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How Does the Competitiveness of Professional Sports Affect the Economy?



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I hereby recognize and pledge to fulfill my responsibilities as defined in the Honor Code and to maintain the integrity of both myself and the College as a whole.

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Abstract

Professional sports are considered to be one of the most influential forms of entertainment the world has ever seen. Sports team's competitiveness tends to shape the way people decide to spend their money on Sundays, whether it is on jerseys, local bars, tickets, etc. This question will investigate with an empirical analysis, the way in which cities are affected by the competitiveness of their local sports teams as measured by their success in the current season. The research may have many possible outcomes, but overall a city's economy can be affected both positively and negatively at any given time. How does the competitiveness of professional sports teams affect the economy?

Chapter 1: Introduction

Competitiveness in professional sports is one of the major reasons why fans all over the world get excited to watch games. Professional sports teams compete against one another for the best players available, to win games, and to bring in a large number of fans to increase their ticket sales. Talented players and their competitiveness will bring more fans to the city because it is enjoyable to watch teams win. Professional athletes may be looked at as heroes to young kids all over the world. Their attitudes and style of play reflect on the kids and give them a reason to watch sports. Unpredictability of the outcome of professional sports is what makes it interesting for fans to watch. A team may be better than their opponent, but the potential role of an underdog always plays a factor in the game. There are currently four major leagues in the United States including the National Football League (NFL), the National Basketball Association (NBA), Major League Baseball (MLB), and the National Hockey League (NHL). Throughout these four leagues there are 23 NHL franchises, 32 NFL franchises, 29 MLB franchises and 29 NBA franchises (Goodrich 2013). The way these teams compete will attract an audience who enjoys watching teams win. Even if your favorite player does not play for the team located in the city you live in, you will still follow them. Most people do not have a favorite player or team that loses on a consistent basis because it is not enjoyable to watch teams lose. This paper will investigate how the competitiveness of professional sports will affect the economy?

Chapter 2: Literature Review

When it comes to a professional team's competitiveness, the number of high quality athletes on that team is very important. Star athletes who make large salaries are expected to play at a high level every game. In a football game there are allowed to be eleven men on offense, and eleven men on defense. The offensive side of the ball is very important. Like any professional sport, fans like to see high scores, big plays, great catches, etc. A football team's quarterback is usually the highest paid player on the team. According to spotrac.com, in 2015 seven out of the top ten highest paid players in the NFL were quarterbacks. In 2016 the top eleven highest paid players in the league were all quarterbacks. Ben Roethlisberger, quarterback of the Pittsburgh Steelers was ranked at number ten in 2015 getting paid a salary of $17,245,000. The following year, he was the third highest paid player at $23,950,000. A quarterback on an NFL team is one of the most valued positions in the entire league. These players are considered to be the leader of the team. Whether the play is a pass, or a run, the ball touches the quarterback's hands every play. These players make a salary that must be carried onto the field. Their level of competitiveness will allow for their team to make an appearance into the playoffs and even the Super bowl if they continue to win games and prove that they are better than the team they are facing.

	Team	Games	W	L	W-L%
	Pittsburgh Steelers	8	6	2	0.750
	San Francisco 49ers	6	5	1	0.833
	Dallas Cowboys	8	5	3	0.625
	Green Bay Packers	5	4	1	0.800
	New York Giants	5	4	1	0.800

Figure 2-1

Table 1, retrieved from (http://www.pro-football-reference.com/super-bowl/standings.htm) shows the number of Superbowls won by the top five teams with the most wins. These five NFL teams at one point in time during their Super bowl wins had an elite quarterback to lead the team. Take the Pittsburgh Steelers for example. Two elite quarterbacks, Terry Bradshaw and Ben Roethlisberger, may be considered two of the best quarterbacks to ever

play the game even though Ben is still in the league. Making the postseason in any professional sport shows that the team has what it takes to compete against other teams and win games. These elite quarterbacks show that their competitiveness is what can lead a team to winning the Super bowl.

By hosting the Superbowl and other postseason events the economic impact tends to always be positive on the economy, but the dollar values and the underlying assumptions always seem to very (Coates & Humphreys 2002). A Superbowl or other postseason game will have an impact on the host city because of all the people the game attracts. People spend money to go see their favorite team play on the big stage. A study done by Ferrall and Smith Jr (1999) showed the outcomes in professional sports championship series and focused on game theory. The test was originally used for the business world to test how employees were incentivized to put in more work for promotions. However, these two men used this model to show that you could study any contest empirically, and be able to contrast heterogeneous players that were composed of a sequence of games played (Ferrall & Smith Jr 1999). A championship series in professional sports differs depending on the sport that is being played. Take the NBA championship as an example. In order to get to the finals a team must win three, seven-game series in order to make it there. The competitiveness of a team will determine how far they can make it. Depending on what seed you are ranked will determine the format of the series. The team that is ranked higher will be awarded four home games and three away games. This shows that the regular season matters. In order for a team to have a shot at the NBA finals, they want to win games to have a better seed in the playoffs. This test was done to show the significance of the game theory when it comes to championship series. Championships won and the winning percentage of teams also goes hand-in-hand.

Lockouts also seem to affect the economy in both a positive and a negative way. Take the NFL for example. If there was a lockout during the season an agreement must be made between the NFL and the National Football League Player's Association (NFLPA). The NFLPA protects the rights and interests of the players. However, during a lockout teams can no longer play until these two organizations come to a mutual agreement. The area around these stadiums and arenas will be affected in ways that may be determined by private and public spending. Private and public spending becomes a highly debatable topic during lockouts. If the public spending decreases during a lockout government no longer have to spend the extra money for these events and will tax the citizens of the area less (Coates and Humphreys 2001). By doing this, the citizens of that city will have more money in their pockets and will not have to waste it on taxes by the government to fund these public services during a sporting event. Also, Coates and Humphreys (2001) argue that the production in terms of output produced per unit of time of workers will be less productive if they are talking about the game that they watched the night before. If there is a lockout and fans do not have a game to watch, their production will increase because there will be nothing to talk about.

Trades and the free agency market allows for teams to go after potential players that the owner's believe will benefit their team. The competitiveness of a player will determine how much he is worth, and how far a team will be willing to go to sign them. LeBron James is currently an NBA star who is considered to be one of the greatest basketball players of all time. In 2003 he was drafted by the Cleveland Cavaliers with the first overall pick in the NBA draft. By the time he got to the NBA, everyone knew that he was going to be a star. However, not many people knew that he could take a team with very little talent to the NBA finals in 2007. The competitiveness of one player allowed for the fans to lock on to something that they have

not experienced for a long time; a winning team. Collective bargaining agreements played a big part in LeBron's decision to leave the Cleveland Cavaliers in 2010 to go join the Miami Heat. These collective bargaining agreements are used by all of the major leagues in the United States. Collective bargaining agreements typically involve issues such as free agency, grievance procedures, and players' salaries (Washutka 2007). LeBron left the Cavaliers because the front office would not sign players to put around him to give them the best chance to win. He took a pay cut in Miami in order for the team to afford Chris Bosh, and Dwyane Wade. Since all of these players took a pay cut the team was able to afford three stars on one team. Their competitiveness brought three NBA championships to the city of Miami. The number of championships won by professional teams has a correlation with the competitiveness of the teams.

Now these games are played in arenas and stadiums all over the world. These places are one of the big reasons why fans enjoy going to the games. Now even though the real reason they are going is based off of the team they want to go see, stadiums attract the audience based off of the luxury given to them by owner's who decide to spend extra money to make the fans have an ultimate trip. According to Siegfried and Zimbalist (2000) out of the four major U.S professional sports between 1990 and 1998, forty-six stadiums and arenas were either built or renovated, with an additional forty-nine more facilities under construction or in the planning stages of a new place for athletes and fans to call home. These stadiums and arenas have certain qualities to each one that is different from the rest of them. However, one must remember that many professional teams, no matter what major sport it is, shares the same stadium or arena. The Staples Center is a perfect example of an arena that has three different professional sporting events going on, including two basketball teams that play in the same season. The Los Angeles Clippers and the

Los Angeles Lakers both play their home games there. Now think about that. Each NBA team plays forty-one out of their eighty-two game season at home. So with two teams in the same arena, there will be a total of eighty-two home games in a season. This is an advantage for stadiums and arenas that have more than one professional sport playing there. Owners know that these facilities bring in an audience and revenue. They also know how much impact they can have on the economy and the city that they are placed in.

However, the worst part about them is the price it costs to either build, or renovate. Each decade the cost of construction for these facilities has risen. Starting in the 1950's when the average price was 3.8 million, the price has currently risen to nearly 300 million between 1990 and 1998 (Siegfried & Zimbalist 2000). Also, many people in a city with the renovations complain because some of their tax dollars are going towards these expenses. On the other side of it, they really do not understand that they are not going to see any benefits from their money going towards renovations right away. It will take time for these expenses to create revenue for the city. The citizens of the city will not see what these renovations will bring until they are complete and have been there for a few years. Many sports economists have run tests they have soon realized that there is actually no positive correlation between facilities and economic impact. A cross section study done between 1958 and 1987 showed that there is no significant difference in personal income growth (Baade 1994).

Time series studies done in the same year showed that these cross section studies were correct. Baade and Sanderson (1997) explained that there was no perceptible net increase in economic employment or activity between 10 cities that acquired new sports teams in the years between 1953 and 1993. They looked at certain economic trends that happened each year to run their tests. However, many of these tests that were done found that these sports teams and

facilities do not stimulate their city's local economy. This is actually very surprising to many people. Whether it is restaurants, hotels, local bars, etc., these teams and facilities have little to no significance to the growth of a local economy. In 1999 the yearly average revenue for an NBA team was around $75 million, $100 million for the NFL, $85 million in the MLB, and $55 million for the NHL. Take the city of St. Louis for example. It is considered to be a medium-sized city. Their baseball team, the St. Louis Cardinals, accounts for less than 0.3 percent of economic growth (Siegfried & Zimbalist 2000). To compare a medium-sized city and a large city, Siegfried and Zimbalist (2000) say that the New York Yankees make up less than 0.03 percent of economic output. This seems strange because most people would think that one of the greatest franchises in the MLB would bring more economic activity than just 0.03 percent.

The substitution effect will come into question when it comes to attending games. Many people have an inflexible leisure budget. Not everyone has the time or money to always go to a professional game. If you go to a local game in your city, the money you spend at the game is money that you will not spend at a bowling alley, restaurant, or movie theater (Siegfried & Zimbalist 2000). By showing this you can see that even though the spending on economic activity will be influenced by the sports teams, the net effect will be little or close to zero. Fenway Park is a baseball stadium that is home to the Boston Red Sox. They claim that tens of thousands of dollars of new demand is spent there because 35 percent of their fans at an average game are from out of state (Siegfried & Zimbalist 2000). These fans are bringing in more money that is outside of the Metropolitan Area. Even though this will continue to stimulate the economy, the impact it will actually have on the area is a minuscule number.

Another contribution that many sports economists believe may be the reason for the decline of competitive balance in the NBA may be the fact that these young teenagers are leaving

college early to enter the draft. These players are getting excited for the next stage of their career. However, many of them are getting greedy because of the money and leaving college too early, giving a decline in their skill. Of course there are cases on both sides of this debate that shows how leaving college early or staying for a longer period of time will have an impact on the competitiveness of players. Michael Jordan and LeBron James are a perfect example to look at from both sides of this idea. Michael Jordan may be considered the greatest basketball player to ever play the game. Even though these are all opinions one cannot doubt that he was one of the greatest NBA stars to ever step on the court. He played at the University of North Carolina for three years where he won a national championship in 1982. After the three years he decided to enter the NBA draft where he was selected by the Chicago Bulls with the third overall pick. He would go on to win multiple NBA championships, MVP's, etc., and will go down as one of the greatest to every play the game. LeBron James on the other head entered the NBA draft straight out of high school. Many sport experts compare Jordan and James even though they both have different skills sets that fit into the style of play during their careers in the NBA.

According to Wise (1998) league statistics are showing that fewer and fewer players are having a high shooting percentage and that the team executives and coaches believe that the early entrance into the draft with teenage males is the reason. Also, many coaches and players believe that the season is longer than what it should be and it is taking away the competitive balance between teams. There are so many nights where you go back-to-back, whether it is a home game or an away game. Players are getting tired and old, causing their lack of performance to show on the court. Another interesting stat that is taken into consideration is shooting percentage and how well a team facilitates the ball. In the decade of the 90s, shooting percentages continued to fall. A few statistics show that shooting percentages and the amount of

assists per game have continued to drop. In the 1980s teams were shooting an average of 48 percent and in the 1990s that number dropped to 45 percent. As for assists, the number dropped during the same decades from 51.2 assists per game to 43.6 (Wise 1998). These numbers show that fatigue and greediness of players have increased through the years. Also, this article was written twenty to thirty years ago. Many believe that the NBA today is even worse when it comes to selfishness and skill. Even though people watch games to see high scoring, dunks, and any other aspect that is exciting the game has started to fall apart. There is more emphasis on offense, and less on defense. This shows that stars are lazy and just want to make the cover of the paper or a website. Now with that being said, nothing can be taken away from the fact that the level of competitiveness and the skill of athletes today may be considered better than the athletes from years past. Teams are now realizing that you cannot win a championship with only one superstar.

Chapter 3: Theory

This chapter will explore various economic theories to see how the competitiveness of professional teams will either have a positive, or a negative effect on the economy. Previous research has shown that many factors of being competitive such as number of championships won, how often a team makes the playoffs, and winning percentage of teams have little to no effect on the economy. Theories such as the supply and demand model, along with competitive balance, the substitution effect and factors that would impact GDP and unemployment will be looked at throughout this chapter. The goal at the end of this chapter will be to try and show that the competitiveness of these professional teams will support these conditions.

Supply and demand is a very important theory that is applicable within professional sports. Professional athletes are paid a certain salary based off of their talent level. Depending on how well they can compete on the big stage will determine what kind of salary they will receive. The demand by fans all over the world to see athletes compete every night shows how important it is for these athletes to perform at such a high level. Since fans are willing to pay more for higher quality athletic competition, the demand for players' services will depend on their marginal contribution to the product quality (Rosen & Sanderson 2001). Many people challenge the idea that these athletes are getting paid millions of dollars to put their bodies on the line each and every day. However, athletes can either be seen as an asset, or a liability. It is the same thing in the work force. When an employer hires someone for a job, they expect to get an output level high enough to allow for the firm to succeed. Athletes are the same way. Owners are paying these players the salary they believe that they deserve. They are either an asset or a liability depending on which one they are will determine the amount of money they will make in their

career. Athletes are also getting “Superstar” wages partly because their product happens in one location, but with television and radio broadcasting they can be distributed widely for no additional marginal cost.

Ticket prices are also a way for owners to create a profit and bring in as many fans as possible. However, it is very different between the leagues. Take the NFL and the NBA for example. The NBA has an eighty-two game season where there all multiple chances to host a home game. This allows for fans to pick and choose between a multiple number of games that can happen on any day of the week. By doing this they can have a certain preference that is based off of their schedule. Therefore owners may not have to increase the price of tickets that much because there are so many home games. The NFL on the other hand is a sixteen game season, where the number of home games is limited. Unless you get a primetime game on a Monday or Thursday chances are that your team will play on Sunday. This gives the audience a smaller chance of picking what game they want to see. This allows for the owners to boost up prices because they know that fans will still attend the games no matter what the price is. It is very difficult to compare these franchises because of the different type of market that they are in.

This idea goes hand-in-hand with the substitution effect. Many economists believe that the substitution effect allows for fans to spend money at the stadium, rather than in the local economy. Baade, Baumann and Matheson (2008) explained that a local resident who goes to a baseball game is spending money at that game that would likely have been spent at local restaurants, theaters, or retail establishments with the absence of the game. This is the problem when trying to figure out if these games actually stimulate the local economy. The money that they spend in the stadium is not going towards the local economy. Money spent for tickets, concession stands, and alcohol is going towards salaries, renovations to stadiums, etc. This

money is also going into the owner's pockets that will most like be spent on products that will not stimulate the local economy. Many economists believe that this idea represents a reshuffling of local spending; therefore they believe that this local spending should be excluded from any economic impact estimates Baade, Baumann and Matheson (2008). Out of state residents however may be looked at differently. If an individual or family decides to travel to another state to watch a team or specific athlete play chances are they will be staying overnight. If this is the case they will not only be spending money at the game, but spending money at a local hotel. The money spent at the game will not stimulate the local economy, but the money at spent at the hotel will. Also, they will probably eat somewhere in the city along with touring it. This will create revenue for local businesses. Major events such as the Superbowl are a perfect example. The Superbowl is typically hosted in a neutral city where neither of the teams who are playing in it are from. By doing this many of the fans who attend the game are from another state. Large events like this create an atmosphere that brings in new customers from all over the United States. The attendance at these games also must be looked at to see how it may affect job creation. According to Rappaport and Wilkerson (2001) it is critical to distinguish the difference between net and gross job creation. Gross job creation refers to the number of jobs that are created that can be directly linked to the presence of a sports team. Gross jobs are typically ones that are either located in the stadium, or ones around the stadium that cater to the fans that attend the games. However, these professional teams can also create job losses because the people who spend a lot of money at the games have less to spend at nearby businesses in the host metro area (2001). However the amount of money spent by each person at a game is determined by their personal preference. Other than spending the money on tickets, the money spent outside of that is up to the fan. If they decide to spend money at the concession stand and not at a local restaurant,

there will be job losses. If they decide to spend the money outside of the stadium there will be an increase in gross jobs.

Competitive balance is another aspect of professional sports that has been looked at over the past few years. Competitive balance allows for no one individual or business to have an unfair advantage over other individuals or businesses. This is a perfect example at the professional level. Many argue that the salary cap in professional sports allows for teams to have a fair advantage to sign top players who are free agents. However, is this really the case? Does every team have a fair chance of signing a player that numerous teams want? The New York Yankees have been considered to be one of the greatest dynasties in Major League Baseball history. According to Sanderson and Siegfried (2003) in the post-strike period of the last decade—four World Series championships in a 5-year period (1996-2000), winning 116 games in 1998, and payrolls that dwarfed those of most opponents—contributed as much as anything to the perception of an injurious competitive imbalance problem. Competitive imbalance can have an uneven impact on a city's economy. It could also have an impact on local GDP and employment. For example, there is a difference between a fan base for a winning team and a losing team. Teams that have droughts, or numerous seasons in a row with a losing record tend to have less fans show up to the game. If this is the case then the local economy will suffer from a drop in people showing up to their local businesses. If fans are not going to the games, the businesses in that metro area will not have a maximum occupancy. On the other hand if a team is known for having consecutive winning seasons then more fans are going to show up to the games. If more fans are showing up to the games local businesses will have a better opportunity to bring those fans to the area around the stadium. This will create jobs if the places in the metro area are always crowded. Competitive balance is also a very serious issue in professional sports

and should be something that becomes a major focus in the near future. Even if there are salary caps, owners who have money can spend more on players if they believe they are worth it. There is a high chance that the definition of competitive balance differs between many people at the professional level. Teams have learned over the years that you must have more than one star on your team in order to be competitive and go after a championship.

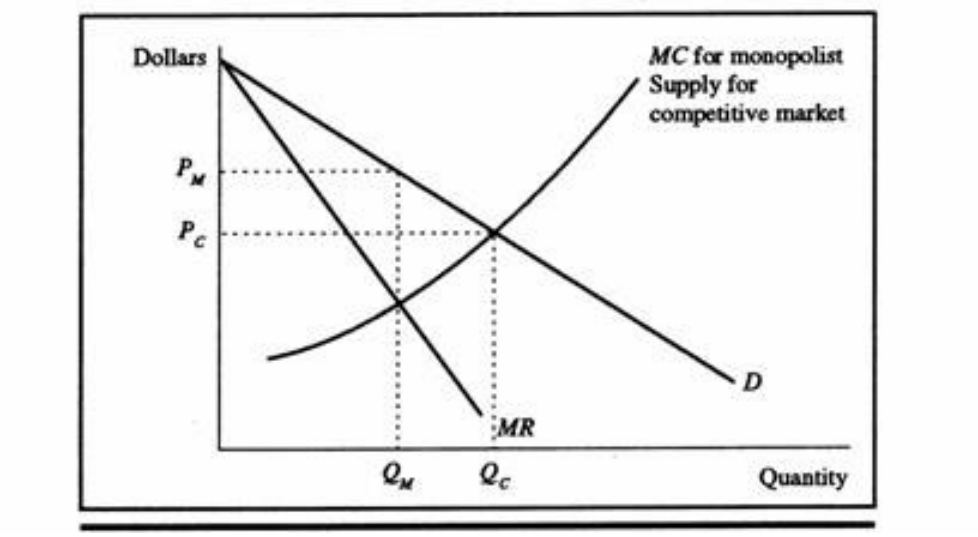


Figure 3-1 (retrieved from http://college.cengage.com/)

Figure 2 shows that firms, or the owners of these franchises will maximize their profit where marginal revenue = marginal cost. By looking at if an owner of a winning team wanted to increase the price of tickets, one could see that people are going to be willing to pay more to go see that team play even with an increase in ticket prices. The market in professional sports is considered to be monopolistically competitive, but it may differ slightly between each professional sport. In the MLB there is no salary cap which allows for owner's and general

managers to spend money as long as they have it. However, the NFL, MLB, and NHL all have a salary cap which makes it easier to compete against one another. The competitiveness of a team can determine how much an owner is willing to sell ticket prices at.

On November 29, 2015 Kobe Bryant, arguably one of the greatest player's to play in the NBA announced his retirement. It is unbelievable how quick ticket prices increased after the star made his announcement. Looking into the future, it is unlikely that the Los Angeles Lakers will make the 2015-2016 post-season. With that being said, Kobe Bryant's final game will likely be on April 14 at home in the Staples Center against the Utah Jazz. Two hours after his announcement, the cheapest ticket for this game went from $125 to $400 (Rovell 2015). However, these tickets are going towards player salaries, owner salaries, stadium costs, etc. One may say that the player's salary is important because if a player is not getting paid the money he wants, he is not going to stay with the franchise. That is important for keeping someone who competes at a high level, but how is this affecting the economy? It may continue to stimulate it by attracting an audience to the game to watch them, but it is still going to have little effect on the local economy in the big picture. Even though ticket prices are set before the season begins the secondary market is critical for team owners. There are so many sites on the internet in the secondary market that sells tickets. You also have people outside of arenas and stadiums trying to sell tickets at a higher value that what they are offered at the ticket booth. People do this because they know that people are going to buy them if the game is sold out and they have no other way of receiving a ticket. Owners may disagree with the second market, but overall it helps out the franchise in more way than most believe. These secondary markets will help sell tickets in order to get a game to be sold out. The secondary market boomed after Kobe Bryant announced his retirement because people were going to do whatever they needed to do in order

to go see him play in person one last time. However, this could have a negative effect on the local economy. If people are paying more than the actual face value of the ticket they are going to have less money to spend in the metro area. Therefore money will no longer be stimulated into the local economy and local businesses may suffer.

The gross domestic product, or GDP, is used to measure the economic growth of a particular city. One may look at GDP as the overall size of the economy. It represents the total dollar value over a certain period of time with respect to all of the goods and services produced. However, this paper will focus on real GDP per capita. Real GDP per capita measures the total economic output of a given country divided by the population with inflation adjusted for, but in this case it will be for a certain MSA, or metropolitan statistical area. Real GDP per capita is better to use in this situation because it allows for a better understanding of the economic health of a particular area. This is very important when involving the competitiveness of professional sports and relating it back directly to the team. This in turn will result in a boost in employment for people in that local area. Take the city of Baltimore for example. Camden Yards is home to the Baltimore Orioles where they play all of their home baseball games. The stadium was built in 1992 and is just a few blocks away from the Inner Harbor which is a key attraction for tourism. One component to look at that goes along with job creation is property value. Hamilton and Kahn (1997) explained that the equilibrium wage for inframarginal workers will rise and the present value of this increase will be capitalized into property value if the Orioles presence will continue to create incremental jobs.

Unemployment is another concept that plays a major role in the sports world. Unemployment happens when people are out of a job, but they are still actively trying to seek work. Sports franchises are always looking for workers to help better the team. For example,

there are many jobs that are located in the stadium and outside the stadium. Concession stands, gift shops, and vendors are all used within the stadium. Stadiums and arenas need so many people for these jobs. Many of these people, like vendors, not only get to work in the stadium, but also get to experience the fan interaction and also get to watch the game. Without workers, stadiums and arenas would not make money. Phillip Miller (2007) argued that the construction of new stadiums would generate millions of dollars of economic output, along with hundreds of jobs with that host city and region. Texas has been considered as one of the states that produce some of the most talented athletes that play football. The Cowboys are located in Dallas and are a very competitive team in the league. In 2014 they went 12-4 with a winning percentage of .750. However, what if there was another stadium for a football team built in Arlington, Texas where the Texas Rangers (MLB) play. A consultant calculated that the construction of a new football stadium in Arlington, Texas will have a one-time impact of more than $71 million dollars and will support 457 jobs in the city of Arlington alone (Miller 2007). This is a lot of jobs that would be created, but further studies show that the money spent on these teams just gets redistributed back into the local economy. There are many different service sectors located in each metropolitan area. According to Coates and Humphreys (2000) professional sports has a small positive effect on earnings per employee in the Amusements and Recreation sector. However, this positive effect is offset by a decrease in both earnings and employment in other sectors of the economy. These results suggest that professional sports have little to no effect on a city's local economy and could possibly have a negative effect on a worker well-being in other sectors.

By looking at these theories one will understand that the short term benefits of competitiveness in professional sports do not outweigh the long-term costs. It seems that these sporting events would generate enough revenue in the city to boost the economy, but the number

is minuscule. I will further this research in the next chapter by running a certain number of regressions and looking at other factors such as unemployment rate, GDP per capita, etc., and how they will affect the economic health, or quality of the local city's economy with respect to the competitiveness of the team in that city. In the next chapter the hypothesis that competitiveness of professional sports has a positive effect on the local economy will be tested.

Chapter 4: Emperical Analysis

This chapter will focus on the hypothesis that the competitiveness of professional sports will have a positive effect on the economy. This chapter will focus on a number of different variables on team performance and whether or not they will have any effect on their local city's economy. The datasets that are used take place during the 2013 MLB, NBA, NHL, and NFL season**s**. The analysis investigates the impact of team presence and performance on different economic indicators. The data that will be analyzed in the chapter was retrieved from The Bureau of Labor Statistics, The Bureau of Economic Analysis, and The United States Census Bureau. Along with these databases, the information collected on the professional sports teams was retrieved from pro-football-reference.com, hockey-reference.com, baseballreference.com, and basketball-reference.com. There were many different variables used in the model including:

- Metropolitan statistical area (MSA) - A metropolitan statistical area is a particular region that consists of a populated core and the surrounding areas. This variable will be used in the model because it narrows the focus to a specific area. This will make it easier for certain variables to focus on the local economy, and not just the entire United States economy. This will also explain the amount of observations. In the United States there are a total of fifty one metropolitan areas that have a sports franchise located in the city.
- Estimated population in 2013- The population will measure how many people are living in a specific MSA. This can be used to determine if the size of a metropolitan

area will have a different effect on the local economy based off of the population. This economic factor should have a positive effect on the independent variables because the number of people in a city will determine whether or not there is a high/low unemployment rate, high/low GDP per capita.

- Unemployment rate- This variable will be helpful to see if the presences of sports team create jobs, or prove to actually create job losses. It can look at the area and see what kind of jobs a sports franchise can create for the local economy. For the analysis in this paper, this independent variable should have a positive effect on GDP per capita and the annual mean wage in 2013.

- Number of championships won- The number of championships that a city wins may play a role in the local economy. A championship is the highest honor a team can achieve. It is the ultimate measure of a team's competitiveness which can be compared to certain factors in the economy. This variable is expected to have a positive impact on the dependent variable.

- Real GDP per capita-. Real GDP per capita measures the total economic output of a given country divided by the population with inflation adjusted for, but for this model it will represent a specific metropolitan statistical area. Focusing on real GDP per capita will be useful to see the economic health of a specific area. This variable will be used as the dependent variable to see if any measures of competitiveness have a positive effect on this economic measuring tool.

- Annual mean wage- Looks at every metropolitan statistical area and focuses on the average wage of every job located in that city. This is important because it will show if

the presence and competitiveness of these sports teams allow for the people in that city to earn a decent wage, and can also show what kind of jobs they will create. This variable will also be used as a dependent variable to see what impact the independent variables dealing with the competitiveness of teams will have on the local economy.

- NFL team- used as a dummy variable in the model to see if there is any effect on the economy. This will be used because there are so many fewer games in the NFL compared to the other sports. It may show different effects on GDP depending on the sport. This variable is used to see if having an NFL team, or not having one in a local city will change the outcome of the analysis in regards to the dependent variable.
- # of teams- The number of teams determines how many teams between all four franchises are located within a city. This will be used as an independent variable to see what kind of correlation it will have with real GDP per capita and the annual mean wage in 2013. A city with a smaller amount of teams may have a different impact on the economy when compared to a city with a larger number of teams.
- # of franchises- The number of franchises located in a city represents the four main ones including: the NFL, MLB, NBA, and NHL. This was used an independent variable to see if a certain franchise would have a different impact on the economy compared to the other ones. A city may be impacted differently if it has an NHL franchise, but lacks an NFL franchise.

The first analysis that will be looked at in this chapter is a multiple regression that will look like the following;

$$annualmeanwage2013 = \beta_0 + \beta_1\, nflteam + \beta_2\, \#ofteams + \beta_3\, \#offranchises + \beta_4\, \#ofchampionships + \beta_5\, estimatedpopulation2013$$

Table 4-1

# of observations = 51						
Prob > F = 0.0083						
R-squared = 0.2846						
Adj R-squared = 0.2051						
annual mean wage 2013	Coef.	standard error	t	P>t	[95% Conf.	Interval]
nfl team	259.7837	2510.792	0.1	0.918	-4797.211	5316.778
# of teams	7017.843	4229.968	1.66	0.104	-1501.749	15537.44
# of franchises	-6757.402	4082.763	-1.66	0.105	-14980.51	1465.704
# of championships	265.0612	174.1807	1.52	0.135	-85.75669	615.879
estimated pop 2013	0.0006689	0.0002066	3.24	0.002	0.0002529	0.001085
_cons	44452.81	2267.635	19.6	0	39885.56	49020.06

The annual mean wage in 2013 for every MSA with a sports team was used as the dependent variable. Estimated population, the number of teams, number of championships, and the number of franchises was used as the independent variables. Also, NFL team was used as a dummy variable. Including a dummy variable in the data could shift the outcome of the model. When compared to the other sports franchises, football has a much shorter amount of games played. Therefore creating this variable as a dummy variable could show if there may be different effects on the annual mean wage in 2013 based off of if a metropolitan area has a football team or not.

The model above represents the outcome of the variables. The number 0 represented a city that did not have an NFL team and the number 1 represented a city that had an NFL team. The number of teams represents how many teams, no matter what sport it is located in that city. The number of franchises represents how many franchises are within that city. For example Cleveland has three franchises located within the city: the Cavs, the Indians, and the Browns. One thing to note is that some metropolitan areas have more than one team in that area. Take Chicago for example. For all four franchises, there are a total of six teams that are located there. The Chicago Cubs and the Chicago White Sox are both MLB teams located in the city of Chicago. One might try to believe that the more teams there are in an area, the more chances there are for games to be played that attract fans. The regression model shows that there are multiple variables that seem to be statistically significant. The number of teams located in an MSA is statistically significant at the 90 percent confidence level. A one unit increase in the number of teams located in that city will create a 7017 unit increase in annual mean wage in 2013 with all other dependent variables held constant. Also, the number of franchises located in a city and the estimated population is statistically significant. For every one unit increase in population there will be a .0006 unit increase in annual mean wages in 2013. As the population grows there are more people in the city who will have a chance to earn a wage. One fewer number of franchises in n MSA is associated with a 6757 decrease in annual mean wage for 2013. The more franchises located in an MSA means that the annual wage per person in that area will be smaller than if the city had a smaller amount of franchises located there. This analysis also looked at heteroscedasticity with the variables. The table below explains The Breusch-Pagan/Cook-Weisberg test for heteroscedasticity and whether or not this analysis is heteroscedastic.

Table 4-2

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of annualmeanwage2013
chi2(1) = 1.94
Prob > chi2 = 0.1632

The Breusch-Pagan/Cook-Weisberg test for heteroscedasticity looks at the null hypothesis to test that the error variances are all equal. This goes against the other alternative which is that the error variances are multiplicative function of multiple variables. The chi squared of these variables is 1.94 therefore this analysis does not suffer from heteroscedasticity. If this analysis was heteroskedastic the chi squared value would have been much larger.

This analysis also looks at multicollinearity. Multicollinearity looks at multiple predictor variables in a multiple regression model to see if they are highly correlated with one another. This means that one of the variables can be linearly predicted from the other with a high level of accuracy. Table 4-3 below explains the results.

Table 4-3

Variable	VIF	1/VIF
# of franchises	33.14	0.030174
# of teams	27.16	0.036814
# of championships	2.96	0.337647
NFL team	1.99	0.501469
estimated pop 2013	1.44	0.692252
Mean VIF	13.34	

When the variance inflation factor (VIF) is larger than 10 the variables are collinear. This test shows that the number of franchises and the number of teams are collinear. They are correlated with one another because there are mostly the same amounts of teams in a metropolitan statistical area as there are franchises. The only cities that have more franchises than teams are Chicago, Los Angeles, and New York City. The second and final analysis will be as followed;

$$Gdppercapita2013 = \beta_0 + \beta_1\, estimatedpopulation2013 + \beta_2\, unemployment2013 + \beta_3\, \#ofchampionships + \beta_4\, annualmeanwage2013 + \beta_5\, nflteam + \beta_6\, \#ofteams + \beta_7\, \#offranchises$$

Table 4-4

Number of observations = 51						
Prob > F = 0.0000						
R-squared = 0.8258						
Adj R-squared = 0.7974						
real gdp percapita2013	**Coef**	**Std. Err.**	**t**	**P>t**	**[95% Conf**	**Interval]**
estimated pop2013	**0.0000716**	**0.0002124**	**0.34**	**0.738**	**-0.000357**	**0.0005**
unemployment2013	-1826.205	810.2308	-2.25	0.029	-3460.192	-192.2191
# of championships	**-39.63848**	**152.0673**	**-0.26**	**0.796**	**-346.3114**	**267.0345**
annual mean wage2013	1.501594	0.1310467	11.46	0	1.237313	1.765875
nfl team	**1034.28**	**2152.403**	**0.48**	**0.633**	**-3306.453**	**5375.014**
# of teams	-2075.518	3712.995	-0.56	0.579	-9563.486	5412.45
# of franchises	**1590.835**	**3580.192**	**0.44**	**0.659**	**-5629.311**	**8810.981**
_cons	-4151.714	8705.698	-0.48	0.636	-21708.43	13405

The second analysis used multiple independent variables to see their relationship with the real GDP per capita in 2013. However, there are only two variables that are statistically significant. At a closer look, these variables do not have anything to do with the hypothesis of this paper. This paper stated in the previous chapter that the hypothesis that competitiveness of professional sports will have a positive effect on the local economy will be tested. The only variables that are statistically significant in this analysis are ones that have to do with the local economy as a whole. The variables dealing with the competitiveness of these teams have no statistical significance in regard to the real GDP per capita. The hypothesis of this paper was focused on the competitiveness of these teams and their impact on the cities local economy. Looking at an economic factor affecting another economic variable proves nothing to in the grand scheme of things. The number of championships won in a given MSA is the variable that will have a major focus in this analysis. At the 90 percent confidence level, this variable is very far off from being statistically significant. The goal of this chapter was to try and prove that it

will have a positive effect on the economy. However after running the analysis, it is obvious that this variable has no significance with the real GDP per capita of that city. There may also be some other factors to look at with this variable. Take the metropolitan area of Cleveland for example. The return of LeBron James back to his home city took place in 2014. The only thing is that this number is based off of championships won in the metropolitan area. The city of Cleveland only has two championships, both coming from the Indians with World Series wins in 1920 and 1948. So these cities without championships happening, or very few being won, are hard to judge the data off of. Yes, LeBron brought publicity, fans, and many other things that would impact the city of Cleveland, but those are all factors that are hard to relate to the local economy. Also, it would also indicate that it would not lead to create permanent jobs in order to impact the annual mean wage and real GDP per capita in 2013.

Table 4-5

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of gdppercapita2013
chi2(1) = 0.04
Prob > chi2 = 0.8353

The chi squared of these variables is 0.04 therefore this analysis does not suffer from heteroscedasticity. If this analysis was heteroskedastic the chi squared value would have been much larger. If the variables were heteroskedastic then some of the variables may have to be omitted in order to get the best possible analysis. Also, instead of omitting the variables there may just have to be a change in what variables are used in the regression.

Table 4-6

Variable	VIF	1/VIF
# of franchises	35.16	0.028439
# of teams	28.88	0.034627
# of championships	3.11	0.321054
estimated pop2013	2.11	0.474571
NFL team	2.02	0.494545
annual mean wage2013	1.49	0.670961
unemployment 2013	1.37	0.727338
Mean VIF	10.59	

Once again multicollinearity will be assessed in order to see if there is any correlation between two or more variables in the model. Like the first analysis that was ran, this test shows that the number of franchises and the number of teams are collinear. The numbers are so small that it would be hard for these two variables to not be collinear.

The hypothesis that competitiveness of professional sports has a positive effect on the local economy was being tested throughout this chapter. There were some variables that proved to show that the competitiveness of professional sports does have a positive effect on the economy, but the numbers are small. However, the first analysis showed that the number of championships ones was very close to being significant. From the start of this paper that was one of the main goals. Even though they may not have been significant, it was important to see that

the impacts of these variables were very close to having a positive correlation with the dependent variable.

Chapter 5: Conclusion

The competitiveness of professional sports is what attracts an audience from all over the world. These players' go out every night and perform in front of the fans. That is there job and it is not easy. However, in the bigger picture the economy is more important than professional sports. The studies that were accounted for throughout this paper suggests that the competitiveness of the sports teams do in fact have an impact on their cities local economy, but the number is so small that it is very hard to tell. However, many economists showed that the economy is not thriving off of these sports, but the money is just be redistributed back into the economy. This makes it difficult to try and understand if these teams are actually affecting the economy, or if they are just there for the entertainment.

The regressions in this paper proved that the hypothesis that competitiveness of professional sports will have a positive impact on the economy was correct to a certain extent. The first regression analysis that took place showed that there are multiple variables that seem to be statistically significant. The t-stat for the number of teams is statistically significant with the number being 1.66. Even though the number of championships won was not statistically significant, it was very close. There are a few factors that may explain this. The Super bowl is known to have a large audience every year. However, the game is played on a neutral site where neither of the teams playing is the host city. On the other hand, the NBA for example has either three of four chances to have a home game in the finals depending on what seed you are. The analysis had a dummy variable in place for the cities that had an NFL team. Even with the dummy variable the number was not statically significant.

One thing that might be interesting to look at if someone wanted to go further this research could be the idea of the entire United States and not just at the metropolitan level. The

metropolitan area is so small that it may be difficult to find trends and impacts of professional sports on their local economy. Going by state, the results may be much larger and one could even look at variables such as immigration housing size, etc. More information of professional teams could also be important if one wanted to dig deeper into this research. Look at different teams or even the top athletes in every sport and use those as variables. This could single out certain athletes and see if their performance and skills would have an impact on the economy.

Overall, even though there were only two variables with statistical significance there were some variables, such as number of championships won that was very close. Also, further research could look at multiple numbers of years. Instead of just looking at 2013 one could do a period over a span of ten or so years? This would give you more data to work with and could spread out the information to focus more narrowly on particular variables.

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