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The Relationship Between Competitive Balance and Revenue in America's Two Largest Sports Leagues

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THE RELATIONSHIP BETWEEN COMPETITIVE BALANCE AND REVENUE IN AMERICA'S TWO LARGEST SPORTS LEAGUES

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Abstract

This paper looks at the impact that competitive balance has on team revenues. The hypothesis that this paper is operating under is that higher levels of competitive balance will lead to higher levels of revenue. Two different measures of competitive balance will be used and regressions will be run to investigate whether high levels of the competitive balance measure are associated with high levels of revenue. The results of the data indicated that over all three time horizons (ten year, five year, and two year), high levels of variability in playoff appearances were associated with high revenue for Major League Baseball (MLB) teams. The results also indicate that over a two year time span, high standard deviation in winning percentage were associated with higher revenue in both MLB and the National Football League (NFL) and also that high standard deviation of winning percentage over a ten year period were associated with lower revenues in the NFL. The data provides consistent support for the hypothesis of a positive relationship between competitive balance and revenue in MLB and inconsistent support in the NFL. This inconsistent relationship in the NFL is hypothesized to be due to differences in time horizons. Over the short term, fans like to see high variability in winning percentage because it gives them faith that their team will be good the next season. In the long term however, fans do not like a lot of variability in their team and would rather see a consistent winner.

1. Introduction

Competitive balance is a topic that is of great debate in professional sports leagues. Competitive balance in sports leagues has been described before as being like wealth, everyone agrees it is a good thing to possess but it is not clear how much is ideal (Zimbalist 2002). Competitive balance is a complex term to quantify but can be defined simply as the gap between the top and bottom teams in a league. A league with good competitive balance would be one where teams are very equal in ability and the

outcomes of games are unpredictable week in and week out and from season to season. A poorly balanced league on the other hand would have some teams that dominate the league each year and some teams that are not competitive at all. Competitive Balance has also been defined by the Major League Baseball commissioner as a situation where every well run club has a regularly recurring hope of reaching postseason play. To explore competitive balance, this study will take a look at the two largest professional sports leagues in the United States: the National Football League and Major League Baseball. Both leagues have taken very different approaches to competitive balance as the NFL has enacted more direct rules to promote high competitive balance. This paper will explore the relationship between competitive balance and revenue and will then describe these two different approaches using the MLB and NFL as case studies.

The rest of this paper is outlined as follows: section 2 will outline studies related to competitive balance with a focus on those investigating the NFL and MLB. Section 3 will outline the methods that will be used in this study while section 4 will outline the methodology and empirical specification. Section 5 will then describe the results of the study and Section 6 and 7 will be case studies for competitive balance as a league focusing on the NFL and MLB respectively. Section 8 will discuss the results of the study and implications of them.

2. Literature Review

Much of the early research on competitive balance was directed on what impact instituting free agency would have on professional sports. Those who were against the implementation of free agency believed that its establishment would lead to complete domination by the rich teams, as they would simply outspend their less wealthy competitors. Rottenberg (1956) was one of the earlier studies that looked into this. In this study, Rottenberg (1956) described his invariance proposition which stated that the distribution of talent would be the same under free agency and the reserve system. This proposition

was applied to another very influential study conducted by Coase (1960). This study outlined the Coase theorem, which stated that a player would end up in the place where his marginal revenue product is the greatest, regardless of whether the reserve clause or free agency was being used. The primary difference between the two systems, the Coase theorem states, is that a player would be paid a much higher amount of their value under a free agency system than a reserve system (Fishman, 2003.).

Since these two early studies on competitive balance, numerous studies have been done on competitive balance or league parity for both the NFL and MLB. A thorough review of this literature was composed by Goddard (2001) and Garcia and Rodriguez (2002). Among the more important studies dealing with this issue however are Schmidt & Berri (2001), Humphreys (2002), Quirk & Fort (1992). These previous studies vary greatly in terms of their definition of competitive balance. Some studies focus on the distribution of league championships between leagues. One such study was conducted by Eckard (2001). In studying the results of playoffs in MLB before and after free agency, Eckard (2001) found that there were a greater number of teams competing in pennant races after the institution of free agency. He hypothesized that this was due to free agency and the increased cost of keeping together a championship team that came along with it. Other studies focusing on league championships can be found in Drahozal (1986) and La Croix and Kawaura (1999). Other studies have focused on league standard deviation of winning percentages as an indicator of competitive balance. These studies have been done both on MLB (Fort 2003; Humphreys, 2002) and the NFL (Schmidt and Berri, 2004) and have found that in general the standard deviation for win percentage in both leagues has increased in recent years.

Other studies have used Gini coefficients to measure the equity between teams in professional sports. One such study was conducted by Schmidt (2001) where competitive balance was shown to have increased after the expansion of the MLB in the 1960's. A large number of recent studies have also

relied on using these Gini coefficients as a measure of balance in sports leagues (Schmidt and Berri, 2001; Larsen, Fenn, and Spenner 2006). However, Utt & Fort (2002) suggest that this may not be the best way to measure competitive balance. The use of Gini coefficients overstates the disparity in competitive balance in the MLB because it cannot take into account accurately things such as unbalanced schedules, league expansion, and interleague play. The authors therefore argue that the best way to measure competitive balance is to use more classical techniques such as standard deviation of winning percentage. Since many of the more recent studies use Gini coefficients to measure the level of competitive balance, this paper will update the research on competitive balance using these potentially more accurate measures.

Much of the work regarding competitive balance has focused on baseball and its relative lack of balance. Many of the articles written on MLB also draw comparison to the NFL as a league that is more successful in achieving league parity. Most studies have focused on MLB and the disparity between large and small market teams, with the lack of revenue sharing (Kesenne 2000) or a salary cap (Larsen, Fenn, Spenner 2006) relative to the NFL frequently put to blame (Sanderson & Siegfried 2003). Few studies explore the end result of these issues however: revenue, and are instead focused on competitive balance and its impact on attendance alone. There is a great deal of data available about competitive balance but there is a lack of information so far on its potential role in explaining the large differences between total league revenue of the two leagues as well as revenue for individual teams. This paper will fill the gap in the research in evaluating the disparity between total league revenue for the National Football League and Major League Baseball with higher league parity in the NFL as one of the primary causes.

Getting fans into the stadium on game day is one of the primary drivers of local revenue for a team. . Local revenues for teams include things like gate receipts, concession sales for games,

advertising revenue in stadiums, merchandise sales, and many other aspects primarily related to the in-stadium experience of the game. The portion of total revenue that comes from local revenue is much higher in the MLB than the NFL but is nevertheless very relevant to both. If competitive balance is a major influence on the disparity between total league revenue in the two leagues, then there would likely be a positive correlation between competitive balance and attendance at games. To explore this relationship, a number of studies have been done. Schmidt & Berry (2001) studied this link by looking at 3 and 5 year averages for competitive balance and attendance as well as panel data on the issue. The historical data pointed to that fact that for the American League and National League both, a correlation was found between both high parity and high attendance as well as for low parity and low attendance. The panel data also supported a similar result, with increased attendance shown with improved competitive balance. This trend has not only been found to be true in MLB but also in the NFL. Quirk & Fort (1992) found that during years where the Cleveland Browns dominated the league (winning 10 straight conference championships and 8 titles), attendance for the Browns actually decreased. This trend of decreased attendance after long streaks of dominance is also found in MLB Eckard (2001). This study found that attendance increases for a team as they are building towards a championship run, but each additional year they are in competition for the championship, their attendance decreases.

The total league revenue figures were about 14% higher for the National Football League than for Major League Baseball in 2009 (Plunkett Research). This study will explore whether this difference is due to overall parity of the NFL over MLB. Competitive balance in the NFL in the past has been shown to exist not only to a greater degree in terms of on field performance but also in terms of individual team revenues. Major League Baseball has historically shown a much greater gap between the revenues of large market and small market teams as well as a greater gap between the competitiveness of those teams. (Levin et al 2000) Further, as the gap in revenue between large market and small market teams

widened over the years, the gap between on field performance between small and large market teams widened as well. (Levin et al 2000)

League revenue is a very complicated figure with a great deal of inputs having an impact on it. To this extent, other articles will also be incorporated to provide mitigating factors to the impact of competitive balance on league revenue. An article was written in 2007 by William A. Hamlen Jr. from NY State University at Buffalo called *Deviations from Equity and Parity in the National Football League*. In this article, the author outlines the implications of certain areas where the competitive parity in the NFL does not hold true. The two primary issues that the author outlines are that coaching salaries do not count towards the salary cap and that premium seating revenue is not shared amongst the rest of the league. The author concludes that because of these two features, teams in large markets are put at an increased advantage over small market teams. The impact to which these may have on league parity will also be explored in this paper.

3. Empirical Analysis

As described above, there are a large number of methods that have been used to measure competitive balance. One of the primary measures of balance used in this study will be the standard deviation of winning percentage. Standard deviation is a good measure because it is able show how much variability teams have had in their records over a certain time span. A high standard deviation of winning percentage indicates that a team has experienced a great deal of movement in the standings and has gone through periods of good records and poor records over that time. A low standard deviation over a period on the other hand, indicates that team has maintained their position in the standings by staying among the best, worst, or middle of the pack over the period.

Another measure of competitive balance that will be used in this study will be the standard deviation of playoff appearances over a period. This will help to measure the predictability of

postseason appearances based on how much change there is in a team's ability to make the playoffs year by year. If there is a low standard deviation of playoff appearances over the period, this would indicate that the team is consistently making or missing the playoffs year in and year out. A high standard deviation on the other hand, would indicate that there is high variability in whether the team is making the playoffs and therefore the results of the season have less predictable outcomes. These two separate measures combined will be able to capture competitive balance from a fan's perspective better than one alone because fans may respond more to variability in postseason appearances or in winning percentage.

This purpose of this study is to look into what effect competitive balance has on revenue. With these measures of competitive balance established, revenue data for MLB and NFL will both be collected from Forbes dating back to the 2003 season. In order to account for inflation and time discrepancies, all revenue figures will be discounted back to 2003 using the Consumer Price Index as reported by the Bureau of Labor Statistics. This will help to control for any differences occurring in the economy over the period that could lead to higher revenue in one season based on nationwide factors.

4. Methodology

Regression analysis will then be run to estimate how much revenue changes per game with varying levels of competitive balance for each team. Three different types of regressions will be run on the two measures of competitive balance: a pooled OLS, random effects regression, and fixed effects regression. The formula for this analysis will is displayed below with the error taking the form of the formula below it.

$$Y_{it} = \beta_O + \beta_1 X_{it} + \varepsilon_{it}$$

$$\varepsilon_{it} = \alpha_i + \eta_{it}$$

If we ignore the structure of the error term and believe $Corr(X_{it}, \varepsilon_{it}) = 0$ then we can pool the data together and run Pooled OLS (model 1). This is unlikely to be true, however, as there are time invariant variables that are unlikely to be captured entirely by this model that may be correlated with the Y variable (revenue) or the X variable (competitive balance). If we do not control for these fixed effects, the coefficient beta could be biased. An example of this could be that some cities have a more rabid fan base. If a city has a rabid fan base, the stadiums in that city are more likely to have higher attendance causing higher revenue. Players may also play better in front of home stadiums packed with crazy fans. Cities such as Cleveland, Denver, and Philiadelphia are renowned for their diehard fans and their stadiums are historically difficult for visitors to play in. If the players play better in front of these home crowds, they would then be more likely to make the playoffs. Our measure of competitive balance therefore could be picking up the ferocity of the team's fans. This study will account for this by running a fixed effects regression which assumes the beta and X are correlated, in addition to a Pooled OLS which assumes that beta is uncorrelated with X. It will then be possible to determine whether there is an endogeneity problem if the results vary across multiple models. This potential endogeneity problem will be further controlled for with the running of a random effects GLS regression in addition to the previous two models.

These models will also be looked at from three different time horizons and compared to team revenues for a given year to see the effect of competitive balance over different periods of time. The main focus will be on the two year levels of competitive balance, but any difference in between the two year and the five and ten year levels can be used as a robustness check. The hypothesis for this data is that high levels of competitive balance will be associated with high revenues.

5. Results

The data was analyzed for standard deviation of winning percentage and standard deviation of playoff appearances first under the two year time horizon. The data was then compared to individual team revenue using a pooled OLS, fixed effects regression, and random effects GLS regression and the results for standard deviation of winning percentage at the two year level was significant for both the MLB and NFL. This data suggests evidence to support the hypothesis that higher competitive balance leads to higher revenue per game.

Robustness checks of data for the past 5 and 10 years were also run to see if the results were consistent over multiple time periods. The data for the five year time horizon did not lend any significant results for either MLB or the NFL and the 10 year time frame only lent a significant result for the NFL. This result actually went against the hypothesis as a negative relationship was found between standard deviation of winning percentage and team revenue.

The data for standard deviation of playoff appearances also produced a significant result although only for MLB. The results were found to be positive and significant at the two year level and also at the 5 and 10 year level. These robustness checks indicate that the positive and significant result found at the two year level is consistent over multiple time periods. The evidence therefore indicates that high standard deviation of playoff appearances were associated with high team revenue. No significant result was found for the NFL.

6. Case Study: NFL

The NFL today is the largest and most successful major sports league in the United Sates. In 2009 the NFL had a total league revenue of $7.8 billion, much higher than any other sports league (MLB $6.8 B; NBA $4.0 B; Plunkett Research). The NFL's strategy is that having large differences between teams is bad for business. Therefore, the league executives believe it is in their best interest to aim to

have high competitive balance and equity between teams. Given the positive relationship between competitive balance and revenue found in this study, the success of this strategy in terms of high league revenue makes sense. Since the early days of the NFL there has been evidence of this goal of high competitive balance. When Pete Rozelle took over as commissioner of the NFL in 1960, one of his main goals was to encourage collaboration between teams to enhance the league as a whole. To this end, Rozelle adopted a revenue sharing system similar to that of the rival American Football League that had helped to stabilize smaller market teams in the AFL. One of the major features of this revenue sharing plan was the equal distribution of television revenues between all the teams. This revenue sharing system was further developed by Rozelle's successors, and now contains revenue sharing for ticket sales, merchandise sales, and many other sources of revenue.

This league wide focus the NFL showed under Rozelle continued into the future with the signing of the 1993 NFL Collective Bargaining Agreement. Under this agreement, the NFL instituted a salary cap and floor to dictate how much each team could spend on players and also a minimum amount that each team had to spend. This provision was aimed at two situations in particular. First at protecting smaller market teams from being outspent by large market teams and second, to prevent small market teams from shying away from spending money on players and operating under a minimalist budget. By creating a range for teams to spend on players' salaries, the league was attempting to ensure that large market teams would not gain a substantial advantage in the ability to bring in good players. The need to control for teams' ability to bring in many new players was created by another feature of the 1993 CBA: free agency. For a long period of time, the NFL operated under the "reserve" system originally created for Major League Baseball. Under this system, when a player's contract expired, the player first had the option of negotiating a new contract with the team they played for. If this could not be done, the team had the option to either renew the old contract at up to a 10% pay cut, or be placed on the "reserve list." Once on the "reserve list," the player could not play for any other team unless they were traded or

their contract was sold to another team. After the reserve clause was ruled illegal by the Supreme Court, the NFL later adopted an avenue for players to move to another team through restricted free agency, but the rule required exorbitant compensation to be given by the new team to the old team that rendered it essentially irrelevant. After the 1993 CBA was signed, once a player's contract expired they had the opportunity to sign with any team of their choosing after at least five years in the league. The presence of these league wide rules have resulted in very high competitive balance that have contributed to the league's economic place at the top of the American sports world.

7. Case Study: MLB

Major League Baseball has also illustrated some commitment to encouraging competitive balance. As a general rule, all sports leagues maintain some level of commitment to maintain competitive balance (Horowitz 1997). Major League Baseball first started to receive strong central leadership with the appointing of Kenesaw Mountain Landis as commissioner in 1920. Under his authority the league instituted an amateur draft to place rookies with new teams and in 1964 the owners voted to institute and reverse order draft that gave teams with the worst record the highest picks in the draft, allowing the worse teams a better chance of bringing in good players (similar to the draft style of the NFL). The league underwent significant expansion as teams began to relocate to more profitable markets. Teams moved rapidly out west during the 1950's and 1960's and then the league expanded internationally to include Canadian teams in 1969. This expansion impacted competitive balance in Major League Baseball in two important ways. First, the expansion increased the tendency for dominant teams to emerge in large markets and second, it helped to spread talent among more teams narrowing the differences between best and worst clubs. (Horowitz 1997)

Major League Baseball was also one of the first sports leagues to implement a system of free agency. The fight to establish free agency took off in 1970 when Curt Flood sued Major League Baseball

to become a free agent. The MLB had previously operated under the reserve clause described earlier where players were essentially stuck on whatever team they were drafted by. After a long litigation process, Flood's lawsuit was taken to the Supreme Court where they ruled in favor of MLB and upheld the reserve clause. This victory against free agency was short lived, however, as free agency was allowed for Major League Baseball in 1975.

In recent years, Major League Baseball has garnered the image of having large gaps between the top and bottom teams, usually divided along payroll. As a result of having free agency with no restriction on team spending, there is a larger opportunity for wealthy teams to acquire the best players in the league than for poor teams. The recent domination of large market teams such as the New York Yankees in comparison to the relative ineptitude of small market teams such as the Pittsburg Pirates has drawn the interest of fans and league policy makers alike to the issue. In 2000 the MLB Commissioner Bud Selig called together a committee of experts, headed by Senator Scott Mitchell, to examine if revenue disparities among franchises were significantly impairing competitive balance (Levin, R.C., Mitchell, G.J., Volcker, P.A., & Will, G.F. 2000). After 18 months of study, the committee did in fact find substantial imbalance between large market and small market teams. They also found that these differences had increased during the 1990's and that programs designed to promote competitive balance that had been instituted in the 1996 collective bargaining agreement had been largely unsuccessful. The committee recommended a number of changes to be made to the league rules to try and solve this problem. As a result of these recommendations, changes were made to the league's revenue sharing system and teams were required to pay 34% of their local revenues into a common pool which is then split evenly among teams.

This is one of the major differences between the MLB and NFL. Both leagues have some means of attempting to share revenue between large market and small market teams but they differ in the size

and incentive structure that the system creates. As the majority of revenue shared between NFL teams comes from sharing of national television contracts, teams are incentivized to create interest in the league as a whole in order to increase the amount of the television contract. With the revenue sharing system in effect in Major League Baseball, revenue is shared between teams as a portion of their total local revenues. These revenues have been estimated to make up between 70-80% of an MLB club's revenue (Genarro 2007). With 34% of a team's local revenue being shared, some teams may be disincentivized to increase their local revenue by fielding a winning team. It is much easier for teams to separate profit maximization from fielding a winning team as they are not extrinsically motivated to improve the on field product like teams are in the NFL. This phenomenon has some evidence in baseball as some low revenue teams have been evidenced to use the money received from revenue sharing to simply improve profits instead of using them to improve the team (Einolf 2004). This action by low revenue teams could have a major impact on competitive balance because these small market teams who are trying to make profits instead of win would not be as competitive.

Another major structural difference between MLB and the NFL with respect to competitive balance is the presence of a salary cap and floor in the NFL. These features do not occur in MLB and could have a major impact on competitive balance because there is room for a set of teams in baseball to outspend their competition. These major differences create very different atmospheres for competitive balance. One major complaint that many fans have is that the large market teams seem to dominate the small market teams. As a result of this division between the have's and the have not's, the teams in Major League Baseball are much less balanced than the teams in the NFL. The MLB has instituted many rules to help cultivate competitive balance, but have still failed to eliminate fully this gap in teams. This lack of balance could help to explain why the MLB still trailed the NFL in total revenue by 14.7% in 2009 (Plunkett Research).

8. Conclusion

The data indicates that over a short time horizon, in this case 2 years, high competitive balance in the form of winning percentage equates to higher team revenues. My hypothesis is that the reason this is true is that more competitive balance increases fan interest. When the outcome of an event is not known or hard to predict beforehand, fans will likely be more interested in the game. This theory is known as the uncertainty of outcome hypothesis. Prior research has shown some evidence for this in the form of a relationship between attendance and competitive balance. Previous research such as Quirk & Fort (1992) found that during periods of dominance, a team's attendance numbers actually decline. When fans know that a team is going to destroy its opponent, they do not find the game as interesting as a closely contested match up. Fans find scores such as 24-21 to be more interesting than games that are 45-0. This same theory that is found in individual games could be applied to entire seasons as a potential explanation to this positive disposition to high competitive balance. If fans are uncertain of the outcome of the season in terms of a winning or losing record, they may express more interest similar to the appeal of uncertainty of outcome for individual games. The data shows a significant relationship between winning percentage and revenue over a 2-year period but results are not significant or consistent as we changed the time frame from 2 years to 5 and 10 years. This would suggest that in making their decisions, fans consider recent memory more than history.

Over the course of ten years, the data suggests that high competitive balance in the form of standard deviation of win percentage leads to lower revenue. In light of the positive relationship in the short term in the NFL, it seems that time horizon would be a very important factor when considering whether competitive balance was good for a league or not. Zimbalist (2002) states that competitive balance in sports leagues is like wealth, everyone agrees it is a good thing to possess but it's not clear how much is ideal. It would seem in this case that the data lends some truth to this statement because

in the NFL we have evidence for balance being good in the short run but bad in the long run. If a team has had a high standard deviation of winning percentage, that team has been up and down and therefore their record for the upcoming season is very unpredictable. Over a short time horizon this may be a good thing. Seeing as fans are generally overly optimistic about their teams, they may take this uncertainty to think that this may be the year for their team to be highly successful. The NFL is full of stories of quick turnarounds and this may provide some false hope for their team. A prime example of this is the New Orleans Saints. In 2005, The Saints finished 3-13 and were one of the worst teams not only in the conference but in the league. A quick turnaround the next season found the saints playing in the conference championship game coming off of a 10-6 record. The next two seasons, the Saints returned to mediocrity by finishing with losing records. Then in 2009, the Saints again made a miraculous comeback and turned their season around and started 13-0 on the way to a Super Bowl championship. Though this type of turnaround may be uncommon, the fact that they occur every once in a while allows fans to fantasize that this year may be their chance after a couple of up and down seasons. Over this time period, the Saints also experienced very high revenues to go with this high short term variability. Before this time, the Saints had long been a losing franchise who hadn't made much movement from the bottom of the standings. As a result, they had a low standard deviation of win percentage. This example emphasizes the importance of short term over the long term perspective of fans, as the Saints had high revenue and a very high standard deviation of win percentage over the short term, but a low one over the long term.

This negative relationship between long term standard deviation of win percentage and revenue could also be attributed to something other than the fact that the team had high variability in its winning percentage. Instead of the relationship being between teams returning to mediocrity and the teams experiencing lower revenue, the relationship could be between something that was causing the team's demise and the team's declining revenue. One such scenario could be the loss of a star or good

players. Fans often rally behind their star players and the loss of one could severely affect fan interest in the team. If a fan's favorite player signs with another team, there is a chance they could start to pay less attention. This scenario is much more likely in the NFL than in MLB because of the presence of a salary cap in football. A successful team is much more likely to have many good players on it than an unsuccessful team and due to salary constraints; they are unlikely to be able to keep them all year in and year out. Teams in baseball also face salary constraints when faced with personnel decisions, but they do not have to stay under a hard salary number. Consequently, they have the ability to pay more to keep a star around by pulling directly from the owner's pocket or from a potentially larger revenue stream. Aside from affecting fan interest, the loss of a star player or even the loss of a good player can also damage a team's record. Logically, in losing a good player, a team suffers in that they are not as talented as if they had him. The impact then is twofold when losing a good player because a team is hurt in terms of ability to win and in terms of fan interest. The increased likelihood of this occurring in the NFL could explain why this trend only manifested in football and not in baseball.

The third effect that the data showed was a positive correlation between standard deviation of playoff appearances and revenue at all three time horizons for the MLB. This trend is consistent with the uncertainty of outcome hypothesis in that greater volatility in the number of teams who have made the playoffs in the past means that the outcomes for the season are less predictable. This could account for the positive trend in MLB but the absence of this in the NFL. One feasible explanation for this could be that playoffs influence a fans decision making process in baseball more than in football. In the MLB, a fewer number of teams make the playoffs and the ensuing races are often more competitive than in the NFL. This could cause the fans of MLB to emphasize competitive balance in playoff appearances much more than the regular season because it is much harder to make the playoffs. It would follow that a relationship in the NFL between playoffs and revenue would not be evident. In football on the other

hand, due to the lowered competition of the playoff hunt, fans may use a more equal combination of regular season and postseason competitive balance to help determine their interest in the game.

Competitive balance is very complex matter that can be very difficult to quantify. This study uses winning percentage and playoff appearances as two measures of competitive balance but fans' perceptions of balance could go even further than simply on field performance. There are a myriad of factors that that could also affect a fan's perception of competitive balance that were not explored in this study. Some of these factors include other on field measures such as distribution of championships or even off the field factors such as the number of star players a team has. Fan psychology is a very complex matter and it is difficult to understand exactly what drives a fan's interest.

The relationship between competitive balance and revenue also cannot be definitely defined as there are many potential mitigating factors behind this relationship. Each team's revenue was controlled for inflation so that all monetary numbers used were valued in 2003 dollars but other macro factors may have had an impact on revenue. The sports industry as a whole could have been impacted by a limitless number of factors other than competitive balance during the years studied that could have impacted revenue. Something as uncontrollable as having particularly nice weather one year could impact team revenues simply by making fans more willing to attend games. The impact of possible confounding variables would be an area that future studies may wish to explore.

Fan interest in this article has been the main explanation of the relationship between competitive balance and revenue. If fans are interested in the game, attendance figures will go up, television revenues will increase, and merchandise sales will go up. These are all very important drivers of overall team revenue. Though the extent of the relationship of competitive balance on revenue cannot be known for certain, the relationship found in this study demonstrates some relationship

between high competitive balance and high revenue. Leagues such as the MLB and NFL would therefore benefit from instating rules that favor competitive balance such as salary caps and salary floors.

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Table 1: Results of 2 Year STDEV of Win PCT and Revenue in MLB

This table reports the relationship between revenue per season in MLB and the standard deviation of winning percentage for a team over the past two seasons. Column 1 reports the results from the pooled OLS, results suggests there is a positive and significant relationship between revenue and competitive balance, the more competitive balance the team the higher the team's revenue. Columns 2 and 3 account for the panel structure of the data, column 2 runs a random effects regression and column 3 runs a fixed effects regression. The coefficient on competitive balance in column 2 and 3 are still positive and significant and do not differ across the two models.

MLB

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
2 year wpct stdev	0.254*	0.186**	0.182**
	(0.151)	(0.0795)	(0.0791)
Constant	-0.0982***	-0.0936**	-0.0933***
	(0.0190)	(0.0366)	(0.00990)
Observations	210	210	210
R-squared	0.013		0.029
Number of tcode		30	30

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Results of 2 Year STDEV of Win PCT and Revenue in NFL

This table reports the relationship between revenue per season in NFL and the standard deviation of winning percentage for a team over the past two seasons. Column 1 reports the results from the pooled OLS, results suggests there is a positive and significant relationship between revenue and competitive balance, the more competitively balanced the team is the higher the team's revenue. Columns 2 and 3 account for the panel structure of the data, column 2 runs a random effects regression and column 3 runs a fixed effects regression. The coefficient on competitive balance in column 2 and 3 are still positive and significant and do not differ across the two models.

NFL

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
2 year wpct stdev	0.244**	0.148**	0.137*
	(0.106)	(0.0729)	(0.0735)
Constant	2.439***	2.452***	2.453***
	(0.0174)	(0.0230)	(0.0118)
Observations	224	224	224
R-squared	0.023		0.018
Number of tcode		32	32

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Results of 10 Year STDEV of Win PCT and Revenue in NFL

This table reports the relationship between revenue per season in NFL and the standard deviation of winning percentage for a team over the past 10 seasons. Column 1 reports the results from the pooled OLS, results suggests there is a negative and significant relationship between revenue and competitive balance, the more competitively balanced the team is the lower the team's revenue. Columns 2 and 3 account for the panel structure of the data, column 2 runs a random effects regression and column 3 runs a fixed effects regression. The coefficient on competitive balance in column 2 and 3 are still negative and significant and do not differ across the two models.

NFL

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
10 year wpct stdev	-0.545**	-0.788***	-0.825***
	(0.248)	(0.209)	(0.218)
Constant	2.573***	2.622***	2.626***
	(0.0482)	(0.0454)	(0.0419)
Observations	218	218	218
R-squared	0.022		0.072
Number of tcode		32	32

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Results of 10 Year STDEV of Playoff Appearances and Revenue in MLB

This table reports the relationship between revenue per season in MLB and the standard deviation of number of playoff appearances for a team over the past 10 seasons. Column one depicts the results of a pooled OLS, column 2 reports the results of a random effects regression, and the third column demonstrates the results of a fixed effects regression.

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
10 Year STDEV Playoffs	0.250***	0.201***	0.189**
	(0.0682)	(0.0724)	(0.0791)
Constant	-0.156***	-0.141***	-0.137***
	(0.0256)	(0.0426)	(0.0250)
Observations	210	210	210
R-squared	0.061		0.031
Number of tcode		30	30

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Results of 5 Year STDEV of Playoff Appearances and Revenue in MLB

This table reports the relationship between revenue per season in MLB and the standard deviation of winning percentage for a team over the past 10 seasons. Column one depicts the results of a pooled OLS, column 2 reports the results of a random effects regression, and the third column demonstrates the results of a fixed effects regression.

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
5 Year STDEV Playoffs	0.223***	0.136**	0.122**
	(0.0622)	(0.0535)	(0.0561)
Constant	-0.142***	-0.118***	-0.114***
	(0.0231)	(0.0395)	(0.0174)
Observations	210	210	210
R-squared	0.058		0.026
Number of tcode		30	30

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Results of 2 Year STDEV of Playoff Appearances and Revenue in MLB

This table reports the relationship between revenue per season in MLB and the standard deviation of number of playoff appearances for a team over the past 10 seasons. Column one depicts the results of a pooled OLS, column 2 reports the results of a random effects regression, and the third column demonstrates the results of a fixed effects regression.

VARIABLES	(1) Revenue	(2) Revenue (Rand Effects)	(3) Revenue (Fixed Effects)
2 Year STDEV Playoffs	0.0485**	0.0538***	0.0541***
	(0.0194)	(0.00969)	(0.00971)
Constant	-0.102***	-0.105***	-0.105***
	(0.0179)	(0.0383)	(0.00887)
Observations	210	210	210
R-squared	0.029		0.148
Number of tcode		30	30

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1