2021-2022 season. In the same season, the UConn men's basketball team drew an average crowd of 10,345 fans, despite having only four national championships and no undefeated seasons (NCAA, 2022).

Trends in the attendance of top Division I baseball and softball programs resemble those of UConn men's and women's basketball. While men's baseball teams have been competing for national championships since 1947, the first women's softball national championship took place in 1982. Since then, the University of California at Los Angeles (UCLA) softball team has won 12 national championships, the University of Arizona (Arizona) softball team has won eight national championships, the University of Oklahoma (Oklahoma) softball team has won six national championships, and Arizona State University (ASU), University of Florida (Florida), and Texas A&M softball teams have each won two national championships. The UCLA, Arizona, Oklahoma, ASU, Florida, and Texas A&M baseball teams have won 1, 4, 2, 5, 1, and 0 national championships, respectively, since 1947.

However, of all these programs, Texas A&M baseball has the highest average home game attendance at 5,383 fans per game, while the Texas A&M softball team has an average home game attendance of 1,494. The largest gap between the baseball and softball attendance at these six schools is at Florida, where the baseball team hosts an average of 4,093 more fans than the softball team. Only at Oklahoma and UCLA do the softball teams draw larger crowds than the baseball teams. But, the differences are much smaller at 47 and 205 more fans than the baseball team, respectively (NCAA, 2022).

These differences in attendance, across some of the most successful men's and women's collegiate teams, suggest that more information is needed to understand the impact of success and other driving factors on attendance in both the men's and women's league. Based on these statistics, it seems that the success of women's teams does not impact their attendance as much as the success of the men's teams. This makes it difficult for women's teams to earn enough money to support their expenditures and are often supported by football and men's basketball revenues (Fendrich & Pells, 2021), which has led to a perception that women's sports are a drain on the athletic and university resources. However, the impacts of the success of the women's team might be more complex and have spillover effects that increase attendance at men's games at these universities. Therefore, increased success of the women's team might have many impacts at the university, while an increase in the men's team success might increase attendance only at the men's home sporting events. This impact has not yet been studied at the collegiate level.

This study examines the game day attendance at Division I home baseball and softball games while filling two gaps in the literature. First, attendance models for both Division I baseball and softball are estimated to compare the impacts of influential attendance determinants across similar men's and women's sports. In addition, a new variable, which captures the quality of the other team, is introduced into the standard attendance models for both the baseball and softball leagues to explore whether these sports have spillover effects. Understanding these differences may increase demand in both sports and increase overall gate revenue for the entire athletic program.

2. Attendance Literature

As some intercollegiate sport programs, such as football and men's basketball, may maximize their ticket revenue, athletic departments could continue to increase their overall gate revenue by tapping into markets that are not currently at capacity, such as home softball and baseball games (Popp, 2014). In Division I athletics, baseball currently generates the fifth highest revenue, at around $450,000 annually. Softball is the seventh highest revenue-generating women's sport at about $100,000 annually. However, baseball programs post the highest net revenue loss of over $1 million and softball programs post a net revenue loss of $795,000, on

average, each year (Fulks, 2017). In general, only about 38% of the seats at baseball stadiums are filled, while 43% of the seats in softball stadiums are filled.[1] However, championship games are often sold out. Moreover, most schools do not charge admission fees for regular season games, and revenue is mainly generated through donations. These facts suggest that a better understanding of what drives home game attendance could help programs increase their ticket sales revenue from baseball and softball.

Given the importance of gate revenue, many authors have explored the determinants of home game attendance. Commonly cited attendance determinants include college or university characteristics (Wells et al., 2000; Price & Sen, 2003; Price & Sen, 2003; Shackelford & Greenwell, 2005), current and previous win percentage of the home team (DeSchriver, 1999; Wells et al., 2000; Shackelford & Greenwell, 2005; Depken et al., 2011; Szymanski & Winfree, 2017), and the quality of the competition (Groza, 2010; Falls & Natke, 2016). Many studies also include an uncertainty of outcomes measure. In his seminal paper, Rottenberg (1956) posits that fans enjoy watching competitive games over forgone outcomes in which teams have a very high or very low probability of winning against their competitors. Later, authors tested the uncertainty of outcomes hypothesis in various sporting contexts, with mixed results.

Men's professional sports dominate the uncertainty of outcomes hypothesis literature. Attendance demand for football (NFL), basketball (NBA), hockey (NHL), and baseball (MLB) are each examined by Mills and Fort (2014). Their results suggest that NHL and MLB attendance is not influenced by outcome uncertainty, only playoff uncertainty matters for attendance at NFL games, and NBA attendance is highly sensitive to specific measures of game uncertainty.

Paul and Weinbach (2007) and Paul et al. (2011) examine the impact of game characteristics on NFL fans' satisfaction ratings. These studies support the uncertainty of outcomes hypothesis, suggesting that fans prefer close, high-scoring games. Jane (2014) studies game day attendance at NBA games for three consecutive seasons. Like Mills and Fort (2014), Jane finds that attendance rises when league-level, but not game-level uncertainty grows. Alavy et al. (2010) examine minute-by-minute television viewership for English league football games. Fans often changed the channel if the game appeared headed for a draw. Buraimo and Simmons (2008) and Sung and Mills (2018) found similar results, each suggesting that fans of professional soccer prefer to see their favored teams have higher probabilities of winning.

At the college level, football and men's basketball remain the most studied topics in this field. Using betting odds to indicate the level of uncertainty of a game, Paul et al. (2012) find that college football fans prefer less uncertainty of outcome in home football games. However, Falls and Natke (2016) use an 8-year panel analysis of football championship subdivision football teams and find that stadiums fill more of their capacity when game outcomes are increasingly uncertain. Kang et al. (2018) find that preferences for uncertainty in NCAA Division I men's basketball games

change throughout the season. While fans prefer more certainty in the outcome during the regular season games, the preference for certainty decreases in the post season.

At the professional sport level, authors have incorporated new factors into the traditional attendance demand models, also with mixed results. These authors explore the substitutability or complementary within and across sports and leagues by including the presence or quality of competing or complementary teams. An early study by Winfree et al. (2004) revealed that MLB teams in close proximity to the same major metropolitan population as another franchise experienced lower levels of attendance. Later, Rascher et al. (2009) and Winfree (2009) used the timing of the natural experiment provided by the 2004-2005 NHL lockout to explore attendance at NBA games. Both studies showed that attendance at NBA games rose when fans substituted basketball games for hockey games during the canceled hockey games. Mills et al. (2015) showed that the number of cars crossing from Canada to the US was larger when the Buffalo Bills played a home NFL game, suggesting that Canadian sport fans substituted these events for other sporting events taking place in Toronto. Fans of European football exhibit similar behavior. When upper and lower-division games are played at the same time, fans tend to prefer the upper-division games, reducing attendance at the lower-division games (Wallrafen et al., 2019).

Beyond examining the impact of the presence of one team or sporting event on another team or league's attendance, other authors explored cross-quality impacts. Mills and Rosentraub (2014) conduct a case study of the game-level attendance of the NHL's Buffalo Sabres and Toronto Maple Leafs. The authors find that Canadian sports fans travel more often to Sabres games when the quality of the Maple Leafs decreases relative to the Sabres. In a more comprehensive study, Mills et al. (2016) examine 4 years of TV viewership data on six MLB teams in three shared "home team" markets. The dependent variable in the analysis measures the proportion of the total market population that watched the game. Since viewers often tune in and out during a game, the dependent variable is averaged across certain times throughout the broadcast. Determinants of viewership include home team characteristics, opposing team characteristics, and the characteristics of another team in the home team's shared market. Using a panel regression model with home and opposing team fixed effects, the authors find that teams that are of similar quality exhibit spillover effects in viewership. In other words, teams that share viewership markets can experience increased viewership when the quality of their market competitor increases. Conversely, using similar methods, Mondello et al. (2017) do not find corresponding results in viewership behavior among NFL fans.

To the best knowledge of the author, no one has explored the cross-quality impact of intercollegiate sports teams. Ferreira (2009) provides convincing arguments for why collegiate sport fan behavior might exhibit different characteristics from those found in professional sport studies. First, fans of a particular college or university might not view its different teams and sports as rivals and instead view the entire

athletic program as one composite good. The results of Mills et al. (2016) might actually be driven by fans tuning in hoping that the market competitor might lose. Attending multiple events being played at the same college or university on the same day have very small travel costs. The results of studies that find substitutability between sports played on the same day in different locations are likely driven by the fans' inability to travel to both or the lack of time and resources to attend both (Winfree et al. (2004); Mills et al. (2015); (Wallrafen et al., 2019). The results of Ferreira (2009) are hypothetical due to the implementation of surveys and forced-choice experiment methodology in the analysis. This study takes the analysis a step further and examines the actual game day attendance at Division I home baseball and softball games.

3. Methodology

Following Mills et al. (2016), traditional attendance models are first constructed with team, opponent, and game day factors for both the baseball and softball teams. For the baseball model's the corresponding softball team's win percentage is included and for the softball models the corresponding baseball team's win percentage is included to explore cross-quality spillover effects on attendance. Model 1 for the baseball league is presented in equation (1).

Model 1: Baseball

$$A_{ijt} = \beta_0 + \beta_1 SWP_{it} + \beta_2 HTWP_{it} + \beta_3 OWP_{jt} + \beta_4 G_{it} + \beta_5 DH_{it} + \beta_6 SC_{ijt} + \sum_{s=7}^{8} \beta_s \tau_s + \sum_{d=9}^{15} \beta_d \delta_d + \sum_{tc=16}^{47} \beta_{tc} \gamma_{tc} + \sum_{oc=48}^{79} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (1)$$

Here, A_{ijt} is live game attendance for baseball team i, against opposing team j, in game t. The primary variable of interest SWP_{it}, is the softball team's cumulative win percentage. The baseball team's cumulative win percentage is given by TWP_{it}, and the baseball opponent's cumulative win percentage is given by OWP_{jt}. Cumulative win percentage is the average win percentage of all games played as of the current game t. The variable G_{it} represents the game number and controls for the fact that attendance may increase throughout the season as teams approach playoff games. The variable DH_{it} indicates whether the current game is a doubleheader, and SC_{ijt} indicates whether the home baseball team and its opponent compete in the same conference. Additionally, the model controls for whether the game is a preseason, regular season, or post season game, which is represented by the dummy variable τ_s. Finally, fixed effects representing the day of the week δ_d, the home team's conference γ_{tc}, and the opposing team's conference δ_{oc}, are also

included in the model.[2]

Model 1 for the softball league is presented in equation (2).

Model 1: Softball

$$A_{ijt} = \beta_0 + \beta_1 BWP_{it} + \beta_2 HTWP_{it} + \beta_3 OWP_{jt} + \beta_4 G_{it} + \beta_5 DH_{it} + \beta_6 SC_{ijt} + \sum_{s=7}^{8} \beta_s \tau_s + \sum_{d=9}^{15} \beta_d \delta_d + \sum_{tc=16}^{48} \beta_{tc} \gamma_{tc} + \sum_{oc=49}^{81} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (2)$$

The specification of Model 1 for softball is nearly identical to the specification of Model 1 for baseball, with BWP_{it} now representing the baseball team's cumulative win percentage. In addition, there are 32 conferences in the softball league and only 31 conferences in the baseball league.

Next, a second model examines the impact of the uncertainty of outcomes on baseball and softball attendance. The specifications of Model 2 for the baseball and softball leagues are presented in equations (3) and (4), respectively.

Model 2: Baseball

$$A_{ijt} = \beta_0 + \beta_1 SWP_{it} + \beta_2 |DWP|_{ijt} + \beta_3 G_{it} + \beta_4 DH_{it} + \beta_5 SC_{ijt} + \sum_{s=6}^{7} \beta_s \tau_s + \sum_{d=8}^{14} \beta_d \delta_d + \sum_{tc=15}^{46} \beta_{tc} \gamma_{tc} + \sum_{oc=47}^{78} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (3)$$

Model 2: Softball

$$A_{ijt} = \beta_0 + \beta_1 BWP_{it} + \beta_2 |DWP|_{ijt} + \beta_3 G_{it} + \beta_4 DH_{it} + \beta_5 SC_{ijt} + \sum_{s=6}^{7} \beta_s \tau_s + \sum_{d=8}^{14} \beta_d \delta_d + \sum_{tc=15}^{47} \beta_{tc} \gamma_{tc} + \sum_{oc=48}^{80} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (4)$$

The only difference between Model 1 and Model 2, in both the baseball and softball specification, is the measurement of success for the two baseball or softball teams that are playing the game. Now, $|DWP|_{ijt}$ represents the absolute value of the difference between the home team's winning percentage up to game t and the opposing team's winning percentage up to that game. The smaller the difference, the more

competitive the two teams would be considered and the less certain the outcome of the game.

Finally, Model 3 includes both the win percentages of the home and opposing teams as well as the absolute value of the differences in these values to capture both the strength of the teams and the uncertainty of outcomes. The specifications of Model 3 for the baseball and softball leagues are presented in equations (5) and (6), respectively.

Model 3: Baseball

$$A_{ijt} = \beta_0 + \beta_1 SWP_{it} + \beta_2 HTWP_{it} + \beta_3 OWP_{jt} + \beta_4 |DWP|_{ijt} + \beta_5 G_{it} + \beta_6 DH_{it} + \beta_7 SC_{ijt} + \sum_{s=8}^{9} \beta_s \tau_s + \sum_{d=10}^{16} \beta_d \delta_d + \sum_{tc=17}^{48} \beta_{tc} \gamma_{tc} + \sum_{oc=49}^{80} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (5)$$

Model 3: Softball

$$A_{ijt} = \beta_0 + \beta_1 BWP_{it} + \beta_2 HTWP_{it} + \beta_3 OWP_{jt} + \beta_4 |DWP|_{ijt} + \beta_5 G_{it} + \beta_6 DH_{it} + \beta_7 SC_{ijt} + \sum_{s=8}^{9} \beta_s \tau_s + \sum_{d=10}^{16} \beta_d \delta_d + \sum_{tc=17}^{49} \beta_{tc} \gamma_{tc} + \sum_{oc=50}^{82} \beta_{oc} \omega_{oc} + \varepsilon_{ijt} \quad (6)$$

All factors in the specifications of Model 3 are identical to those in Models 1 and 2. Given that attendance is bounded by the number of seats in the stadium, all models are estimated using the Tobit specification.

4. Data

Data used to explore the cross-quality impact between Division I softball and baseball teams on home game attendance was collected for the 2018-2019 season, since this is the last season before the COVID19 pandemic impacted live game attendance at sporting events. I collected data from the NCAA website for all home games at schools that participate in both Division I baseball and softball (NCAA, 2022). The resulting data set contains information for 5,800 home baseball games and 4,278 home softball games. The softball season is shorter than the baseball season, with most softball teams playing around 35 games per season, while most baseball teams play around 50 games per season.

The NCAA website provided game-by-game statistics for the dependent variable *Attendance*. The home team success variable *Home Team Win Percentage* was calculated by taking the rolling average of the home team's win percentage up to the current

game in the season. This was also done for the opposing team and is denoted *Opponent Win Percentage*. The independent variable for Model 2 was calculated as the absolute value of the difference between the *Home Team Win Percentage* and the *Opponent Win Percentage* and is denoted as *Difference in Win Percentage*. Other controls, such as *Game Number,* which is the number of the current game in the season, and *Doubleheader,* which is an indicator variable denoting whether the game was part of a doubleheader, also came from this site. *Same Conference* denotes whether the home team and the opposing team competed in the same conference. The time of season indicators for the baseball league were *Preseason* games for games that took place from February 15, 2019, to March 21, 2019, *Regular Season* games from March 22, 2019, to May 20, 2019, and *Post Season* which includes games from May 22, 2019, to June 10, 2019. For the softball league, *Preseason* took place from February 15, 2019, to March 14, 2019, *Regular Season* lasted from March 15, 2019, to May 18, 2019, and *Post Season* went from May 19, 2019, to May 26, 2019.

Two additional variables of interest were created, one for each sport. For baseball, a variable capturing the strength of the corresponding softball team is the rolling average of the softball team's win percentage up to the current game, *Softball Win Percentage*. For softball, the analogous variable for baseball was also created. The rolling average of the win percentage of the corresponding baseball team is denoted *Baseball Win Percentage*. Finally, the size of each home baseball and softball team stadium, *Stadium*, was recorded to allow the Tobit specification to be estimated for each model. Table 1 provides summary statistics and descriptions for all dependent and independent variables for both leagues.

Note first, that baseball games draw nearly triple the attendance of softball games. For this reason, baseball stadiums are also much larger. However, both the baseball and softball teams do not reach stadium capacity for most home games. In the dataset, home teams have a slightly higher win percentage than visiting teams. This is likely because the teams that host the games later in the season have the higher win percentage. It may also be due to home field advantage or the disproportionate home game scheduling of stronger teams. To capture the larger crowds at the end of the season and post season, I control for both the game number and time in the season of the game. The day of the week accounts for the fact that weekend games likely draw larger crowds.

The large standard deviations for both softball and baseball home game attendance indicate that there are large differences in this variable. Breaking down this variable by conference indicates that the differences occur across teams in the sample and not just over the time of the season. In every conference, baseball teams draw larger crowds than softball teams. However, both sports see large differences between the top conferences and the bottom conferences in terms of attendance. Teams in the SEC draw the largest crowds for both the baseball and softball league. Baseball teams in the SEC draw nearly five times the national average, while its softball teams draw more than three times the national average. SEC baseball teams draw almost twice as many fans as the second-place Big 12.

Table 1. Summary Statistics.

Variable	Description	Baseball		Softball	
		Mean	Standard Deviation	Mean	Standard Deviation
Dependent Variable					
Attendance	Total number of fans at the game.	1,148.43	1,815.24	422.16	533.32
Tobit Variable					
Stadium	Number of fans that fit in the home team's stadium.	2,843.86	2,839.66	1,024.22	846.69
Variables of Interest					
Softball Win Percentage	Rolling average of the home softball team's win percentage, up to the current game.	0.52	0.20		
Baseball Win Percentage	Rolling average of the home baseball team's win percentage, up to the current game.			0.53	0.20
Win Percentage					
Home Team Win Percentage	The rolling average of the home team's win percentage, up to the current game.	0.54		0.53	
Opponent Win Percentage	The rolling average of the visiting team's win percentage, up to the current game.	0.47		0.49	
Difference in Win Percentage	The absolute value of the difference between the home team's and opponent's win percentage, at the current game.	0.22		0.22	
Game Variables					
Game Number	The number of the game in the season.	25.65	13.77	22.03	9.35
Doubleheader	Dummy Variable = 1 if the home team is hosting two games on the same day, 0 otherwise.	0.19		0.55	
SameConference	Dummy Variable = 1 if the visiting team is in the same conference as the home team, 0 otherwise.	0.53		0.59	
Day					
Sunday		0.21		0.20	

(continued)

Table 1. (continued)

Variable	Description	Baseball		Softball	
		Mean	Standard Deviation	Mean	Standard Deviation
	Dummy Variable = 1 if the game is played on a Sunday, 0 otherwise.				
Monday	Dummy Variable = 1 if the game is played on a Monday, 0 otherwise.	0.02		0.02	
Tuesday	Dummy Variable = 1 if the game is played on a Tuesday, 0 otherwise.	0.14		0.08	
Wednesday	Dummy Variable = 1 if the game is played on a Wednesday, 0 otherwise.	0.08		0.12	
Thursday	Dummy Variable = 1 if the game is played on a Thursday, 0 otherwise.	0.04		0.03	
Friday	Dummy Variable = 1 if the game is played on a Friday, 0 otherwise.	0.23		0.22	
Saturday	Dummy Variable = 1 if the game is played on a Saturday, 0 otherwise.	0.30		0.34	
Season					
Preseason	Dummy Variable = 1 if a Preseason game, 0 otherwise.	0.31		0.21	
Regular Season	Dummy Variable = 1 if a Regular Season game, 0 otherwise.	0.67		0.78	
Post Season	Dummy Variables = 1 if a Post Season game, 0 otherwise.	0.02		0.01	
Observations			5,800		4,278

In contrast, SEC softball teams average only 100 more fans than PAC-12 teams, the conference with the second largest average attendance.[3] The NEC and MEAC are the two conferences that draw the smallest crowds for baseball and softball, respectively, with an average of 141 fans for baseball games and 98 fans for softball games. This data suggests the need to control for a conference in the analysis.

Table 2 presents the first glimpse into the cross-quality impact of baseball and softball teams on attendance in Division I athletics. Here, attendance for each sport is broken down by the strength of the other team as well as whether the teams compete in a top attendance conference.

The analysis begins with the full sample of baseball and softball teams and is presented in the first row of Table 2. Both sports have larger average attendance when the other team has a win percentage of over 50%. Attendance for baseball games in which the softball team has a winning percentage over 50% is nearly triple that of games when the softball team has a winning percentage below 50%. For softball, attendance is a little more than twice as large when the corresponding baseball team has a win percentage over 50%.

Since these results might be driven by the fact that baseball and softball teams at the same school and in the same conference might have similar win percentages, I re-run the analysis for the top conferences and non-top conferences in each sport. The top conferences were identified as those with the largest average attendance. In baseball, the top conferences are the AAC, ACC, Big 12, Big Ten, Pac-12, SEC, and Sun Belt, because each of these conferences draws crowds of 1400 people or more on average. For softball, the top conferences are the Big 12, Big Ten, Pac-12, and SEC. These conferences are identified because they draw crowds of over 700 people on average. All other conferences are categorized as non-top conferences.

The second and third rows of Table 2 present the attendance for baseball and softball teams in each of the conference categories based on the strength of the corresponding team. In both sets of conferences, baseball and softball teams draw larger crowds when the corresponding softball or baseball team has a better

Table 2. Baseball and Softball Attendance, by the Strength of the Other Team's win Percentage and Conference.

	Baseball		Softball	
	Softball Win Percentage Less than 50%	Softball Win Percentage Greater than 50%	Baseball Win Percentage Less than 50%	Baseball Win Percentage Greater than 50%
Full Sample	538.51	1,680.59	230.46	569.56
Top Conference	1,325.14	2,958.80	886.63	1,168.53
Non-Top Conference	390.34	521.75	193.42	289.49

record. This difference is largest in absolute and percentage terms in the baseball team's top conferences. For softball, the percentage difference is larger among non-top conferences.

5. Results

Table 3 presents the results of Model 1 for both baseball and softball. Columns 1 through 3 present the results for baseball and columns 4 through 6 present the results for softball. Each column presents a slightly different specification of the model with columns 3 and 6 presenting the results for the specification with all controls.

The first specification for each league includes only the variables of interest and the home team and opponent conference fixed effects. These results appear in column 1 for baseball and column 4 for softball. The cross-quality effect for baseball is positive, suggesting that a better softball team leads to higher attendance at home baseball games. Specifically, an increase in the softball team's win percentage by 1% would increase the corresponding baseball team's attendance by about six people.

Columns 2 and 3 present the results of Model 1 for baseball when additional controls are included. Consistent with the literature, results indicate that both the home team's win percentage and the opposing team's win percentage have positive impacts on home baseball game attendance. Note that the coefficient on the home team's win percentage is statistically larger than the opposing team's win percentage indicating that fans respond more to an increase in the home team's strength than the strength of the opposing team, though both are consistently significant. Other controls also have the expected sign. The later the game is in the season, the higher the attendance. Games played between teams in the same conference draw smaller crowds than those across conferences. This is likely because the games that often draw the largest crowds are intrastate or regional rivals between teams that compete in different conferences and often draw more away fans.

Turning to softball, the cross-quality factor has mixed results. In the first specification, which includes only this factor and the home team and opposing team conference fixed effects, the coefficient is insignificant. In the two additional specifications with more controls, this factor becomes negative. However, the estimated impact is small, suggesting that a 1% increase in the winning record of the baseball team reduces softball home game attendance by less than one fan. Although the average softball attendance (422.16) is smaller than the average baseball attendance (1148.43), this estimated impact on the softball attendance remains smaller in percentage terms than an increase of six fans for the baseball attendance.

The other controls are similar across softball and baseball. The coefficients on the home team's win percentage and the opposing team's win percentage are both positive. Once again, the estimated impact of the home team's win percentage is statistically larger than the estimated impact of the opposing team's win percentage on the

Table 3. Model 1: Tobit Baseball and Softball Attendance Models.

	Baseball			Softball		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Attendance						
Softball Win Percentage	668.2***	525.6***	560.7***			
	(93.09)	(94.14)	(93.42)			
Baseball Win Percentage				−3.679	−90.71***	−58.75*
				(33.26)	(33.13)	(32.52)
Home Team Win Percentage		866.6***	827.5***		472.7***	434.2***
		(99.33)	(99.10)		(33.52)	(33.13)
Opponent Win Percentage		475.3***	403.3***		141.5***	121.1***
		(92.34)	(92.39)		(31.02)	(30.36)
Game Number			4.054**			4.396***
			(1.978)			(0.869)
Doubleheader			−30.21			−21.33*
			(44.00)			(12.32)
Same Conference			−140.4***			−55.77***
			(51.46)			(17.29)
Preseason			−1,157.1***			−678.0***
			(152.6)			(82.59)
Regular Season			−1,146.3***			−675.1***
			(133.6)			(79.58)
Constant	1,194.4***	484.7***	1,619.2***	386.3***	78.70*	667.0***
	(117.6)	(143.1)	(219.1)	(39.99)	(46.82)	(98.65)
Day Fixed Effects	No	No	Yes	No	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	229	229	229	313	313	313
Chi Squared	5,145.27	5,228.00	5,364.60	3,462.79	3,664.69	3,904.70
Observations	5,800	5,800	5,800	4,278	4,278	4,278

attendance at the softball games, and the later the game is in the season, the higher the attendance. Similar to baseball, and likely for the same reasons, games played between teams in the same conference draw smaller crowds than those across conferences. Finally, doubleheader games for softball tend to decrease game attendance, perhaps because the fans split their time between these games.

I repeat the analysis for the subsample of games in which the corresponding team is hosting a home game on the same day. The results of this analysis are in Table 4.

Note first, that the sample shrinks more for baseball than for softball since there are fewer softball games. Nevertheless, the implications of the result for the cross-quality effect of softball on baseball attendance remains consistent. In all three specifications of the model, the results suggest that a better softball team leads to increased attendance at the corresponding baseball game, that a 1% increase in the softball team's win percentage would lead to about 5.6–7 more fans at the baseball games.

Two of the three specifications for softball now result in insignificant coefficients for the baseball win percentage. The second specification suggests that a higher baseball win percentage leads to a decline in softball game attendance. Again, the impact is small, that a 1% increase in the baseball win percentage would lead to a decrease in softball attendance by about one fan. Since this sample includes only games in which the other team is also hosting a home game, this reduces the likelihood that a stronger baseball team pulls fans away from the softball team.

Estimates for Model 2 using the same data as for Model 1 appear in Table 5. For baseball, columns 1 and 2 present results for the entire sample with different specifications, and columns 3 and 4 present results for the sample of only games in which the other team also hosts a home game. For softball, columns 5 and 6 present results for the entire sample, and columns 7 and 8 present results for the sample of only games in which the other team also hosts a home game.

Once again, the baseball results are consistent. Results of both specifications of Model 2 for both samples suggest that a 1% increase in the win percentage of the softball team increases attendance at baseball games by about 6.8 people. All control variables of the full sample are also consistent with those of Model 1 but lose some significance in the sample of games in which the other team is also hosting a home game. In addition, there is some evidence that fans prefer to watch collegiate baseball games in which one team is more likely to win than the other team over closely competitive games due to the positive coefficient on the uncertainty variables in three of the four sets of results.

For softball, the cross-quality indicator is insignificant in all four sets of results. There is also no significance in the difference between the home team's win percentage and opposing team's win percentage. Across the specifications and samples, there are some differences in significance and sign of other controls.

Estimates for Model 3 using the same data as for Model 1 and Model 2 appear in Table 6. For baseball, columns 1 and 2 present results for the entire sample with different specifications, and columns 3 and 4 present results for the sample of only

Table 4. Model 1: Tobit Baseball and Softball Attendance Models, for Sample of Games When the Other Team is Also Hosting a Home Game.

	Baseball			Softball		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Attendance						
Softball Win Percentage	697.4***	561.8***	558.4***			
	(182.3)	(187.4)	(187.2)			
Baseball Win Percentage				−14.79	−99.12**	−81.50
				(50.05)	(50.25)	(50.47)
Home Team Win Percentage		661.5***	617.3***		436.3***	416.1***
		(203.3)	(204.7)		(52.03)	(51.90)
Opponent Win Percentage		220.0	261.1		88.58*	92.58**
		(176.5)	(177.2)		(46.70)	(46.30)
Game Number			4.336			4.144***
			(4.375)			(1.361)
Doubleheader			51.07			−11.72
			(80.95)			(19.53)
Same Conference			9.038			−31.51
			(104.3)			(28.47)
Preseason			1,687.9			474.8*
			(1,187.4)			(272.6)
Regular Season			1,417.7			426.4
			(1,177.0)			(271.5)
Constant	1,322.4***	868.2***	−796.3	439.0***	187.4***	−369.1
	(207.1)	(262.9)	(1,222.7)	(58.18)	(68.60)	(283.7)
Day Fixed Effects	No	No	Yes	No	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	67	67	67	140	140	140
Chi Squared	1,609.07	1,619.68	1,635.71	1,470.87	1,540.53	1,595.31
Observations	1,667	1,667	1,667	2,001	2,001	2,001

Table 5. Model 2: Tobit Baseball and Softball Uncertainty of Outcomes Models.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	666.8***	700.4***	685.6***	674.0***				
	(93.07)	(92.42)	(182.1)	(182.4)				
Baseball Win Percentage					−3.831	19.48	−16.30	−2.138
					(33.28)	(32.56)	(50.06)	(50.29)
Difference in Win Percentage	117.8	222.4***	316.4**	291.2*	4.440	52.73	65.37	71.73
	(78.77)	(85.20)	(150.0)	(163.8)	(34.06)	(33.81)	(51.29)	(51.95)
Game Number		5.051**		5.884		5.579***		5.331***
		(2.020)		(4.481)		(0.887)		(1.379)
Doubleheader		−33.69		48.25		−27.55**		−13.78
		(44.24)		(81.07)		(12.57)		(19.86)
Same Conference		−121.7**		22.16		−63.90***		−46.23
		(52.10)		(105.0)		(17.64)		(28.86)
Preseason		−1,209.1***		1,767.8		−704.6***		485.6*
		(153.1)		(1,189.0)		(83.58)		(276.7)
Regular Season		−1,223.2***		1,480.5		−725.0***		421.6
		(133.9)		(1,178.7)		(80.43)		(275.7)
Constant	1,177.5***	2,259.4***	1,276.0***	−508.8	385.7***	963.4***	429.3***	−152.4
	(118.2)	(203.1)	(208.0)	(1,217.2)	(40.24)	(96.35)	(58.66)	(287.1)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	229	229	67	67	313	313	140	140
Chi Squared	5,147.51	5,297.87	1,613.52	1,629.43	3,462.50	3,733.56	1,472.49	1,522.14
Observations	5,800	5,800	1,667	1,667	4,278	4,278	2,001	2,001

games in which the other team also hosts a home game. For softball, columns 5 and 6 present results for the entire sample, and columns 7 and 8 present results for the sample of only games in which the other team also hosts a home game.

The baseball results remain consistent. The estimated impact of the softball team's suggests that a 1% increase in the softball win percentage would result in about 5.6 more fans at the baseball games. The home team's win percentage and opposing team's win percentage continue to have positive impacts on attendance and once again the uncertainty variables are significant in three of the four specifications indicating that fans prefer more certain outcomes.

For softball, the cross-quality indicator is negative in three of the four sets of results. As in previous models and specifications, the overall estimates suggest that a 1% increase in the baseball team's win percentage would result in a decrease of one or fewer fans at the softball games. As in Model 2, there is also no evidence that fans prefer close or games with more certain outcomes among softball teams but home and opposing team's records are still strong indicators of softball game attendance.

Due to the inconsistencies in the softball analysis and the large differences across conferences, these analyses were also conducted for teams that play in top conferences and teams which play in non-top conferences. Results of Model 1 for the sample of schools in the top conferences are in Table 7, and results of Model 1 for the sample of schools in the non-top conferences are in Table 8. Again, the first two columns for baseball and softball in each table are for the full sample and the second two columns are for the sample of games in which the other team is also hosting a home game.

In both the top conferences and non-top conferences, the results for baseball are consistent. All specifications for all samples indicated that increased win percentage of the corresponding softball team leads to increased attendance at the baseball game. The estimates in the top conferences suggest that a 1% increase in the softball team's win percentage would lead to an increase of more than 10 fans at the corresponding baseball games, while in the non-top conferences a 1% increase in the softball team's win percentage would lead to an increase of about 2.4 more fans. Other factors remain consistent throughout, except for the impact of the home team win percentage for the smaller sample of only games in which the softball team is also hosting a game in the top conferences. This result becomes insignificant. With the smaller sample and all top conferences, there is likely not enough variation in this variable.

For softball, the sample of top conference teams is the only set of results in which the cross-quality factor of the baseball win percentage has any consistency. In all four sets of results, the coefficient is negative indicating that stronger baseball teams decrease the attendance at softball games. The estimated effects suggest that a 1% increase in the baseball team's win percentage would lead to a decrease in about seven fans at the corresponding softball games which is a larger percentage change from the average attendance at softball games. However, in the non-top conference sample, a much larger sample and applicable to many more schools, the first

Table 6. Model 3: Tobit Baseball and Softball Win Percentage and Uncertainty of Outcomes Models.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	528.5***	571.8***	571.9***	571.6***				
	(94.19)	(93.54)	(187.2)	(187.2)				
Baseball Win Percentage					−90.79***	−58.63*	−99.32**	−79.69
					(33.14)	(32.51)	(50.25)	(50.49)
Home Team Win Percentage	850.6***	796.7***	607.1***	580.2***	472.6***	432.2***	433.3***	413.0***
	(100.8)	(100.2)	(205.1)	(205.6)	(33.54)	(33.15)	(52.13)	(51.96)
Opponent Win Percentage	496.5***	444.7***	310.9*	337.9*	142.2***	129.9***	97.78**	103.8**
	(95.16)	(94.55)	(182.9)	(182.5)	(31.62)	(30.89)	(47.68)	(47.20)
Difference in Win Percentage	76.40	181.8**	297.6*	296.3*	4.101	52.05	49.36	63.43
	(83.17)	(88.74)	(159.3)	(171.1)	(33.96)	(33.77)	(51.64)	(52.23)
Game Number		4.772**		5.964		4.521***		4.257***
		(2.008)		(4.470)		(0.873)		(1.363)
Double Header		−27.57		55.25		−21.65*		−12.56
		(44.00)		(80.90)		(12.32)		(19.54)
Same Conference		−127.5**		30.73		−55.36***		−30.74
		(51.82)		(104.9)		(17.29)		(28.47)
Preseason		−1,159.3***		1,692.5		−681.3***		480.7*
		(152.6)		(1,186.2)		(82.60)		(272.6)
Regular Season		−1,146.9***		1,415.3		−676.9***		435.1
		(133.6)		(1,175.8)		(79.58)		(271.5)
Constant	470.1***	1,552.2***	800.5***	−924.3	77.80	653.5***	176.3**	−396.4
	(143.9)	(221.5)	(265.0)	(1,223.6)	(47.41)	(99.02)	(69.57)	(284.5)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)

Table 6. (continued)

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	229	229	67	67	313	313	140	140
Chi Squared	5,228.74	5,368.80	1,623.17	1,638.70	3,664.71	3,907.14	1,541.44	1,596.78
Observations	5,800	5,800	1,667	1,667	4,278	4,278	2,001	2,001

Table 7. Model 1: Tobit Baseball and Softball Attendance Models, by Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	915.1***	1,043.8***	1,137.1**	1,155.1**				
	(271.6)	(268.1)	(449.2)	(454.5)				
Baseball Win Percentage					−993.5***	−667.3***	−573.3**	−550.4**
					(176.4)	(184.1)	(237.5)	(242.2)
Home Team Win Percentage	1,943.8***	2,025.7***	872.6	700.0	1,321.4***	1,215.3***	1,100.3***	1,107.8***
	(329.5)	(335.3)	(540.6)	(560.0)	(169.7)	(168.9)	(256.4)	(254.7)
Opponent Win Percentage	787.3***	514.1*	−85.00	−54.47	577.5***	464.7***	285.0	259.8
	(273.1)	(271.8)	(449.4)	(450.9)	(153.0)	(149.9)	(212.4)	(208.6)
Game Number		18.46***		16.60*		10.79***		12.11**
		(5.660)		(10.04)		(3.829)		(5.335)
Doubleheader		41.75		112.6		−126.6**		−54.63
		(141.2)		(216.6)		(62.08)		(87.43)
Same Conference		−392.7**		184.3		−111.9		−46.18
		(175.6)		(312.4)		(115.3)		(185.9)
Preseason		−1,154.3***		2,424.7		−439.8**		865.1
		(363.1)		(1,805.3)		(221.5)		(580.3)
Regular Season		−1,267.6***		1,633.4		−376.6**		703.9
		(297.9)		(1,766.1)		(188.6)		(570.0)
Constant	−500.6	439.4	542.0	−1,943.6	148.3	283.8	−51.29	−1,021.6
	(331.7)	(549.0)	(546.8)	(1,916.5)	(246.4)	(362.2)	(379.3)	(712.0)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	129	129	40	40	192	192	84	84
Chi Squared	1,109.04	1,200.98	460.64	474.79	274.79	341.07	138.59	165.76
Observations	1,900	1,900	669	669	853	853	431	431

Table 8. Model 1: Tobit Baseball and Softball Attendance Models, by Non-Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	224.0***	225.5***	247.8***	256.7***				
	(48.49)	(48.29)	(82.33)	(81.80)				
Baseball Win Percentage					51.44**	54.57***	−23.02	−8.649
					(20.53)	(20.22)	(32.43)	(32.43)
Home Team Win Percentage	389.8***	391.9***	244.7***	254.7***	343.7***	331.2***	376.0***	366.9***
	(48.27)	(48.13)	(85.40)	(85.29)	(20.93)	(20.89)	(32.97)	(33.10)
Opponent Win Percentage	269.3***	251.2***	246.0***	241.8***	79.04***	74.82***	95.96***	95.02***
	(46.70)	(46.93)	(75.21)	(75.31)	(19.49)	(19.25)	(30.34)	(30.19)
Game Number		−0.796		−3.167		1.810***		2.254**
		(1.013)		(1.945)		(0.577)		(0.920)
Doubleheader		−31.17		13.32		2.432		1.019
		(21.43)		(32.90)		(7.833)		(12.86)
Same Conference		46.33*		56.84		−28.38**		−12.63
		(27.59)		(48.22)		(11.23)		(19.25)
Preseason		−86.52		−48.95		−682.2***		4.519
		(104.2)		(52.00)		(149.8)		(20.82)
Regular Season		−17.78				−667.9***		
		(96.13)				(149.2)		
Constant	104.0	196.8	1,036.4***	1,104.1***	122.8***	759.9***	193.9***	126.8**
	(94.98)	(142.3)	(197.6)	(204.8)	(28.59)	(154.4)	(42.57)	(50.93)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	100	100	27	27	121	121	56	56
Chi Squared	1,303.20	1,348.44	560.89	580.97	1,468.31	1,594.70	684.37	719.28
Observations	3,900	3,900	998	998	3,425	3,425	1,570	1,570

two sets of results suggest that an increased baseball win percentage would increase attendance at home softball games. Although the estimated result is small, suggesting that a 1% increase in baseball win percentage would lead to an increase of about 0.5 fans at the softball games.

Models 2 and 3 are also estimated for top conference and non-top conference teams. These results of Model 2 are presented in Tables 9 and 10, and the results of Model 3 are presented in Tables 11 and 12, for top and non-top conferences, respectively.

Under all samples and specifications, results of Models 2 and 3 suggest that increased softball win percentage increases attendance at baseball games. Results of Model 2 for the top softball conferences are no longer consistent, with only the full sample indicating that an increase in the win percentage of the baseball team leads to decreased attendance at a softball game. Again, this result flips and becomes positive for the sample of schools in the non-top conferences. The results of Model 3 for softball are consistent with those of Model 1.

6. Conclusion

Similar to past studies, the above results suggest that both the success of the home team and the opposing team in both softball and baseball have positive impacts on home game attendance. However, the impacts of cross-quality measures are mixed. The results indicate that a stronger softball program leads to an increase in attendance at home baseball games. This result is consistent across all models, specifications, and sub-samples and is contrary to the perception that women's sports are a drain on men's sports. However, the results for softball are less consistent. It is unclear how the increase in baseball win percentage affects softball attendance. In some models and specifications, results indicate that increased baseball program strength could lead to lower attendance at softball games. Though, this result seems to be driven by the teams in the top conferences. For the non-top conference analysis, the sign of the baseball win percentage coefficient switches to positive. Since most teams do not play in top conferences, increased strength of the baseball team could lead to increased attendance at softball games at most colleges and universities. However, the estimated impacts are small.

Given that baseball and softball teams can host larger crowds than they do, and benefit from charging these fans admission, more analysis is needed to understand the factors driving attendance at these events. This is the first analysis to look at cross-quality impacts for men's and women's sports. However, limitations exist. With additional data, perhaps over many years, a true fixed effects model could be run with team and opponent fixed effects instead of just conference fixed effects. The samples get small when cutting across different dimensions, such as conferences and the home game presence of the corresponding team. Nevertheless, the results are consistent for baseball, that increased performance of the softball team leads to

Table 9. Model 2: Tobit Baseball and Softball Uncertainty Models, by Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	1,468.9***	1,573.3***	1,387.0***	1,362.4***				
	(256.0)	(255.8)	(418.9)	(427.4)				
Baseball Win Percentage					−670.7***	−396.9**	−256.4	−277.7
					(177.6)	(185.3)	(229.6)	(239.4)
Difference in Win Percentage	134.1	566.8**	657.2*	668.2*	−10.41	105.2	121.9	135.6
	(229.4)	(247.1)	(357.9)	(387.7)	(158.8)	(156.7)	(213.5)	(216.2)
Game Number		18.75***		19.92*		11.75***		11.65**
		(5.815)		(10.31)		(3.932)		(5.430)
Doubleheader		−15.34		75.55		−159.7**		−44.02
		(141.9)		(213.7)		(63.21)		(88.63)
Same Conference		−362.8**		223.4		−123.4		−65.27
		(177.3)		(312.2)		(118.3)		(189.4)
Preseason		−1,268.8***		2,556.9		−534.5**		833.5
		(365.2)		(1,799.3)		(226.7)		(587.7)
Regular Season		−1,485.8***		1,711.6		−561.5***		619.1
		(297.6)		(1,762.2)		(192.0)		(578.3)
Constant	759.9***	1,718.6***	789.2**	−1,970.7	1,189.5***	1,349.6***	717.7**	−170.2
	(239.3)	(483.8)	(373.4)	(1,880.7)	(209.3)	(332.5)	(318.2)	(698.6)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	129	129	40	40	192	192	84	84
Chi Squared	1,072.59	1,169.77	460.84	475.89	208.57	286.61	120.47	147.24
Observations	1,900	1,900	669	669	853	853	431	431

Table 10. Model 2: Tobit Baseball and Softball Uncertainty Models, by Non-Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	262.2***	266.5***	268.6***	281.0***				
	(48.64)	(48.42)	(81.72)	(81.20)				
Baseball Win Percentage					110.5***	109.6***	42.35	54.24
					(20.99)	(20.63)	(33.22)	(33.19)
Difference in Win Percentage	43.42	97.88**	54.26	88.73	12.55	30.54	23.78	36.06
	(41.21)	(44.18)	(70.62)	(75.78)	(22.39)	(22.35)	(35.63)	(36.10)
Game Number		−0.0726		−2.625		2.931***		3.719***
		(1.032)		(1.981)		(0.598)		(0.951)
Doubleheader		−29.50		18.24		−2.324		−2.890
		(21.61)		(33.14)		(8.129)		(13.40)
Same Conference		57.06**		65.18		−37.27***		−31.35
		(28.09)		(49.07)		(11.64)		(19.96)
Preseason		−112.0		−54.97		−758.1***		20.73
		(104.8)		(52.30)		(153.3)		(21.65)
Regular Season		−47.69				−759.0***		
		(96.65)				(152.5)		
Constant	440.9***	514.6***	1,305.4***	1,353.0***	333.9***	1,030.3***	421.0***	320.7***
	(87.58)	(138.3)	(185.4)	(195.4)	(24.66)	(156.9)	(36.74)	(48.56)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	100	100	27	27	121	121	56	56
Chi Squared	1,228.30	1,278.88	546.66	567.28	1,205.80	1,351.28	557.59	599.55
Observations	3,900	3,900	998	998	3,425	3,425	1,570	1,570

Table 11. Model 3: Tobit Baseball and Softball Uncertainty and Win Percentage Models, by Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	909.5***	1,089.8***	1,170.8***	1,203.9***				
	(272.3)	(269.7)	(448.7)	(454.4)				
Baseball Win Percentage					−998.8***	−662.4***	−571.1**	−540.3**
					(176.8)	(184.1)	(237.7)	(243.5)
Home Team Win Percentage	1,975.6***	1,891.2***	785.8	678.4	1,313.6***	1,198.8***	1,092.6***	1,097.0***
	(347.9)	(347.2)	(542.3)	(558.8)	(170.6)	(169.4)	(259.0)	(256.0)
Opponent Win Percentage	744.7**	732.0**	264.3	335.4	609.5***	549.4***	302.9	294.4
	(311.4)	(308.8)	(503.3)	(508.6)	(169.1)	(166.2)	(228.8)	(225.1)
Difference in Win Percentage	−80.20	438.1	632.1	730.4	76.65	202.2	48.82	95.21
	(281.4)	(295.4)	(413.9)	(444.8)	(171.8)	(170.7)	(231.4)	(233.0)
Game Number		20.22***		20.79**		11.23***		12.24**
		(5.779)		(10.34)		(3.843)		(5.344)
Double Header		43.09		117.1		−125.2**		−53.76
		(141.1)		(216.1)		(62.04)		(87.44)
Same Conference		−377.2**		220.2		−115.2		−51.19
		(175.8)		(312.4)		(115.2)		(186.3)
Preseason		−1,150.3***		2,435.4		−450.2**		873.5
		(362.9)		(1,801.1)		(221.6)		(580.5)
Regular Season		−1,263.5***		1,634.8		−376.2**		721.4
		(297.7)		(1,762.0)		(188.5)		(571.3)
Constant	−482.7	244.6	302.5	−2,406.3	122.6	189.7	−66.48	−1,074.3
	(337.6)	(564.1)	(567.6)	(1,932.6)	(253.0)	(370.6)	(386.0)	(723.3)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)

Table 11. (continued)

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Home Team Conference Fixed Effects								
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	129	129	40	40	192	192	84	84
Chi Squared	1,109.13	1,203.18	462.97	477.48	274.99	342.47	138.63	165.93
Observations	1,900	1,900	669	669	853	853	431	431

Table 12. Model 3: Tobit Baseball and Softball Uncertainty and Win Percentage Models, by Non-Top Conference.

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Attendance								
Softball Win Percentage	225.2***	228.9***	247.3***	257.1***				
	(48.52)	(48.31)	(82.30)	(81.75)				
Baseball Win Percentage					51.37**	54.55***	−23.21	−8.179
					(20.53)	(20.22)	(32.43)	(32.43)
Home Team Win Percentage	385.7***	381.7***	237.2***	244.3***	343.5***	330.6***	375.5***	366.3***
	(48.65)	(48.53)	(85.92)	(85.82)	(20.94)	(20.89)	(32.98)	(33.10)
Opponent Win Percentage	273.3***	257.7***	250.9***	245.2***	80.57***	78.01***	98.99***	99.36***
	(47.09)	(47.09)	(75.45)	(75.33)	(19.68)	(19.41)	(30.68)	(30.46)
Difference in Win Percentage	27.95	71.67	54.72	78.87	12.33	28.24	22.75	36.90
	(41.79)	(44.55)	(71.03)	(75.94)	(21.71)	(21.70)	(34.53)	(34.96)
Game Number		−0.545		−2.834		1.878***		2.325**
		(1.025)		(1.971)		(0.579)		(0.922)
Double Header		−30.04		14.83		2.296		0.490
		(21.43)		(32.91)		(7.832)		(12.86)
Same Conference		52.88*		65.42		−28.26**		−11.98
		(27.88)		(48.89)		(11.23)		(19.25)
Preseason		−83.08		−49.14		−684.1***		3.348
		(104.2)		(51.96)		(149.7)		(20.85)
Regular Season		−13.23		0		−669.3***		
		(96.14)		(.)		(149.1)		
Constant	96.93	166.1	1,018.6***	1,076.0***	120.1***	753.5***	188.9***	116.2**
	(95.57)	(143.5)	(198.7)	(206.4)	(28.97)	(154.3)	(43.24)	(51.90)
Day Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Home Team Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)

Table 12. (continued)

	Baseball				Softball			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Opponent Conference Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Censored	100	100	27	27	121	121	56	56
Chi Squared	1,303.65	1,351.02	561.49	582.05	1,468.63	1,596.40	684.80	720.39
Observations	3,900	3,900	998	998	3,425	3,425	1,570	1,570

increased attendance at the baseball games. Analysis from this study suggests that athletic departments could increase attendance at both softball and baseball games with improved softball programs. However, improving the baseball program might only increase attendance at baseball games.

Ultimately, this study increases awareness of the interplay of men's and women's sports and can inspire more investigation into the differences across men's and women's sport programs to better understand how to close gaps in demand, revenue generation, and other areas. This is a first look into two specific sports. A full analysis of college sports and the entire athletic programs could shed more light on the complementarity or substitutability across all men's and women's sports to further improve athlete, team, fan, and school outcomes.

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Notes

1. These calculations are based on the statistics for the 2018-2019 athletic season.
2. Note that it would be ideal to include team and opponent fixed effects; however, with over 350 teams in the sample and only one year of data, the model does not have enough power to support all of these fixed effects.
3. This data is available in table format for all conferences and is available upon request.

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