Valuation of NBA teams based on intangible assets

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Bachelor's Thesis

International Bachelor Economics Business Economics
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Number of pages: 33

13 August 2024

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Abstract

The value of National Basketball Association (NBA) franchises is at an all-time high with the average value being worth $4 billion. Economists have tried determining how to value NBA franchises correctly for decades and have constantly failed and undervalued them. Forbes underestimates the value of NBA franchises by an average of 35%. Using a hedonic model, I study how intangible assets affect NBA franchises. This paper will regress the valuation estimates given by Forbes between 2019 and 2022, with multiple intangible assets that impact NBA team values. The results indicate that population, GDP, historical performance, and the presence of other major American sports teams all have a significant impact. The results enhance our understanding of NBA franchise valuation, highlighting the importance of intangible assets in the sports industry.

Contents

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1 Introduction

Basketball Partners L.L.C., the ownership group of the Boston Celtics, announced they are planning to sell the team by the end of 2024 or 2025. This news caught the NBA world by storm. The Boston Celtics are the reigning NBA champions and are arguably the most historic and valuable franchise in the NBA. Franchise values have more than doubled in the past five years in the NBA, but their growth has been consistent throughout the 21st century. They have experienced an annual growth of 21% over the past 13 years. An example of a team's value increasing exponentially is the case of the Dallas Mavericks. Mark Cuban bought the Dallas Mavericks for $285 million in 2000, or $520 million in 2024 dollars. In early 2024, he sold 73% of the team for $3.5 billion, which means the team's value increased by 600%. Some sports fans speculate that, in the event the Celtics franchise gets sold, it will become the most expensive sale of a sports franchise in NBA history. Therefore, NBA fans and economists are curious about the true value of the team and how much it will sell for. However, calculating the true value of sports franchises is a very difficult task. Access to financial data from sports teams is not available to the public. Furthermore, franchise values are significantly impacted by intangible assets that are difficult to quantify. This raises the question: how are NBA team values calculated, and what variables drive them?

This study will utilize a hedonic model to regress the valuation estimates provided by Forbes against various intangible assets that potentially impact NBA

Figure 1: Average value of NBA teams over time
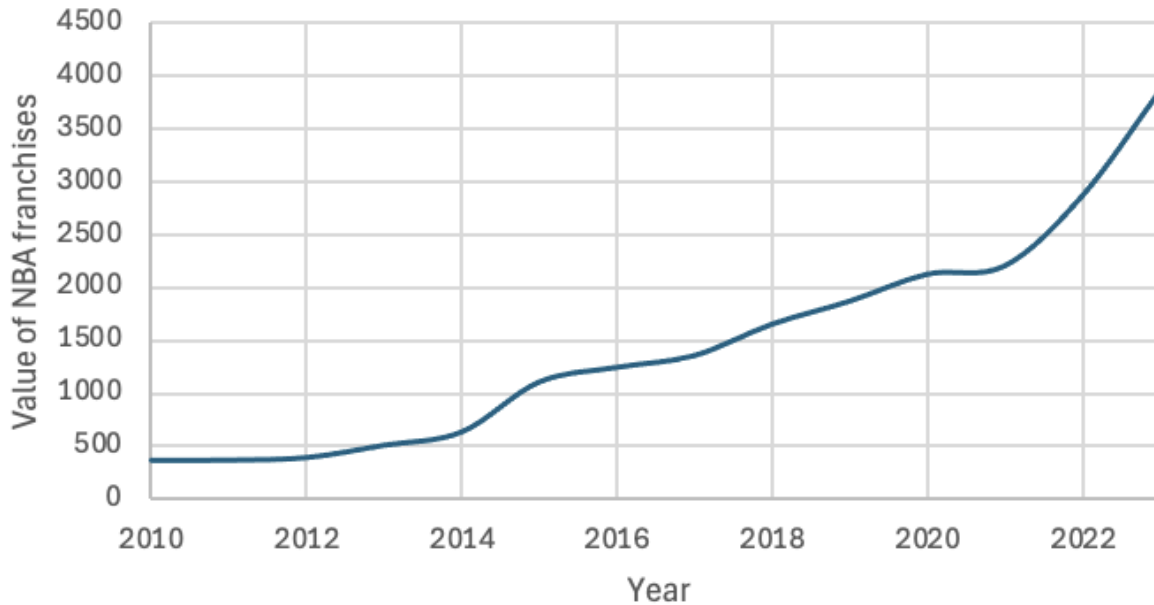
team values. These variables include market income and size, historical performance indicators, and the presence of star players, among others. The main research questions for this thesis are focused on identifying the key intangible assets that influence the valuation of NBA franchises. The study will examine how market demographics, team expenditure, and team success correlate with the market value of NBA teams. It will also explore the role of star players in the valuation of their respective franchises, and analyze how the presence of other major sports teams in the same city affects the valuation of an NBA team.

2   Background

Calculating the value of sports franchises is challenging, but it hasn't deterred economists and sports magazines from attempting to do so. From 1991 to 1998, Financial World magazine, a publication for investors, annually published their estimations of NBA team values in the "Sports Franchise Valuation Issue". Af-

ter the magazine ceased operations in 1998, Forbes, another American business magazine, continued the tradition of evaluating American sports teams annually.

Table 1: Difference between Forbes valuations of NBA teams and actual transaction prices

Team	Year	Price	Forbes Value	Premium(%)
Denver Nuggets	1991	70	41	72
Orlando Magic	1991	85	61	40
San Antonio Spurs	1993	75	65	15
Golden State Warriors	1995	119	83	43
Minnesota Timberwolves	1996	95	11	-14
Philadelphia 76ers	1996	125	93	34
Toronto Raptors	1998	125	121	3
Denver Nuggets	2000	202	124	63
Memphis Grizzlies	2000	170	127	34
Atlanta Hawks	2001	184	184	0
Oklahoma City Thunder	2001	200	187	7
Boston Celtics	2002	360	218	65
Atlanta Hawks	2004	184	202	-8
Brooklyn Nets	2004	300	244	23
Phoenix Suns	2004	401	282	42
Cleveland Cavaliers	2005	375	298	26
Golden State Warriors	2010	450	315	43
Philadelphia 76ers	2011	280	330	-15
Memphis Grizzlies	2012	377	269	40
New Orleans Pelicans	2012	338	285	19
Los Angeles Clippers	2014	2000	575	248
Milwaukee Bucks	2014	550	405	36
Atlanta Hawks	2015	850	825	3
Houston Rockets	2017	2200	1650	33
Brooklyn Nets	2019	3300	2350	40

Team values in millions of dollars

Table 1, showcases the difference between the valuation of NBA teams by financial magazines and the actual transaction prices, including the premiums or discounts at which NBA franchises were sold. The table lists the year the transaction took place, the valuation given by Financial World or Forbes, the real transaction price, and the resulting premium or discount percentage.

The results reveal that 22 NBA teams were sold at a premium, 3 were sold

at a discount and 1 valuation was exact. Franchises were sold at an average premium of \$159.9 million, which is 35.6% higher than the reported value of financial magazines. The only valuation that is exact is the sale of the Atlanta Hawks in 2001. This is due to the transaction taking place just a couple of weeks before Forbes published their valuation list, hence they did not use their economic model to value the Franchise and just used the actual transaction price.

Please note that this valuation only takes into account a portion of NBA transactions since 1991. It excludes more than half of the total sales of NBA franchises. Usually when a team is sold, it's only a majority stake and not full ownership that is transferred. Since NBA franchises are very expensive, they are typically purchased by a group of 2 or more investors. The valuation excludes majority and minority sales of teams in order to accurately represent the valuation price and premiums of acquiring a full NBA franchise, rather than partial stakes that may be valued differently.

Forbes has been valuing sports franchises for over 30 years and has adapted the model they use over the years to be as accurate as possible. Initially, they only focused on revenue, operating income, and debt. Throughout the years, they started accounting for other variables, such as team brand and market size. Nevertheless, Forbes's economic model still undervalues sports franchises on average. Kurt Badenhausen, a Forbes editor who works on team valuations, argues that the ultra-wealthy can sometimes pay a premium for a team beyond anyone's expectations or structure a deal that makes it look vastly different from any estimate (Badenhausen, 2020).

This premium can be due to various reasons. Vine (2004) suggested that this premium was due to prospective owners perceiving the utility of owning a sports team as significantly greater than that of owning a more traditional asset. He termed this the "ego factor." In contrast, Alexander & Kern (2004) argues that

the premium paid for various franchises may simply reflect the "winner's curse" when bidders fail to consider factors conducive to overbidding in the bidding competition for that franchise. Both scholars give compelling arguments to justify the premium that buying sports franchises comes with; however, these two factors are only two of the various intangible assets that impact sports franchise values.

Since the early 1990s, there has been growing awareness of the importance of intangible assets within an organization. They have been recognized as the primary source of value creation and deemed critical to competitiveness assessment for conceptual companies, which rely more on intangible-intensive activities than physical assets.

It is essential to define intangible assets within an organization because they are the drivers of values and strategic tools for development. Company executives see the identification and valuation of these assets as essential metrics. However, as their name implies, these assets are "intangible" and hard to quantify, and firms often overlook their importance in financial reporting.

Professional sports organizations, such as the NBA, are heavily impacted by intangible assets. While conventional assets like advertising, sponsorships, ticket and merchandise sales, and stadium leases contribute significantly to a team's value, other factors such as sporting results, the influence of star players, and brand strength drive additional value. This impact is evident in fans' support for winning teams and their enthusiasm for renowned superstars and exciting young talent. However, the influence of intangible assets may not always be immediately obvious. Sports teams depend on maintaining their brand recognition and fan base to generate revenue from advertising contracts, sales of branded products, arena attendance, and game day operations.

In this study, intangible assets are non-physical value determinants that impact NBA franchise transaction values but cannot be measured by any single

numerical variable. I will examine the influence of various intangible assets on team valuation. These assets include the appeal of a city, the team's historical and current success, the impact of superstar players, and the presence of other major American sports teams in the same city as NBA teams. As it is challenging to put a quantitative value on intangible assets, especially for sports franchises without public financial statements, I will explore different value determinants in various contexts to assess their impact on franchise valuation. To measure the appeal of a city, I will consider the city's GDP and the population of the metropolitan area. Assessing the team's success will involve looking at historical factors such as the team's all-time winning percentage and number of championships, as well as current factors like playoff appearances in the last 5 years and the team's current player salary expenses. To gauge the impact of superstar players, I will take into account the number of most valuable players (MVPs) and All-NBA players in each team. Lastly, I will consider the influence of other major American sports leagues by examining whether the NBA team's location overlaps with other major sports teams.

Therefore this study aims to analyze Forbes' valuations of all 30 NBA teams and determine the intangible assets that influence their valuation. How do these intangibles affect the market value of these franchises? To answer these questions this thesis will empirically calculate the effects of intangible assets on the market values of NBA franchises.

There are differences between this work and previous studies: this paper will examine explicitly NBA franchises instead of data sets that cover all four major North American sports leagues (NFL, MLB, NHL, and NBA). By narrowing down the analyzed teams, the study can be more specific and focus in the variables that affect mainly the NBA. Previous researchers typically rely on estimated values from Forbes and Financial World Magazines, which have been available

8

since 1991. This study will concentrate on the Forbes valuation of NBA teams from 2019 to 2022, examining the variables that contribute to it while disregarding historical sale values. This study aims to broaden the analysis by including previously unexplored variables, such as the presence of another major sports team in the same city as an NBA team. However, it is important to acknowledge the limitations of this study. The primary limitation is that it is not feasible to account for all the intangible factors that can impact the value of a franchise, therefore, some significant intangibles may be overlooked. Furthermore, the use of a least squares regression model is subject to common limitations such as multicollinearity and heteroscedasticity.

3 Literature Review

The amount of economic research on the value of professional sports teams and the factors that drive their value is small, but there has been a recent increase in published work about it. The limitations of this research stem from the fact that North American professional sports teams are private organizations that do not make their audited financial data publicly available, making it difficult to apply the basics used to value ordinary businesses and carry out valuation techniques like discounted cash flow analysis. Hence, studies generally all use team sales prices as a proxy for firm values.

Vine (2004) compared the actual sale prices of NBA, NFL, NHL, and MLB franchises from 1999 to 2003 against the value estimates provided by Forbes to see if the sports magazine undervalued or overvalued sports franchises. In the studies, teams proved to be sold at an average premium of 27% over Forbes' valuations, with NBA franchises specifically selling at a 38% premium. Vine attributed this gap to what he called the "ego factor," the idea that owners derive more utility

by owning a sports franchise than they do from other conventional assets. More precisely, this premium reflects all the additional non-monetary benefits owners gain, such as elevated social status, direct engagement with the team, having a say in squad building, deciding the kit designs and colors, or changing the logo of the team and unique experiences like sitting courtside or interacting with players. As quantifying the ego factor is challenging, the visible enthusiasm and behaviors of high-profile owners like Mark Cuban and Steve Ballmer support Vine's findings.

I will analyze team value from a more current perspective using Forbes data from a limited time period and excluding sales values. Using sales price data has several significant drawbacks, the main one being that, in order to have enough observations, the data spans over fifty years of team sales. This is a major issue because the game has evolved significantly, and today's basketball is vastly different from the basketball that was played 50 years ago. Over the last fifty years, the NBA has implemented a three-point line, introduced rules like the three-second offensive violation, and eliminated hand-checking from the game, among other changes. From a business and financial standpoint, it has also transformed considerably. The league is now much more international; it is not just the American market that consumes the league but the entire world, particularly Europe and China. Other factors such as cable television rights, the internet, contemporary media advertising, and many other contributions must be taken into consideration in a modern transaction, as they would not have been reflected in sales pricing in the 1970s and 1980s.

Other studies have focused on the impact of common economic strategies employed by team owners. The strategies observed are not strategies where the value is already ascertained and the impact on the value of the franchise is proof of the payoff of this strategy, such as when sports franchises sell the naming

rights of their stadium. In those cases, the impact it has on the franchise value is determined by how much the rights were sold for. The strategies observed are ones that owners employ to raise capital, but the payoff is not as straightforward. For example, when the Golden State Warriors changed their logo in 2010 to feature, the iconic Golden Gate Bridge a symbol of San Francisco, representing the team's geographical and cultural ties to the city. This change was part of an effort to strengthen the team's connection to its home region.

Alexander & Kern (2004) are some of the first scholars to observe such strategies and their impact on franchise values in the four major professional sports: the NFL, NBA, NHL, and MLB. The study includes data on 9 variables that range from 1991 to 1997. Key variables include market size, metropolitan population, team performance, and the presence of a new facility. They found all of these factors to have a significantly strong and positive impact on franchise values: a new stadium added $17 million and $6.6 million on average to MLB team and NBA team values, respectively. The study also examined the effect of regional identity on a team and found that it had a significant and positive coefficient in the case of the MLB, but not in the other three leagues. The paper argues that this may be due to other leagues having institutional policies to avoid disparity, such as revenue sharing.

Miller (2007) used panel data from 1990 to 2002 to further analyze the impact of changing to new stadiums on MLB franchise values. The variables included were market income, market population, winning percentage of the current and prior season, age of the stadium, age of the team, tenure of the team in the city, and whether the stadium was privately owned or not. The results showed that having a privately owned stadium, the market income, and being successful all increased the value of a franchise. The only variable that harmed a team's value was stadium age. However, Miller (2007) also discovered that when new team

11

stadiums are funded privately, the increase in value of the franchise is not enough to cover the construction costs needed to build the stadium. Thus, most of the teams seek public funding to build new stadiums.

Lastly, there are also those scholars who focused on the historical growth of franchise sales prices. Fort (2004) conducted a study of the historical growth of MLB team sales across the modern baseball era, which covers fifty years. He discovered that the growth rate of MLB team values was two times faster than the average 3% of the overall economy. Humphreys & Mondello (2008) expand the analysis of transaction prices to all four major American professional sports (NBA, NFL, MLB, and NHL) clubs between 1969 and 2006. In the study, the number of local rivals, age of the franchise, facility ownership, and metropolitan population all significantly impact the price valuation of franchises. Based on these findings, a quality-adjusted price index shows that prices increased by more than 15% on average annually during the period. Humphreys & Lee (2010) used the repeated sales method where they reduced the scope to only franchises that were sold more than once and compared the differences in sale prices. In the study, they found that the quality-adjusted North American professional sports franchise index developed had no upward trend, hence the value of professional sports franchises is driven by changes in the quality of individual franchises.

4 Data collection

4.1 Method

In this study I will use a hedonic model to analyse the determinants of value of NBA franchises. A hedonic model uses Ordinary Least Squares (OLS) regression to estimate the value of an asset that cannot be directly observed. It dissects the price of a product into various characteristics, studies them, and evaluates

the extent to which each one influences the final price. It is a valuation method typically employed in real estate (Gibbs et al., 2018), but can also be relevant assessing sports franchises as we do not have access to any of their financial statements (Humphreys & Mondello, 2008).

$$ln(P_{it}) = \alpha + \beta_1 X_{i_t} + \epsilon_{it} \tag{1}$$

P is the dependent variable and it represents the value of the product being analysed, which is a log value to avoid the distribution from being skewed. X represent the independent variables, which are the assets that contribute to the value being analysed. The coefficients (β) represent the estimated contribution of each asset to the price. Finally, ϵ is the error term, which captures the variation that is not explained by the model.

4.2   Forbes NBA Teams Values List

Forbes is a media and publishing company that was established in the US in 1917. The organization offers daily news coverage on a variety of subjects, including sports, business, technology, financial markets, and personal finance. In addition, it produces the Forbes magazine, which has 6.1 daily million readers. Forbes is best known for its rankings related to money, which cover a wide range of topics such as the wealthiest individuals, young billionaires, professional athletes, companies, and influencers. This study will specifically focus on Forbes' NBA Team Values from 2019 to 2021. In an article by The New York Times, Forbes editor Kurt Badenhausen shares insight into how they calculate these values. To be as accurate as possible, Forbes editors consult with teams, bankers, and other sources to determine each team's annual revenue. Some of the math variables taken into account are local and national TV deals, debt and stadium/arena

deals, and harder factors to quantify, such as the worth of the market size for the team and its brand value. In the article, the Forbes editor claims that even if their team valuations are spot on, sometimes, the price discrepancy is due to a bidding war, which is impossible to account for when doing calculations.

4.3   Revenue and Operating Income

The data for both variables is also derived from Forbes's list of NBA team values. Forbes states that revenue is calculated based on the net revenues of the arena based on debt payments. It includes all the income generated from the use of the sports stadium. It encompasses all revenue streams directly related to the arena operations on game days and during other events, such as parking and ticket sales. Sports arenas have a lot of financial obligations as well. Debt payments refer to the costs associated with repaying loans or bonds that were used to finance the construction or renovation of the arena. Essentially, revenue is arena-related revenue that is available to the team after it has fulfilled its debt obligations. Operating income is the earnings before interest, taxes, depreciation, and amortization.

4.4   Appeal of the city (Market income and population)

The market's income and size heavily influenced an NBA team's value. Larger markets have more media exposure, a bigger fanbase, and a larger spread of economic avenues. In the NBA, there are franchises located in New York and Los Angeles. These are two of the largest and richest places not only in the US but in the entire world. The largest media outlets are also located in these cities, which guarantee major coverage and exposure, and boost the team's appeal and brand. Basketball is only one of many other attractions in large markets. It allows the biggest stars in the league to interact with other celebrities and attend

14

big events. Franchises in large markets also have more business opportunities. By being located in large cities, they already have a bigger potential fan base. There is a higher demand for team-related products and attendance for games, boosting merchandise revenue and ticket sales. Moreover, companies are ready to capitalize on the massive media coverage and audience, which provides franchises and players with a vast amount of advertising deals and sponsorship opportunities with the biggest and richest brands in the world. All the benefits translate to more revenue and directly drive a team's value up. Unfortunately, smaller cities cannot generate the same level of revenue. Smaller cities lack the media exposure, fanbase, and investment opportunities that larger cities offer. In the study, market income and size is measured by the city's GDP in 2022 and the metropolitan area's population in 2022, respectively . Data for the GDP of every city was obtained from The Bureau of Economic Analysis (BEA) of the United States Department of Commerce. Data for the metropolitan population of every city was obtained from The United States Census Bureau.

4.5 The success of a team (Championships, All time winning percentage, playoff appearances in the last 5 seasons and team salary)

A variable that very clearly drives the value of a franchise is the team's success. The perfect example of this is the Golden State Warriors. In 2010, the Golden State Warriors were placed 15th on Forbes's annual valuations list. However, I have previously mentioned the importance of being situated in a big market and how it increases the value of a franchise, and apart from New York and Los Angeles, there is not a bigger market in the NBA than the Bay Area in California. Before the sale of the franchise in 2010, the Warriors had the second-worst record

in the league over the previous 16 years. They were seen as a losing franchise, hence even though they were in a big market there were 14 teams more valuable in the NBA according to Forbes. Since 2010 the Warriors have been the most successful team in the NBA and are now listed at number 1 in Forbes list. To measure the success of the different NBA teams we will look at various variables: number of championships, all-time win percentage and playoff appearances in the last 5 years.

Winning an NBA championship is the ultimate goal every NBA franchise and player has. Teams play 82 games a season and have to win an extra 16 just to win what objectively is a piece of metal. Professional athletes are competitors and winning the championship certifies them as the best players in the world, however, for franchises it has major economic ramifications. It helps to increase fan base and loyalty and enhances brand revenue. When new sports fans choose a team to support it is usually done for different reasons. They support their parent's team, hometown team, a team they have a special connection with, or a winning team. Most people prefer to celebrate victories rather than suffer with losses. The top teams are more likely to win games and trophies, which in turn attracts more fans. Winning a championship is not only important for drawing in new fans, but it also helps existing fans form a stronger emotional bond with the team. Furthermore, it boosts the team's reputation and marketability, attracting fans beyond their local area and leading to sponsorship and endorsement deals with larger companies.

Winning a championship is the biggest achievement in sports, but it is not the only measure of success. There is still a lot of value in being a very good team. That is why in the analysis of what drives team valuation, I include the all-time winning percentage and playoff appearances in the last 5 years. I mentioned the Warriors as a team before that was seen as a losing franchise which affected their

market value. Similarly, the Minnesota Timberwolves rank 16th in the NBA in terms of market income, however, they are valued 28th by Forbes. An explanation for this discrepancy is that ever since the creation of the team in 1989, they have had the worst winning percentage in the league and have had only 1 season where they were among the 4 best teams in the NBA. Even more important than the all-time results of a franchise are the recent results. For example, the Spurs in 2016 were ranked as the 12th most valuable franchise in the NBA by Forbes. However, in Forbes 2022 list they rank 20th. The difference is that when Forbes did the valuation in 2016 the Spurs had won a championship in 2014 and was one of the best teams in the world. But, in 2022 the Spurs had a losing record and missed the playoffs for the third straight year. That is the reason a variable for playoff appearances in the last 5 years is included, NBA teams situations can shift very rapidly. Data on NBA teams' championships, winning percentages, and playoff appearances was retrieved from basketball-reference.com.

The team salary is often overlooked as a factor in team valuation. The NBA limits the total amount teams can spend on roster construction, which is called the salary cap. The salary cap is used to maintain parity in the league, but teams are allowed to exceed it and pay a tax for doing so. The luxury tax requires teams to pay a penalty for every dollar they go over the salary cap, and the penalties increase as teams exceed the cap by larger amounts. The tax is paid by the teams and affects the owners' revenue because it impacts the team's profit margin. Although it is an expense, it also reflects a commitment to winning. The teams that are willing to go over the salary cap are the teams that have a chance to have a successful season. Having a high salary expense improves a team's competitive performance, leading to more wins, playoff appearances, and potential championships. As mentioned earlier, success on the court increases a franchise's value. Data on NBA teams' salaries was collected from basketball-

reference.com.

4.6   Superstar impact (MVPs and All-NBA players)

NBA superstars have a major impact on the value of NBA franchises. Having a star player not only boosts a team's chances of winning but also drives ticket sales, media deals, and merchandise revenue due to their on-court performance and popularity. For example, in 2018, the Cleveland Cavaliers were ranked as the 15th most valuable NBA franchise by Forbes. At that time, the Cavaliers had LeBron James, the best and most popular player in the NBA. However, when LeBron James left the team in the 2018 offseason, the Cavaliers dropped to number 25 in the 2019 Forbes list. This extreme example demonstrates the influence of a superstar on a team's value, particularly given LeBron James' status as the most famous and widely regarded as one of the best basketball players, alongside Michael Jordan. In order to account for the top superstars in the league, it's important to consider the number of most valuable player (MVP) award winners on rosters. Additionally, to factor in the impact of lesser-known stars, the number of current All-NBA players on rosters should also be taken into consideration. MVP is the award given to the best player every year in the NBA All-NBA players are the top 15 best players every season chosen by the media. Data on MVP and All-NBA awards was collected from basketball-reference.com.

4.7   The presence of other major Sports teams from other leagues in the same city (NHL, NFL and MLB)

The study includes binary variables for the last set of factors, indicating whether there is another sports team from the three other major American Sports Leagues. The NBA is the second largest league among the four major American

leagues, boasting the most teams and being the only major sports franchise in a city. However, when excluding Canadian teams and focusing only on US cities, the NBA has the same number of cities (7) with only one major sports team as the other three leagues combined. This exclusion is necessary because there are 7 Canadian teams in the NHL, while the NBA and MLB have 1 each, and the NFL has none. The presence of several major sports teams in a city gives fans more entertainment options to choose from. In large cities like New York or Los Angeles, where there are over a million people, having a shared market does not significantly impact NBA teams due to high demand. However, in smaller cities like Memphis or New Orleans, competition can affect ticket sales as fans may not attend as many games for each team. For instance, when the Minnesota Timberwolves perform poorly, attendance drops because sports fans in Minneapolis start focusing more on the Minnesota Vikings (NFL) or Minnesota Twins (NHL). Consequently, this decreases ticket and merchandise prices, significantly impacting the team's revenue and value.

Table 2: Summary statistics dependent variable

Variable	Observations	Mean	Standard Deviation	Min	Max
Franchise Value	120	2264	1106	1200	7000

Values in millions of dollars

Table 3: Summary statistics independent variables

Variable	Observations	Mean	Standard Deviation	Min	Max
Revenue	120	294	82	204	765
Operating Income	120	71	43	-34	206
GDP	120	482880	488171	75060	2163209
Population	120	1.66	2.08	0.2	8.74
Championships	120	2.5	4.2	0	17
All time winning percentage (%)	120	48.7	5.7	35.4	63.9
Playoffs appearances 5Y	120	2.7	1.6	0	5
Team salary	120	134.5	20.6	82	192.9
MVP	120	0.35	0.84	0	4
ALL NBA	120	0.5	0.59	0	2

Values in millions except for Championships, All time winning percentage, Playoffs appeareances 5Y, MVP and All NBA.

5 Results and Discussion

I employ OLS to measure the effect of the different assets in the hedonic model. The equation includes several independent variables representing different team and city characteristics, as mentioned in the data section of the paper. Forbes Value, representing the estimated value of the franchise, is the dependent variable. Each coefficient measures the impact of the corresponding independent variable. Because team value, GDP and population are variables that have a wide range of values I transformed them using natural logarithms. This logarithmic transformation helps normalize the data distribution and makes the regression results easier to interpret, allowing for analysis in terms of percentage changes of each variable.

$$ln(ForbesValue_{it}) = \alpha + \beta_1\ln(\text{GDP})_{it} + \beta_2\ln(\text{Population})_{it} + \beta_3\text{Pl\_5Y}_{it} + \beta_4\text{Champ}_{it}$$

$$+ \beta_5\text{Rev}_{it} + \beta_6\text{OI}_{it} + \beta_7\text{W/L}_{it} + \beta_8\text{NHL}_{it}$$

$$+ \beta_9\text{NFL}_{it} + \beta_{10}\text{MLB}_{it} + \beta_{11}\text{All3}_{it} + \beta_{12}\text{ALLNBA}_{it} + \beta_{13}\text{Salary}_{it}$$

$$+ \beta_{15}\text{MVP}_{it} + \epsilon_{it}$$

$$(2)$$

In the equation lnGDP is the natural logarithm of GDP of the city, the natural logarithm of the metropolitan area's population is represented by ln(Population), Pl 5Y is playoffs appearances in the last 5 years, Champ is championships, Rev is revenue, OI is operating income, W/L is all time winning percentage, NHL/NFL/MLB is presence of the respective leagues in the same city, All3 is presence of all three leagues (NHL, NFL, MLB), ALLNBA is All-NBA team selections, Salary is team salary, MVP is most valuable player awards.

In regression 1, I added all the variables. The results of the regression show that 92.3% of the variation in the natural log of franchise valuation is explained by these variables, as indicated by the R-squared value. The F-test ($F(14, 105) = 108.24$, $p < 0.000$) confirms the overall significance of the model. The significant and positive variables are operating income, revenue, GDP, metropolitan area population, championships, and team salary. MLB and NFL are significant and negative. These variables significantly influence franchise valuation. On the other hand, variables such as Win-Loss record, Playoffs in the last 5 years, NHL, All3, All-NBA, and MVP awards were not statistically significant, suggesting that these factors may not have a substantial direct impact on franchise valuation in this model. The constant term (coefficient $= 3.748$, $p < 0.000$) is also highly significant, indicating a baseline level of franchise valuation that is influenced by the other factors in the model. However, in this regression, I included 14 varia-

Table 4: Regression Results

Variable	R1	R2	R3	R4	R5	R6	R7	R8	R9
R-squared	0.923	0.884	0.791	0.678	0.591	0.648	0.777	0.489	0.793
F-Test	108.24	226.64	38.56	42.72	29.67	32.36	52.81	19.99	77.10
C	**3.748*****	**4.467*****	**2.103*****	**2.99*****	**2.735*****	**2.917*****	**2.575*****	**6.460*****	**2.527*****
	(0.28)	(0.210)	(0.430)	(0.359)	(0.508)	(0.470)	(0.401)	(0.366)	(0.338)
ln(GDP)	**0.152*****	**0.124*****	**0.276*****	**0.232*****	**0.375*****	**0.377*****	**0.19*****	-	**0.27*****
	(0.031)	(0.024)	(0.050)	(0.040)	(0.068)	(0.063)	(0.036)	-	(0.043)
ln(Population)	**0.062*****	**0.05*****	**0.061***	**0.070***	0.02	0.002	**0.091*****	-	**0.068****
	(0.019)	(0.021)	(0.033)	(0.036)	(0.044)	(0.041)	(0.031)	-	(0.030)
Pl_5Y	0.009	-	-0.013	0.008	-	-	-0.011	-0.034	-
	(0.008)	-	(0.013)	(0.015)	-	-	(0.013)	(0.019)	-
Champ	**0.017*****	-	**0.024*****	-	-	-	**0.023*****	**0.044*****	**0.031*****
	(0.048)	-	(0.006)	-	-	-	(0.006)	(0.008)	(0.004)
Rev	**0.002*****	**0.003*****	-	-	-	-	-	-	-
	(0.000)	(0.000)	-	-	-	-	-	-	-
OI	**0.001*****	**0.002*****	-	-	-	-	-	-	-
	(0.000)	(0.000)	-	-	-	-	-	-	-
W/L	0.047	-	**0.916****	-	-	-	**1.089****	0.047	-
	(0.267)	-	(0.437)	-	-	-	(0.424)	(0.611)	-
NHL	-0.010	-	-0.007	-	-0.053	0.036	-	-	-
	(0.038)	-	(0.081)	-	(0.109)	(0.065)	-	-	-
NFL	**-0.062***	-	-0.089	-	**-0.175****	**-0.101***	-	-	**-0.093****
	(0.034)	-	(0.058)	-	(0.078)	(0.066)	-	-	(0.049)
MLB	**-0.096*****	-	**-0.131****	-	-0.070	**-0.138***	-	-	**-0.136****
	(0.035)	-	(0.058)	-	(0.079)	(0.075)	-	-	(0.055)
All3	0.041	-	0.027	-	0.1252	-	-	-	-
	(0.055)	-	(0.092)	-	(0.120)	-	-	-	-
ALLNBA	0.003	-	0.001	-0.006	-	0.028	-0.011	0.042	-
	(0.021)	-	(0.035)	(0.042)	-	(0.043)	(0.035)	(0.052)	-
Salary	**0.002*****	-	**0.006*****	**0.005*****	-	-	**0.006*****	**0.008*****	**0.006*****
	(0.000)	-	(0.001)	(0.001)	-	-	(0.001)	(0.001)	(0.001)
MVP	-0.026	-	0.008	**0.072****	-	**0.117*****	0.005	0.023	-
	(0.016)	-	(0.027)	(0.03)	-	(0.030)	(0.027)	(0.040)	-

[1]The parentheses is the standard error
[2]*** Significant at 1%, ** Significant at 5%, * Significant at 10%

bles. The large amount of variables makes it hard to identify the individual effect of each variable, and only 8 of the 14 variables are significant, hence there is a high chance of multicollinearity.

The results of regression 2 indicate that 88.4% of the variation in the natural log of franchise valuation is explained by these variables, as shown by the R-squared value. The F-test ($F(4, 115) = 226.64$, $p < 0.000$) is the highest among all the regressions. All four variables are significant. Revenue has the highest impact, suggesting that a 1% increase in revenue leads to an increase of the franchise value rise by 0.269%. Financial performance (revenue and operating income) and market size and power play a crucial role in determining franchise valuation, as shown by this regression model. Nonetheless, the outcome was expected. With increasing revenue, the value of a franchise naturally grows, and the variables that have the most intuitive impact on team value are a city's population and GDP.

For the rest of the regressions revenue and operating income are excluded because in this study I want to look at the impact of non-financial assets. I will also keep population and GDP for most of the regressions because their impact on team valuation is more straightforward than the rest of the variables.

In regression 3, I include every variable except for revenue and operating income. In this regression, 7.91% of the variation is explained by these variables, as reflected in the R-squared value. The F-test ($F(12, 107) = 38.56$, $p < 0.000$) is good, but not as strong as the first regression. This is logical as the only thing we have done is remove the two strongest variables. The significant and positive variables are the same as regression one plus all-time winning percentages. MLB is still significant and negative, but the NFL is not significant anymore. The rest of the variables that were insignificant in regression 1 remain insignificant. However, similar to regression 1, there are still too many variables included in

23

the regression and a lot of insignificant variables.

In regression 4, I only add variables that are representative of a team's current success or are directly related to the team like team salary. The positive and significant variables are GDP, population, team salary, and MVP. For the first time having an MVP on the roster has a positive and significant impact. This might be due to the fact of controlling strictly only for basketball-related variables.

In regression 5, I control only for the presence of other major league sports teams in the same city. GDP and the NFL are the only significant variables, whilst population NHL, MLB, and ALL3 are insignificant. In regression 6, I control for the presence of other major league sports teams and the presence of superstars (MVP and All-NBA) on a team. GDP, MVP, and MLB prove to be the only significant variables, whilst population, NHL, NFL, All3, and All-NBA are all insignificant. NFL and MLB are negative due to their ability to take customers and fans off the NBA, hence impacting franchise value negatively. Similarly, MVP being positive is due to the ability of star players to retain fans and bring fans into games.

In regression 7 and regression 8, I control only for basketball-related variables. Contrary to regression 4 in these regressions I also add all-time success indicators, such as championships and all-time winning percentages. The only difference between both regressions is that in one population and GDP are included. Please make a note of the following information: All the variables maintain their sign and significance between regressions, except for the all-time winning percentage. It is significant in regression 7 but not in regression 8. Additionally, regression 8 has the lowest R-squared (0.489) and F-test value (19.99). This is likely due to the exclusion of GDP and population, which are critical variables in franchise valuations, making the model less accurate.

Regression 9 is the most significant. It has the highest R-squared (0.793) and F-test (77.1) values of any regression, excluding those where revenue and operating income were included. Furthermore, it is the only regression where all variables are significant. GDP, population, championships, and team salaries are positive, whilst NFL and MLB have negative coefficients.

The natural logarithm of Gross Domestic Product (ln(GDP)) has been the most significant factor in determining franchise values. In all the regressions, it was shown to be significant, indicating that GDP is an excellent explanatory variable for the value of a franchise. This supports our assumption that higher economic activity in a metropolitan area leads to greater financial potential for sports franchises. A higher GDP indicates a strong economy with increased consumer spending power, which can result in higher ticket sales, merchandise sales, and sponsorship deals. This finding is consistent with Miller (2007), who observed that market income significantly impacts franchise values.

The variable natural logarithm of the metropolitan population was found to be significant in 6 out of the 8 regressions in which it was included. A larger metropolitan population implies a broader fan base, greater media exposure, and more substantial business opportunities. Larger populations create higher demand for game attendance, merchandise, and other revenue streams. Fort (2004) emphasizes that larger metropolitan areas offer more diversified economic opportunities, which can boost a franchise's overall valuation. Therefore, the population size of the metropolitan area is a crucial determinant, reflecting the potential market reach and economic advantages available to the franchise.

To assess the impact of a team's performance, we used 3 variables, playoff appearances in the previous 5 seasons, all-time winning percentage, and total championships. Several playoff appearances in the last five years (PL 5Y) did not have a significant impact on improving a franchise's value in a single regres-

sion. This finding contradicts the common expectation that recent team success would increase market value. Playoff appearances are typically seen as an indicator of consistent performance and competitiveness, attracting more fans and generating higher revenue from ticket sales, merchandise, and media rights. However, this result supports Alexander & Kern (2004) study, which found that the win percentage the previous season was positive and significant, but win percentage in the previous five years was insignificant. Hence, it can be deduced that utilizing playoffs from the preceding 5 seasons may not serve as a driver of a franchise's value and that only the most recent seasons influence a franchise's worth. Nevertheless, championships was significant in all 5 regressions it was included in. Thus, making it a stronger driver of franchise value than the historical winning percentage of a franchise, which was significant in 2 out of 4 regressions. These variables highlight the prestige and historical success associated with winning titles, which can enhance a team's brand and market appeal. Championship victories and constant winning create winning environments and customs, fostering a strong fan base and long-term loyalty. The significance is consistent with findings by Miller (2007), who emphasized that team success, particularly championships, increases franchise value.

The variable's presence of other major sports franchises had mixed results in the regressions. NHL was insignificant in all regressions. This is likely due to the NHL being the least popular of the four sports. The presence of all 4 sports teams in the same city was also insignificant in all regressions. This is because the biggest cities, like New York, Los Angeles, or Boston, are normally the ones to have four major sports teams from different leagues. The demand for sports entertainment in larger cities is high, and the competition between teams for viewership is not very intense. However, the NFL and MLB proved to be mainly significant and negative, proving that competition is still very fierce

in some cities. The popularity of American football and baseball surpasses that of hockey, and they have a greater overlap with cities that host NBA teams, explaining their significant impact. The strategy of the NBA of not sharing the city with other sports teams proves to be successful.

The variables ALLNBA and MVP capture the presence of players who have been selected to All-NBA team and won Most Valuable Player (MVP) awards. In the regression analysis, the ALLNBA variable was found to be insignificant across all regressions, while the MVP variable was significant in only 2 regressions, having a positive impact on value in both cases. This likely indicates that while having superstar players might enhance a team's visibility and popularity, their impact on the overall valuation of the franchise is relatively minor or non-existent. This is due to several factors. First, players in the NBA frequently change teams, making them less stable assets compared to infrastructure or long-term revenue streams. Second, only exceptionally high-profile superstars tend to have a big effect on a team's market value, as seen in rare cases like LeBron James. MVPs are only given to the best basketball player in the world and there is a big difference between being named All-NBA and MVP, for instance, in NBA history only 36 players have won MVP whilst 294 players have been featured in an ALLNBA team. Thus, while star power can boost marketing and attract short-term attention, it does not necessarily translate into a stable, long-term increase in franchise value. Hence, we can deduce MVPs have a minor impact on team valuations, and ALL-NBA do not impact team values.

The variable Salary, which represents the team salary, the amount of money spent on paying players, has shown to be significant in all regressions conducted in the study. This high level of significance indicates that the team salary expense might not be exogenous and that bigger and richer teams spend more. However, I believe that salary expense is another measure of team success. The highest-

spending teams are usually those who are successful and have a chance of winning the championship. For example, in 2022 the Bucks and the Jazz were among the best teams in the NBA and in the top 6 spending-wise, whilst the Knicks did not make the playoffs and had the third-cheapest roster in the NBA.

5.1 Further sensitivity analysis

In my study, I conducted an OLS regression analysis without considering seasonal fixed effects or team fixed effects. The baseline model aimed to capture the relationship between the independent variables (GDP, population, championships, and team salary) and the dependent variable (valuation of NBA franchises). However, this approach did not account for potential variations across different seasons or differences between teams that might influence the results.

In this section, I will present a sensitivity analysis. I will compare the results of the baseline model (regression 9) with the ones obtained when including seasonal fixed effects and team fixed effects separately in the regression model. This comparison will help us understand how these additional controls impact the estimation of the model coefficients and the overall model fit. It will provide insights into whether the variation in franchise valuations is driven more by temporal factors or cross-sectional differences between teams.

Table 5 displays the results of the regressions. When controlling for seasonal fixed effects, the coefficients for GDP, championships and team salary remain positive and significant, similar to the baseline model. The coefficients for the population, NFL, and MLB become insignificant. Incorporating seasonal fixed effects keeps the interpretation of the key variables largely unchanged, but alters the significance of some variables.

In model (3), where team fixed effects are introduced, the coefficients of all variables, except team salary, increase substantially. GDP and team salary re-

main positive and significant. The population coefficient and the constant turn negative and insignificant, and championships remain positive. Overall, introducing team fixed effects emphasizes the role of GDP while diminishing the impact of the rest of the variables.

Table 5: Comparison of Regression Results

Variable	(1) Baseline	(2) Seasonal FE	(3) Club FE
ln(GDP)	0.27***	0.221***	1.082***
	(0.043)	(0.079)	(0.114)
ln(Population)	0.068**	0.084	-0.354
	(0.0.030)	(0.062)	(0.354)
Championships	0.031***	0.038***	0.111
	(0.004)	(0.008)	(0.066)
NFL	-0.093**	-0.082	0 (omitted)
	(0.049)	(0.053)	
MLB	-0.136**	-0.038	0 (omitted)
	(0.055)	(0.057)	
Salary	0.006***	0.002**	0.003***
	(0.001)	(0.001)	(0.001)
Constant	2.527***	3.328***	-1.934
	(0.338)	(0.779)	(4.608)
R-squared	0.793	0.897	0.748

Note: *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Standard errors are in parentheses.

The comparison of the regression models shows that GDP has a significant impact on NBA franchise values, consistently demonstrating a strong positive effect across all models. This suggests that franchises located in robust economic

markets are significantly more valuable. Initially, population size has an impact on franchise value, but this effect diminishes when considering team fixed effects, indicating that other team-specific factors are more important than the size of the metropolitan area. Championships and team salary also have a positive influence on franchise value, but their significance decreases when team fixed effects are taken into account, suggesting that these factors may be partly captured by inherent team characteristics. The presence of NFL and MLB teams becomes insignificant or is omitted due to collinearity when considering seasonal and team-fixed effects. The variables were excluded from team fixed effects due to perfect multicollinearity caused by their time-invariant nature. However, they remains in the model with seasonal fixed effects as it varies between teams, which seasonal fixed effects do not consider. Overall, the analysis emphasizes that franchise valuations vary more between teams than over seasons, highlighting the importance of economic conditions and team-specific attributes over time-based factors.

5.2   Comparing results

To evaluate the accuracy of my model, I compared Forbes' valuation of the Brooklyn Nets in 2019, the actual sale price, and the predicted value from my model using regression 9 coefficients. According to my model, the value of the Raptors in 2019 is $2.950 billion. The predicted value from my model is closer to the actual transaction price ($3.3 billion) than the Forbes valuation ($2.35 billion), but still undervalues the actual transaction price by 11%.

6 Conclusion

The objective of this study was to examine the different factors that impact the assessment of NBA teams' value, using Forbes Magazine's valuations from 2019 to 2022. The study used Ordinary Least Squared regression (OLS) analysis to evaluate various factors, including market income, metropolitan population, playoff appearances, championships, team salaries and stars impact. The results highlight the complexity involved in franchise valuation and underscore the significance of several key findings.

Similar to previous literature, the study agrees that the size and population of a market are critical factors in franchise valuation. Teams located in economically vibrant cities with larger populations benefit from broader fan bases, greater media exposure, and more substantial business opportunities. However, when accounting for seasonal and team fixed effects, the population became statistically insignificant, indicating that it may be influenced by specific time periods rather than being a consistent driver of franchise value. Whilst, GDP remained significant and positive.

Historical performance indicators like total championships and all-time winning percentages also contribute positively to team values. The model supports prior research that these factors have a positive impact on team values, with the most influential variable being total championships. The number of playoff appearances in the last 5 years was also taken into account in analyzing the impact of recent success. This variable turned out to be insignificant, suggesting that only success from the previous one or two previous seasons affects team value positively.

Team salary proved to be a significant in all regressions. The evidence suggests that teams with higher spending are typically stronger, and their success on the court boosts the value of the franchise. Furthermore, when accounting for

seasonal and team effects the coefficient was similar across all three models and it remained significant and positive.

The model differs from previous research by taking into account the presence of other major sports teams in the same city. The presence of other major sports franchises had mixed results in the regressions. The NHL was insignificant in all models, likely due to its lower popularity. Similarly, the presence of all four sports in one city was insignificant in all regressions. However, the NFL and MLB were significant and negatively impacted value. The main reasons are that American football and baseball are more popular and share more cities with NBA teams than the NHL. It indicates that in smaller markets there is high competition for local fans, thus having an MLB or NFL team in the same city negatively affects NBA franchises value. When adjusting for seasonal fixed effects, the statistical significance of NFL and MLB diminished, and when considering team fixed effects, they were excluded due to multicollinearity. Contradicting the conclusions of the OLS regressions.

The last variables included in the model attempted to gauge the impact of players on franchise values. The variable MVP, even though it was mostly insignificant, indicated that only exceptionally high-profile superstars can affect a team's market value, whilst just normal stars are unable to, due to the nature of NBA players to constantly change teams.

In conclusion, this study highlights the multifaceted nature of NBA franchise valuation, where the main drivers are total championships, market size and economic conditions, while the presence of other sports teams and superstar impact play a minor role, the identification of these effects primarily stems from cross-sectional variation between teams rather than from temporal (seasonal) variations. The study does have some limitations. The ever-evolving nature of basketball and our world requires broader consideration of various intangible and

tangible assets. For example, this study did not take into account significant factors like TV deals, arena contracts or the number of international players, which can potentially impact franchise values.
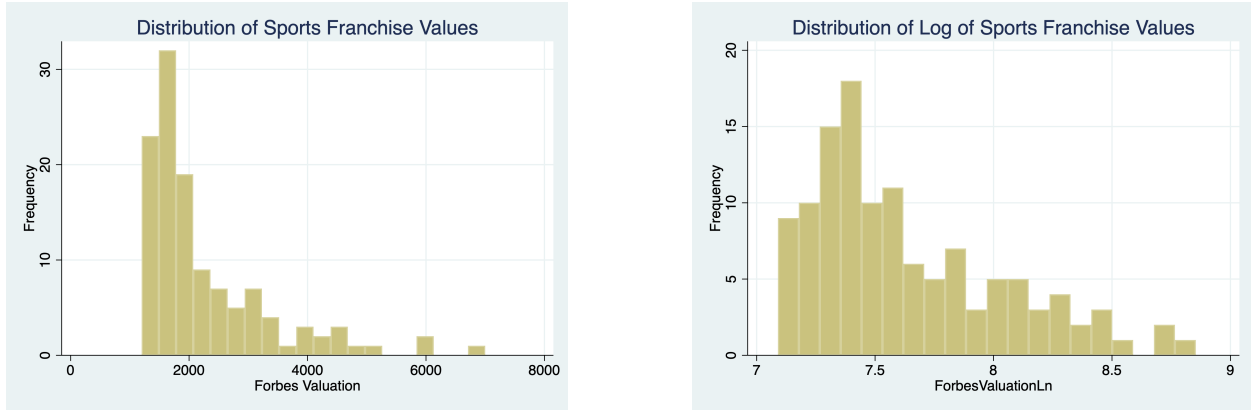
A   Distribution of normal vs logarithmic variables

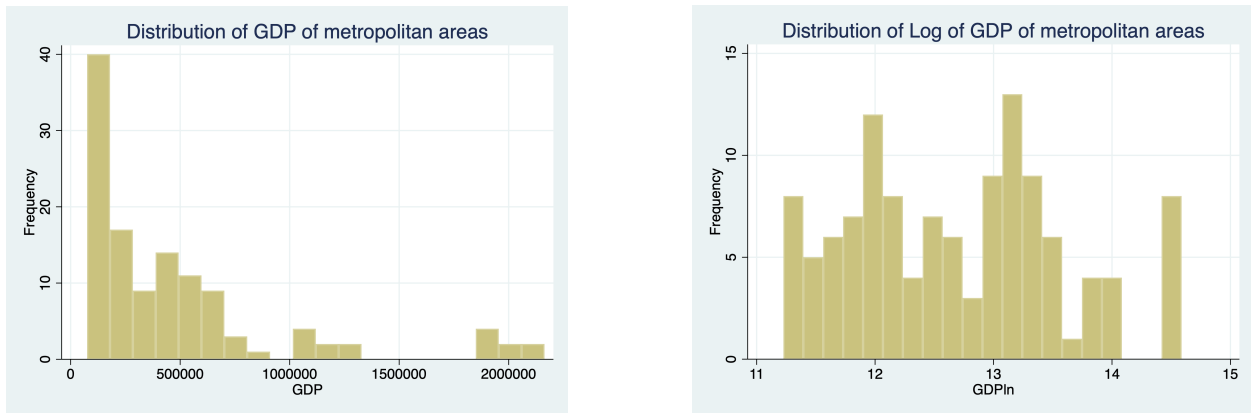

Figure 2: Distribution of Franchise Values of NBA Teams
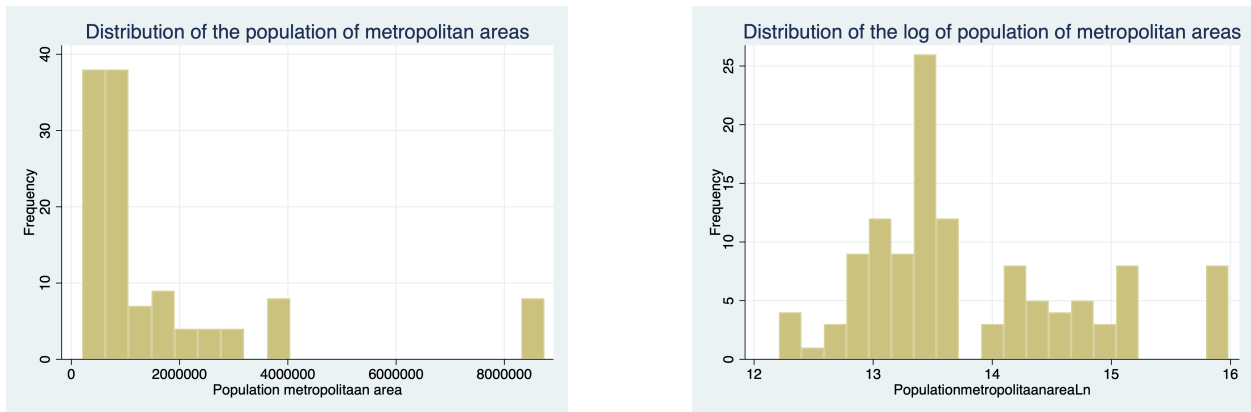

Figure 3: Distribution of GDP of US cities

Figure 4: Distribution of population of metropolitan areas of US cities

B Social Media Following

Table 6: Regression results

Regressions	R-squared	F-Test	C	ln(GDP)	ln(Population)	Champ	NFL	MLB	Salary	Social Media
Regression	0.897	37.12	**2.763**	**0.269**	0.062	0.007	**-0.143**	-0.069	**0.005**	**0.012**
		(0)	(0.538)	(0.063)	(0.044)	(0.008)	(0.073)	(0.089)	(0.002)	(0.003)

In the study I wanted to include the variable social media following. The world has entered the social media era. A strong social media presence increases fan interaction, increases the team's audience, and develops a strong international brand. It would enable NBA teams to establish direct connections with fans outside ofstadiums and games. The increase in exposure social media provides attracts more sponsors who want to use the team's audience for advertising, and the excitement it generates online can increase viewership for games. Fundamentally, a high social media following amplifies an NBA team's marketability, engagement, and revenue potential, all of which have a direct impact on raising the team's overall market value. The variable is the sum of each team's Instagram, Twitter, and Facebook accounts.

To test the impact of social media following on team valuation I added the variable to a regression with all the variables that were proved to be significant in this study. The results are displayed in table 5. The regression has a high R-squared (0.897) and F-test (37.12) value. Additionally, Social media following is significant and positive. However, I was only able to collect data for the year 2022, hence I only had 30 observations, which were not enough. There, is also the possibility that it is not an exogenous variable, and that bigger clubs have more followers because they are bigger. When looking at the value this appears to be true. The most followed teams are the , Lakers (58.5M), Warriors (54M), and Bulls (30.9M). The only outliars are the Cavaliers (27.6M)and the Knicks (11.9M). In the case of the cavaliers, it is likely due to Lebron playing there for the majority of his career, thus a lot of followers of the Cavaliers on social media are fans of Lebron James and not the Cavalaiers.

C Variance inflation factors (VIFs) analysis

To check the issue of multicollinearity I ran a Variance inflation factors analysis (VIFs) to identify the degree of multicollinearity. A VIF of 1 indicates two

Table 7: Variance Inflation Factors (VIF) Results

Variable	VIF
ln(GDP)	5.27
ln(Population)	2.84
MLB	2.42
NFL	1.85
Salary	1.19
Championships	1.14
Mean VIF	**2.45**

variables are not correlated, a VIF between 1 and 5 indicates moderate correlation, a VIF above 5 indicates high correlation, and VIF is higher than 10, there is significant multicollinearity that needs to be corrected. Ln(GDP) has a VIF score of 5.27 which is moderately high, but still acceptable. The rest of the variables have a VIF lower than 3, indicating that multicollinearity is not a significant issue for them.

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