

The Yankee Effect in Minor League Baseball

Rodney J. Paul* and Andrew P. Weinbach**

ABSTRACT

The New York Yankees, as a visiting team, have been shown to have a positive and significant effect on attendance for their opponent (Paul et al., 2004). This paper explores the possibility of a “Yankees Effect” at the minor league level. Through a study of individual game attendance for the 2011 season, having the Yankees-affiliate as the visiting team was shown to have a positive and significant effect on attendance at the AAA-level (International League). The Yankees-affiliate was shown to have a positive, but statistically insignificant, effect on attendance at the AA-level (Eastern League). It appears the “Yankees Effect” occurs in the minor leagues for the players closest to playing at the major league level.

I. Introduction

In a 2004 article in the *New York Economic Review*, Paul et al. explored the concept of the “Yankee Effect” in Major League Baseball. With the introduction of interleague play, many touted the structural change in scheduling, allowing for American and National League teams to play each other on a limited basis during the regular season, as a success by looking at the overall average increase in attendance at Major League Baseball games during interleague play. Paul et al. (2004) explored this topic and showed that the statistically significant increase in attendance was mainly due to the New York Yankees being the interleague opponent for National League teams, with the rest of the matchups having statistically insignificant impacts on attendance. Furthermore, Paul et al. (2004) showed that significant increases in attendance also occurred in intra-league games with the Yankees as an opponent. This revealed the Yankees were a dominant team at the gate, attracting more fans and producing greater revenues for opposing teams.

This study takes the “Yankee Effect” concept beyond Major League Baseball into the minor leagues. Minor League baseball has a hierarchy of levels with the top prospects (closest to majors) placed on AAA rosters, the next closest at AA, with a step down to A (broken down into advanced and regular leagues at the A-level) and then short-season and rookie leagues. The leagues are then broken down regionally, generally keeping the farm teams of the parent club relatively close to their minor league affiliates and keeping travel costs within-league to a reasonable level.

*Rodney J. Paul, Professor of Sport Management, Falk College of Sport and Human Dynamics, Syracuse University, 810 Nottingham Road, Syracuse, NY 13244, Email: rpaul01@syr.edu, Phone: 315-443-8165

**Andrew P. Weinbach, Associate Professor of Economics, E. Craig Wall Sr. College of Business Administration, Coastal Carolina University, P.O. Box 261954, Conway, SC 29528, Email: aweinbac@coastal.edu, Phone: 843-349-6542

The New York Yankees have minor league affiliates at the AAA-level in Scranton/Wilkes-Barre, PA (International League) and at the AA-level in Trenton, NJ (Eastern League). Both teams are geographically close to New York City, and may receive spillover benefits from their relationship with the Yankees. The Scranton/Wilkes-Barre team furthered the direct association with the parent club by actually having their team nickname as the Yankees¹, with a similar logo (the nickname of Trenton's team is the Thunder). Both teams appear to actively promote their association with the Yankees, using the Yankees brand to help market and promote their franchise.

Given the success on the road of the New York Yankees in Major League Baseball, this study examines the question of whether this road success also translates to the AAA and AA levels of minor league baseball. If baseball fans around the country enjoy following the New York Yankees, they may want to follow their prospects on the way to the majors. If so, the minor league affiliates of the New York Yankees might see the same "Yankee Effect" at the gate, with increased attendance on days the visiting team is part of the Yankees farm system. If minor league fans really do not associate the minor league team with its parent club or simply care more about the overall game day experience (promotions, activities, events, etc.) at the ballpark than the actual players or team success, then the "Yankee Effect" may not exist at minor league stadiums.

We attempt to answer this question by estimating a model to explain attendance of minor league baseball for the International (AAA) and Eastern (AA) Leagues, where the Yankees farm system teams participate. Controlling for city demographics, day of the week and monthly effects, team success, weather, and promotions, we examine if having the New York Yankees affiliate as the visiting team leads to significant increases in attendance in these leagues. It should be noted that neither Yankees-affiliate had an outstanding or particularly poor season in 2011 (the year studied). Scranton/Wilkes-Barre had a record of 73-69 and finished 8 games behind the division leader. Trenton fared slightly worse at 68-73 and finished 8.5 games back of the division leader. Neither team made the playoffs in the 2011 season.

Baseball attendance has been studied by economists in a variety of settings with many different sets of independent variables in the analysis. Consumer behavior of baseball fans and demand for baseball game attendance have been examined through different regression models, some focusing on annual attendance, others focusing on game-to-game differences in attendance. Some of these studies include an investigation into population, income per capita, star players, and recent success (Noll, 1974), televised games, quality of the team, and availability of substitutes (Demmert, 1973), expected probabilities of winning a championship (Whitney, 1988), salary structure (Richards and Guell, 1998), turnover in team rosters (Kahane and Shmanske, 1997), the impact of interleague play (Butler, 2002; Paul et al. 2004), new stadium effects (Coates and Humphreys, 2005; Depken, 2006), team performance as well as the impact of MLB affiliate proximity and pricing on minor league baseball attendance (Gitter and Rhoads, 2010). Studies of minor league baseball include Siegfried and Eisenberg (1980), Gifis and Sommers (2006), Paul et al. (2007), and Anthon, et al. (2012).

This study focuses on game-by-game attendance in the International and Eastern Leagues for each of its teams, using many of the independent variables discussed in the papers mentioned above. The main focus of this paper, however, is the direct impact of the New York Yankee affiliate on attendance when they are the visiting team. The paper proceeds as follows: the next section presents the regression model and discusses the empirical results. The final section summarizes the findings and concludes the paper.

II. Regression model of International League (AAA) and Eastern League (AA) Attendance

To test for the possibility of a “Yankees Effect” in the minor leagues, a simple regression model was specified with daily game-by-game attendance as the dependent variable for games played in the 2011 baseball season. The attendance was taken from the box scores of each team in the International and Eastern Leagues. The independent variables in the regression model include common factors used in analysis of daily attendance figures in baseball including city demographics, weekday and month of the game, team performance, weather factors, promotions, and a dummy variable indicating whether the Yankees farm teams (Scranton/Wilkes-Barre in the International League and Trenton in the Eastern League) are the visiting opponent to measure the potential “Yankees Effect.”

After the intercept, the next set of independent variables included in the regression model is city demographic variables. These independent variables include population and income per capita of the city. If higher-populated areas attract more fans to minor league baseball games, population should have a positive and significant effect on attendance. In relation to income per capita, the ultimate impact of this variable depends on whether minor league baseball is a normal or inferior good. If normal, the sign will be positive; if inferior, the sign will be negative. Information on these variables was gathered for each city in the International and Eastern Leagues from www.city-data.com.

The next category of independent variables is the dummy variables for the days of the week and the months of the season. Weekend days are expected to be more popular than weekday games due to the opportunity cost of the time required to attend a baseball game. With respect to the months of the season, early season games are likely to have fewer fans in attendance (except opening day), while the summer months and end-of-season playoff races could lead to increased interest. Wednesday and June are the omitted daily and monthly dummy categories.

Team performance is included for both the home team and the road team as the next category in the regression model. Pre-game home team win percentage is calculated as a running average throughout the season. It is expected to have a positive impact on attendance if fans value team success at the minor league level. Opponent win percentage is also included in the model, and is calculated in the same fashion as the home team win percentage. If fans value the overall quality and success of the road team, the sign on this variable will be positive.

Weather was included in the regression model in two ways. First, the temperature was directly included as an independent variable. Given that fans likely prefer warm days to cold days for attending

outdoor minor league baseball games, the expected sign on this variable is positive. In addition to the temperature, the weather category noted in the box score was also included as a series of dummy variables in the regression model. The categories noted in the box score include partly cloudy, cloudy, clear, sunny, rain, and drizzle. The omitted category is partly cloudy, with all results compared to that weather condition.

Promotions are an important part of the game day experience for many fans of baseball, especially minor league baseball, therefore categories of promotions were included as independent variables in the regression model. Although there are many different promotions across teams and leagues, enough similar promotions existed to group the promotions into eight categories. We included promotional categories for opening day, merchandise giveaways, fireworks, group nights, free or discounted food/drink, free or discounted beer, “Dogs to the Park” nights, and post-game concerts. If fans value these promotions, especially the major promotions such as fireworks and concerts, these promotional categories should have a positive effect on attendance.

To account for the possible “Yankees Effect” a dummy variable was included when the visiting team was a Yankees-affiliate. If fans prefer the Yankees to other teams, as they do in Major League Baseball, and enjoy following Yankees’ prospects on the path to the majors, the coefficient on this variable should be positive.

Summary statistics for the International League and Eastern League are presented in Tables I and II. A frequency table for dummy variables is shown in Table III. Table IV presents the regression results for the International League, the Eastern League, and combined results for both leagues (using a dummy for the AA games in that model specification). Due to heteroskedasticity issues in the regression model, White’s heteroskedasticity-consistent standard errors and co-variances was used in the results below. Coefficients of each variable are presented with corresponding t-statistics in parentheses.

Table I: Summary Statistics – International League

	Attendance	Temperature	Population	Income Per Capita
Mean	7,015	75	333,023	22,718
Median	6,830	78	252,057	21,479
Std. Deviation	2,873	12	259,047	5,548

Table II: Summary Statistics – Eastern League

	Attendance	Temperature	Population	Income Per Capita
Mean	4,975	75	84,173	22,465
Median	4,915	77	73,206	19,433
Std. Deviation	2,038	11	45,473	7,433

To discuss the results, we will address the three separate regressions (Combined leagues, International League, and Eastern League) simultaneously, noting any key differences between the specifications. Overall, AA-teams were found to attract nearly 2,000 fewer fans than AAA baseball

Table III: Frequency Table – International and Eastern League

Variable	International League	Eastern League	Variable	International League	Eastern League
Partly Cloudy	356	220	Sunday	158	119
Cloudy	273	168	Monday	144	80
Clear	236	229	Tuesday	138	116
Sunny	72	65	Wednesday	111	105
Rain	16	10	Thursday	159	125
Drizzle	11	12	Friday	150	119
Overcast	44	0	Saturday	152	124
Opening Day	14	11	April	167	113
Merchandise	186	193	May	199	165
Fireworks	191	201	June	203	150
Group	104	214	July	200	169
Food	126	66	August	206	159
Beer	31	76	September	37	32
Discount	161	206			
Dogs to Park	15	21			
Concerts	17	29			

(specification I), likely due to the smaller markets of AA-baseball and the quality of players participating in AAA compared to AA. In relation to city demographics, population was found to have a positive and significant effect (1 percent level) on attendance in all three specifications. Income per capita, on the other hand, was found to have a negative and significant effect (1 percent level) on attendance in all three regression models. More fans attended games in larger cities for the minor leagues studied in this sample, but minor league baseball could be classified as an inferior good for the residents of these cities. While team representatives generally prefer to refer to baseball as value family entertainment, it is likely that as income rises in an area, consumers are able to afford higher quality forms of entertainment (sports included) which are sold at higher prices. Therefore, for higher-income areas, substitution of a longer trip to a Major League Baseball ballpark may serve as viable entertainment option that consumers from poorer areas may not be able to afford.

The days of the week revealed the expected result that weekend days are the most popular days for attendance in the International and Eastern Leagues. Saturday was shown to have the largest impact, with positive and significant effects at the 1 percent level. Thursday, Friday, and Sunday were also shown to have positive and significant effects on attendance, compared to the omitted day Wednesday, with Friday having the next largest impact after Saturday. Thursday nights were more popular than Sundays in the International League, but Sunday was a greater draw in the Eastern League.

The months of the season only showed significant effects early in the season. In the months of April and May, when the weather is not ideal for baseball in the northeastern U.S., and public schools are still in session, fewer fans attended games. Results for these months were found to be significant at the 1 percent level, with April showing the fewest fans in attendance at baseball games.

Table IV: Regression Model of Attendance for International (AAA), Eastern (AA), and Both Leagues

Variable	International and Eastern Leagues Combined	International League (AAA)	Eastern League (AA)
Intercept	6510.235*** (6.8338)	7371.251*** (6.2320)	6001.071*** (5.1174)
Population	0.00139** (2.3253)	0.0017*** (3.0667)	0.0171*** (11.5436)
Income Per Capita	-0.0910*** (-8.1749)	-0.1643*** (-8.1844)	-0.0402*** (-3.7531)
Sunday	430.2759** (2.3245)	616.9522** (2.2094)	663.7426*** (2.9299)
Monday	97.3340 (0.5344)	254.8244 (0.9317)	138.1304 (0.6693)
Tuesday	386.7103** (2.1397)	589.2773** (1.9818)	51.6321 (0.2675)
Thursday	462.4927*** (2.7697)	772.1439*** (3.0614)	388.8413* (1.9438)
Friday	735.6735*** (4.0168)	941.2551*** (3.4092)	795.5852*** (3.5835)
Saturday	1165.518*** (5.8733)	1520.221*** (4.9398)	1180.012*** (4.7646)
April	-1915.211*** (-6.6058)	-2131.463*** (-5.3795)	-1694.061*** (-6.9318)
May	-863.9150*** (-3.6433)	-1025.106*** (-2.8895)	-606.9015*** (-3.1105)
July	189.8350 (0.7779)	219.9526 (0.5972)	118.8240 (0.5905)
August	257.9626 (0.9485)	368.0885 (0.9258)	192.6018 (0.8496)
September	433.4735 (1.1212)	823.9547 (1.5310)	-16.1951 (-0.0396)
Win Percentage	2386.357*** (3.1007)	2124.278** (2.0266)	-798.0547 (-1.1202)
Opponent Win Pct.	721.0064 (0.6129)	644.8537 (0.4852)	-2058.528 (-1.0124)
Temperature	3.6099 (0.4944)	10.4532 (1.0847)	-8.7068 (-1.0982)
Cloudy	-263.7016* (-1.8278)	12.0059 (0.0631)	-674.6277*** (-4.3348)
Clear	-112.8421 (-0.8335)	-98.0928 (-0.4937)	25.0916 (0.1620)
Sunny	9.4962 (0.0467)	96.7256 (0.3395)	120.4616 (0.4801)
Rain	-730.2034* (-1.8728)	-400.9276 (-0.6987)	-1506.732*** (-5.2406)
Drizzle	-586.8499 (-1.5112)	-634.5419 (-1.1525)	-1066.792*** (-2.6157)
Opening Day	2804.477*** (3.9337)	3551.095*** (3.5554)	2121.385*** (5.3190)
Merchandise	509.5322*** (3.7872)	701.0381*** (3.5869)	327.4970** (2.1480)
Fireworks	1601.153*** (10.4439)	1885.300*** (7.9367)	1262.085*** (7.1345)

Group	-30.6788 (-0.1925)	-622.8200** (-2.2815)	570.3076*** (3.9712)
Food	-223.1785 (-1.4598)	52.1092 (0.2358)	-151.1475 (-0.7249)
Beer	-696.3498** (-2.4517)	176.0442 (0.3124)	-567.0435*** (-2.7005)
Discount Tickets	-714.8886*** (-4.3069)	-1039.579*** (-4.7334)	-81.0498 (-0.4073)
Dogs to Park	86.6798 (0.3408)	86.1226 (0.1989)	-136.1273 (-0.4758)
Concerts	1370.857*** (3.5285)	1973.738*** (2.6106)	960.8517*** (3.0163)
AA	-1988.708*** (-8.0937)		
Yankees-Affiliate as Visiting Team	660.8292*** (2.5949)	850.3257*** (2.6267)	85.8401 (0.2906)
R-squared	0.4560	0.4310	0.4814
Adjusted R-squared	0.4289	0.4117	0.4533
F-statistic	14.8632	15.12394	14.2827
Number of Observations	1800	1012	788

*significant at the 10 percent level, ** significant at the 5 percent level, and *** significant at the 1 percent level.

Fans appeared to care more about winning for teams at the AAA International League. For the International League, the win percentage was shown to have a positive and significant effect on game attendance. In the AA Eastern League, a negative, but statistically insignificant effect of win percentage was found. Fans of minor league baseball in the U.S. northeast may care more about team success the closer the prospects are to the majors. This result is different than the result seen in Gitter and Rhoads (2010) where win percentage was found to have a positive and significant effect on AA-level baseball, but not at the AAA-level. Their sample used a long time series where the dependent variable is average per game attendance, while ours is a single-year sample with each individual game attendance used as the dependent variable. Their sample also aggregated leagues across all levels (A, AA, AAA), while ours used individual leagues. These differences in time and level of aggregation may account for the differences seen. Opponent win percentage was not found to have a significant impact on attendance in these leagues.

In relation to the weather, temperature was not shown to have a significant impact on attendance, but certain weather categories had a major influence on Eastern League attendance. Poor weather conditions, characterized as Rain, Drizzle, or Cloudy days, were all shown to have a negative and significant (at the 1 percent level) impact on attendance. Rain led to over 1,500 fewer fans in attendance and days classified as Drizzle were shown to decrease crowds by over 1,000 fans. Cloudy days did not have as large of an effect, but its impact was still statistically significant. In contrast, fans of AAA baseball did not appear to be as sensitive to weather conditions. AAA-baseball fans may be less sensitive to the

weather in AA cities because the attraction of the games is more tightly linked to performance, while the AA-level games may be attracting more of a general audience, that may not follow baseball closely, but views the games as a source of entertainment that may be easily substituted for by another form of entertainment if weather conditions are less favorable.

With the promotional categories included in the regression model, some results were quite consistent across leagues. Opening day, merchandise giveaways, fireworks shows, and concerts were all shown to positively affect game attendance in both the International League and the Eastern League. All four categories of promotions were statistically significant at the 1 percent level. Beer promotions and reduced priced tickets were shown to have negative and significant effects on attendance, but differed by league. In the International league, discount tickets were found to have a significant impact, but beer did not. While the negative impact of discounted tickets may seem counter-intuitive, it may be that the discount tickets variable is intentionally linked to games where management has forecasted poor attendance based on the relative popularity of certain opponents, or the timing of special events that may directly compete for fans, such as a fair or circus that is outside of our available data. In the Eastern League, beer was found to have a negative and significant effect on attendance. Although surprising on the surface, as many fans associate drinking beer with attending sporting events, many people see baseball games with their family, which may drive away a significant portion of the fan base for games when free- or reduced-priced beer is offered. Having free or cheap beer may lead to negative externalities for other fans, who simply decide not to attend games having this promotion. Dogs to the Park and free- or reduced-price food promotions were not found to have statistically significant effects on attendance. The Dogs to the Park promotion may attract people who would not otherwise attend games, and simultaneously keeping some baseball (but not dog) fans away.

It does appear that the strength of the Yankees brand extends to the AAA level in Minor League Baseball. In testing for the “Yankees-Effect” at the minor-league level, the Yankees-affiliate as the visiting team was shown to have a positive and significant effect on attendance for the regression model specification I, where both leagues are included. However, the significant impact of the Yankees-affiliate lies nearly entirely in the AAA International League. When Wilkes-Barre/Scranton (the AAA Yankees-affiliate) visited the other International League teams, over 850 additional fans attended these games, with statistical significance at the 1 percent level. In the Eastern League, however, a non-statistically significant result of 85 additional fans was shown for games where Trenton (AA Yankees-affiliate) visited other Eastern League teams. Although the Yankees-affiliate is quite popular at the gate as an opposing team at the AAA-level, the overall impact appears to quickly drop-off as lower-levels of minor leagues are examined. This may have to do with how recognizable the top prospects are to followers of the Yankees, with more top-notch prospects playing in AAA-baseball compared to AA-baseball, at least in terms of readiness to capture a potential spot on the Yankees roster. This result may also be a function of players who appeared with the Yankees previously, who are either sent to the minors as a short-term rehabilitation assignment or may be fringe MLB players, moving back-and-forth between AAA and the

majors based upon injuries and recent performance. Another possibility for this result is that Trenton does not use the Yankees as its nickname, instead opting for the Thunder, while Scranton/Wilkes-Barre actually uses the name brand of the Yankees, which more directly associates the team with its parent organization.

III. Conclusions

Minor League Baseball attendance at its top two levels, AAA and AA, were examined in relation to the impact of the New York Yankees affiliate as the visiting team. Previous research has shown that the New York Yankees attract large crowds on the road in Major League Baseball (Paul et al., 2004). That study showed that most of the increase in attendance attributed to interleague play was driven by games where the Yankees were the visiting team. This study extends this analysis to minor league baseball by examining attendance in the International (AAA) and Eastern (AA) leagues. AAA-baseball features more skilled players than AA since AAA-ball is only one step removed from the majors and AA is a notch lower on the development ladder.

A regression model was constructed for each individual league (International and Eastern) and for both leagues together. Game-by-game attendance was the dependent variable with independent variables included to control for city demographics, day of the week, month of the year, team performance, weather, game promotions, and a dummy variable for the New York Yankees affiliate as the visiting team. The majority of the results are similar to what has been found in previous studies of Minor League Baseball. Population was found to have a positive and significant effect on attendance, but Minor League Baseball was shown to be an inferior good at both levels of play, consistent with the idea that Minor League Baseball games are attractive to the value-oriented consumer.

Weekend games, as expected, were shown to be more popular than weekdays and early season games (April and May) were shown to have significantly lower attendance figures. Win percentage of the team was shown to have a positive and significant effect at the AAA level, but not at the AA level, perhaps indicating that fans have higher expectations of play quality for games at the AAA level, and may view AA level games as general entertainment. Weather had some effects, as poor-quality days led to lower attendance. Opening day, merchandise giveaways, fireworks, and concerts all led to significantly higher attendance figures at both the AAA and AA level.

The key aspect of attendance investigated in this paper, the "Yankee effect" at the minor league level, was shown to have a positive and significant effect on attendance at the AAA-level, but was not statistically significant at the AA-level. When the New York Yankees affiliates in the International League (Scranton/Wilkes-Barre Yankees) was the visiting team, attendance rose by 850 fans, a figure statistically significant at the 1 percent level. However, in the Eastern League, when the Trenton Yankees were the visiting team, attendance rose by 85 fans, but it was not found to be statistically significant.

Overall, it appears that fans of AAA baseball more closely associate the Yankees prospects with the major league club. As one moves down a notch on the minor league hierarchy, fans are not as interested

in seeing Yankees prospects at the AA-level. This result is consistent with the findings on win-percentage, where AAA-level fans are more sensitive to winning than AA-fans. It appears that AAA-fans prefer to attend games involving higher quality teams and players. With the major league Yankees being a popular and successful team across much of the landscape of the cities of the International League, attendance in opposing stadiums significantly rise when the Wilkes-Barre/Scranton Yankees visit their stadium. At the AA-level, however, fans do not appear to care as much about winning, nor do they follow the local Yankees prospects when they come to town. The closer the prospects are to the majors, the more Yankees' fans follow them across minor league baseball, implying a "Yankee effect" exists at the AAA-level (as it does in the majors), but not at the AA-level.

ENDNOTES

1. For the 2013 season, Wilkes-Barre/Scranton changed their nickname to the RailRiders.

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