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The Economic Determinants of American Professional Sports Franchise Valuations

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THE IMPACT OF AMERICAN PROFESSIONAL SPORTS

TEAM NAMES ON FRANCHISE VALUES

A Capstone Project Presented in Partial Fulfillment

of Requirements for the Degree Bachelor of Science

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ABSTRACT

This thesis seeks to analyze the impact of regional identities on American professional sports team valuations. Regional identities are classified as any name of a team that is not tied directly to the city that they reside in. For example, the Carolina Panthers have a regional identity because they are not based out of "Carolina", they are based out of Charlotte, North Carolina. Another example would be the Arizona Cardinals, whose name encompasses the whole state of Arizona rather than Phoenix, the city they are based out of. The leagues that will be involved in this study are the National Football League (NFL), Major League Baseball (MLB), National Hockey League (NHL), Major League Soccer (MLS), and National Basketball Association (NBA). In these five leagues, teams that reside outside of the United States will not be included due to insufficient statistics about their localities.

From this study, the goal is to see if the results differ from a similar study previously done with teams in the 1990s from the MLB, NFL, NBA, and NHL. As the MLS continues to add more teams as the years go by, this is a good opportunity to look at how these teams should be named from a valuation perspective. To answer that question, panel data regression will be using statistical software R, with a different regression being done on each of the five leagues.

STATEMENT OF DEDICATION

I dedicate this to my wife, Kirbey, who supports me in all that I do. As well, I dedicate this to my parents, Brian and Kristen, my stepmom, Sara, and my sister, Sydney, who encouraged me throughout this process.

ACKNOWLEDGEMENTS

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CHAPTER ONE: INTRODUCTION

Valuations of professional sports teams have been a topic of interest in the economic world for many years. *Forbes/ Financial World* has been compiling yearly valuations for American professional sports league teams for about 30 years now. Many studies have been done to examine the most influential determinants for these teams, but *Forbes* seems to have the most reputable method in doing so. When comparing these valuations with the effect of regional identities it becomes clear that the impact is not uniform throughout the five leagues. A previous study was conducted by Alexander and Kern (2004) to analyze the impact of regional identities on valuations, which resulted in regional identities only being significant in the MLB. The aforementioned study was conducted using the MLB, NBA, NHL, and NFL. The study was done using data from the 1990s, so it must be updated according to modern day valuations and other data. This paper adds the MLS to the study, while also changing some predictor variables in the process. When effects on valuation are described, the results are not meant to be strictly causal, rather they are meant to be relational.

The results of this thesis pose an interesting comparison to the previous study by Alexander and Kern (2004). This study concluded that regional identities have a significant effect on franchise valuation in the MLB, NBA, NFL, and NHL, while there is no significance of regional identities for franchise valuations in the MLS. This study shows that Alexander and Kern's (2004) results of regional identities being significant in MLB team valuations holds, while proceeding to differ from their results by adding the

NBA, NHL, and NFL the list of leagues in which regional identities are significant to team valuation. To obtain these results, this study utilized the "plm" function in the statistical software R (R Core Team, 2018). This function is utilized for econometric linear models for panel data. When utilizing this function, all currency values, such as team value, operating income, and household median income, were adjusted using the CPI (Consumer Price Index) to 2019 United States Dollars. This adjustment was done to remove the extraneous effect of inflation. The "plm" model for this thesis uses both numerical and categorical predictors in this regression. Each model varies by league both in output and variable input, with some variables excluded from certain leagues based on a lack of available data.

This study aims to address the increasing number of teams being added to the MLS and NHL. These two leagues are the most recent to add expansion teams, with the MLS expanding yet again in the coming years. There have also been rumors that the NFL is looking to add another team for international fans and that the NBA is interested in putting a team back in Seattle. The implications of this study could be helpful for owners and league officials if these moves are made in the coming years. Though the MLS did not show that regional identities were significant in team valuations, the NHL and NFL did garner that regional identity significance. Though the NHL already added the Las Vegas Golden Knights in 2017, a new expansion team has been awarded to Seattle. The nickname of this team has not been announced yet (at the time in which this paper is written), but these results could prove to be viable for use of the Seattle franchise. Though correlation does not imply causation, it could be useful for this new franchise to incorporate the idea of using a regional identity in their name. This notion was already

applied by the Phoenix Coyotes in their 2014 change to the Arizona Coyotes. The co-owner, President, and CEO Anthony LeBlanc said in a 2014 interview about the name change "We also want to be recognized as not just the hockey team for Glendale or Phoenix, but the team for the entire state of Arizona and the Southwest. We hope that the name 'Arizona' will encourage more fans from all over the state, not just the valley, to embrace and support our team." (Staff Writer, Arizona Coyotes, 2014). This is the essence of why regional identities make sense in increasing valuation; they incorporate a larger fanbase for their organization. This should be something that the new franchise in Seattle considers before making a final decision on the name of their expansion team. Going forward, this could allow for more expansion teams to observe these results before making their decisions on their franchise's name, as well.

CHAPTER TWO: LITERATURE REVIEW

Modern research on American professional sports franchise values aims to derive the best model to predict franchise value, holistically. This thesis is closely intertwined with that question, so it is important to analyze the significance of many determinants. A paper by Humphreys and Mondello (2008) analyzed the different determinants for franchise values of North American professional sports leagues from 1969 to 2006. Specifically, they looked at how certain predictors affected the selling prices of franchises. They found that the league type, size of the local market, age of the franchise, number of other professional teams in the market, and the ownership of the facility are all significant in their hedonic price model, while the success of the team and age of the facility are not significant (2008). This opposes one of the findings by Alexander and Kern (2004), in which they concluded that the end-of-season place in a franchise's inner division standings does have an impact on the franchise valuation for each league except the NFL.

Franchise success is often analyzed as a possible determinant for franchise value, though it is calculated differently in each study. Alexander and Kern (2004) used end-of-season inner division place, while Humphreys and Mondello (2008) used an aggregate of team win percentage over the last five years. While Alexander and Kern concluded that success has an impact on the franchise valuation for each league except the NFL, Humphreys and Mondello found that team success does not have an

impact on franchise valuation. A study comparing franchise values of professional sports teams in the United States and Europe by Scelles, Helleu, Durand, and Bonnal (2013) used a sliding scale that ranged from 6 (if the team won the title) to 0, 1, and 2 (different results within the regular season, but still eliminated in the regular season). The previous study included a mix of the results between Alexander and Kern and Humphreys and Mondello, by concluding that team success is significant in franchise valuation for only the MLB and NBA, not for the NFL and NHL. Different methods have resulted in different findings for each way of calculating team success. Franchise success is one of the many non-monetary determinants that effects franchise valuation.

A crucial non-monetary determinant for franchise values is encompassed by the concept of franchises opening new stadiums. One study by Jasina and Rotthoff (2008) aims to look at the impact of professional sports franchises on county employment and wages. Each of the other studies uses city data in their model, while Jasina and Rotthoff try to look at the more specific county level in their analysis. The purpose of this raised specificity in analysis was to more easily see the impact of sports franchises on the local unemployment and wages. When Jasina and Rotthoff analyzed the effect of new stadiums they looked at the effect on local employment and payroll when teams were planning on opening a new stadium in five years. For the five-year analysis, Jasina and Rotthoff found that franchise plans to open a new stadium in five years had no significant effect on local employment and local payroll for any league. In parallel, Alexander and Kern (2004) looked at teams playing in new stadiums in singular years to determine if a new stadium had an impact on valuation, and they concluded that playing in a new stadium was significant for the MLB, NBA, and NHL but not for the NFL.

The non-monetary determinant that is most widely used across these studies is population of the city that contains a specific franchise. Population is one of the most unanimously significant determinants used in these models. Alexander and Kern (2004) concluded that population was significant when determining franchise value for teams in the MLB, NBA, and NHL but was not significant in the NFL. Scelles et al. (2013) used log(population) in their study and concluded that it was significant in determining franchise values for teams in the MLB, NFL, NHL, and NBA. These models agree on most determinants and their significance, but it is worth noting that their models do not match up when examining NFL franchise values. Alexander and Kern used data from 1992-1997, while Scelles et al. used data from 2004-2011. Not only do these two studies contrast when looking at the NFL, but Humphreys and Mondello (2008) concluded that "local market size" has an impact on North American sports franchise valuations. Humphreys and Mondello used data from 1969 to 2006, which nearly encompasses both prior studies mentioned. Though Humphreys and Mondello encompasses more of Alexander and Kern's time period, their work agrees completely with the population determinant significance of Scelles et al., and not entirely with the results from Alexander and Kern.

Each paper mentioned previously seeks to use multiple determinants that incorporate "tangible assets" (Humphreys and Mondello, 2008). These studies are not able to take all factors into account due to their intangible nature. Humphreys and Mondello (2008) argue that "intangible assets, including player contracts, television rights, stadium agreements, and relationships with fans are important factors contributing to the overall financial status of professional sports teams." It is important to note that

these models are imperfect; no model will completely encompass the perfect way to predict professional sports franchise values. The fact that a large portion of what goes into predicting these franchise values is intangible makes the analysis of tangible assets so much more important. That is why Alexander and Kern (2004) study involving the regional identities is so unique. The more relevant determinants that are found when attempting to predict professional sports franchise values, the more accurate the models can become, and as a result, the negative impact of not being able to capture the effect of intangible assets on franchise values can be minimized. The research in this thesis helps provide insight into the question of regional identity significance in American professional sports franchise valuations.

CHAPTER THREE: DATA

The data utilized in this project were collected from sites such as *Forbes* (Forbes

(2005-2020)), Minneapolis Fed (Consumer Price Index, 1913-. (n.d.).), American Fact

Finder (American Community Survey (2005-2017)), and US Census (U.S. Census

(2018)). This data includes the valuations for each franchise by year (*VALUE*), operating

income for each franchise by year (*OPERATING INCOME*), household median income

for each city by year (*HOUSEHOLDMEDIANINCOME*), and population of each city by

year (*POPULATION*). Forbes provided the franchise values and operating income by

year for each league. American Fact Finder and US Census provided the household

median income and population per city for each year. Minneapolis Fed was used to

obtain the data for the CPI adjustments by year (to 2019 U.S. Dollars), specifically, years

2005-2019. These CPI values aid in adjusting *Value*, *Operating Income*, and *Household*

Median Income for inflation.

In this thesis, the three numerical values that necessitate a CPI calculation are

Value, *Operating Income*, and *Household Median Income*. *Value* and *Operating Income*

are both reduced by a factor of $1,000,000 each. In other words, the valuations were large

enough that it was necessary to divide both *Value* and *Operating Income* by $1,000,000

to simplify the data. These alone are not used in any of the models because they have yet

to be adjusted for inflation. The CPI adjustment method used for each year was

$\frac{CPI_{2019} - CPI_i}{CPI_i}$, for some i in years 2005 through 2018. After obtaining this number, one was

added to it, then that sum was multiplied by the desired variable. This produced the

predictors (*CPIAdjusted Value*, *CPI Adjusted Operating Income*, and *CPI Adjusted Household Median Income*) that are utilized in the upcoming models.

The categorical predictors were compiled through a variety of online resources ((Allen, S., 2018), (Anderson, J., 2020), (Basketball Insiders, 2016), (Bohlin, M., 2019), (Hollingdrake, B., 2010), (List of All Stadiums in the United States, 2020), (MLS Cup Playoffs, 2020), (NFL's Most Valuable Teams: How Much Each Team is Worth- 2018 rankings, 2018), (NHL Records, 2020), (Pollakoff, B., 2015), (RealGM, 2020), (Reichard, K., 2017), (AP, 2017)) which varied by league. *NEWTEAM* is simply whether the team is a new franchise or not. For example, the Las Vegas Golden Knights are the newest team in the NHL, joining the league in 2017. This predictor (along with some of the other categorical predictors) is assigned a 1 in the first year, and proceeds to garner a .75 in year two, .5 in year three, .25 in year four, and a 0 the remaining years. This method is called a diminishing marginal effect and is used to represent the impact that a major event has beyond the singular year that it happened. The Las Vegas Knights, therefor, have a 1 for *NEWTEAM* in 2017, and a .75 for *NEWTEAM* in 2018 (2018 is the last year of data obtained). Other categorical predictors that are utilized and employ the diminishing marginal effect method include *NEWFACILITY*, *NEWLOC*, and *CHGID*. *NEWFACILITY* represents the notion that a team has built or is playing in a new stadium. *NEWLOC* pertains to teams that move to a new location but are the same franchise. This has happened recently with the San Diego Chargers becoming the Los Angeles Chargers. *CHGID* represents the changing of a team's name identity. For example, the Seattle Supersonics became the Oklahoma City Thunder in 2008. The last two categorical predictors are *REGID* and *Playoffs*. *REGID* is whether the team garners a regional

identity or not, simply a "1" if so, and a "0" if not. *Playoffs* represent whether or not the

franchise made the playoffs in that given year, a "1" if so, and a "0" if not. These

categorical predictors will be tested for significance in each league in the upcoming

models.

When analyzing the data on a league by league basis, it is worth noting that the

New Orleans Pelicans (NBA) have data for this thesis beginning in 2007. This is because

hurricane Katrina affected the Pelicans' (nicknamed the Hornets at the time) location for

the 2005-2006 and 2006-2007 seasons. The Pelicans jumped around between New

Orleans and Oklahoma City during those years and was even being identified by both

"New Orleans" and "Oklahoma City". That data would be inconsistent with the rest of

the data set and would serve no benefit to the model.

Tables 3.1-3.4 show the distribution of descriptive statistics by league and the

summary statistics for each variable being used in the model by league.

	League				
	NFL	MLB	NHL	NBA	MLS
Regional Identity	6	6	7	5	2
Changed Identity	2	3	1	4	0
New Facility	8	10	6	11	7
New Location	2	1	2	3	0
New Team	0	1	1	1	6

Table 3.1: Descriptive Statistics by League

	League							
	NFL				MLB			
	Mean	SD	Min	Max	Mean	SD	Min	Max
CPI Adj. Value	1742	807.503	850	5,601	982.6	704.1882	273.6	4,684.3
CPI Adj. Operating Income	61.83	58.79	-24.23	435.03	21.24	N/A	-88.8	96.74
CPI Adj. Household Med. Income	53,166	14,006.17	26,283	115,609	53,990	14,327.1	26,283	115,609
Population	1,249,983	1,924,855	103,703	8,475,976	1,589,304	2,075,437	296,020	8,475,976
NEWTEAM	0	0	0	0	.0062	.06776	0	1
NEWFACILITY	.042	.1758	0	1	.05	.1849	0	1
NEWLOC	.0089	.0864	0	1	.0062	.06776	0	1
CHGID	.0089	.0864	0	1	.018	.1164	0	1
REGID	.1875	.3907	0	1	.1897	.3925	0	1
Playoffs	.375	.485	0	1	.305	.4611	0	1

Table 3.2: Summary Statistics for the NFL and MLB

	MLS				NBA			
	League							
	Mean	SD	Min	Max	Mean	SD	Min	Max
CPI Adj. Value	217.6	60.502	113.3	336.1	861.5	691.74	291.7	4073.3
CPI Adj. Operating Income	-.4146	5.303	-15.27	10.79	22.1	33.69	-107.38	157.84
CPI Adj. Household Med. Income	67,603	23,479.22	33,134	134,407	45,595	10,750.33	23,600	85,203
Population	1,438,609	1,837,339	154,157	8,475,976	1,414,736	1,880,611	180,488	8,475,976
NEWTEAM	.1232	.311	0	1	.0037	.0464	0	.75
NEWFACILITY	.1304	.302	0	1	.05	.1867	0	1
NEWLOC	0	0	0	0	.016	.1059	0	1
CHGID	0	0	0	0	.02475	.1342	0	1
REGID	.072	.2611	0	1	.1559	.3632	0	1
Playoffs	.5797	.4972	0	1	.5347	.4994	0	1

Table 3.3: Summary Statistics for the MLS and NBA

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| | League NHL | | | |
	Mean	SD	Min	Max
CPI Adj. Value	395.9	251.93	147.8	1680.2
CPI Adj. Operating Income	5.93	N/A	-28.61	125.25
CPI Adj. Household Med. Income	53,534	14,643.79	26,283	115,107
Population	1,533,396	2,236,590	256,304	8,475,976
NEWTEAM	.0054	.0693	0	1
NEWFACILITY	.0347	.1566	0	1
NEWLOC	.0077	.0758	0	1
CHGID	.0077	.0758	0	1
REGID	.2747	.447	0	1
Playoffs	.5648	.4965	0	1

Table 3.4: Summary Statistics for the NHL

CHAPTER FOUR: MODEL

4.1 Overall Model

When analyzing the panel data in this thesis, a fixed effect panel regression model was utilized. A fixed effect model is used to eliminate the effects of time (*YEAR*) and control for individual objects (*TEAM*). The need to eliminate the effects of time and control for individual objects stems from the objective to determine the overall effect of the predictors on the response variable (Torres-Reyna, 2007). When constructing this model, the basis is represented by the following equation:

$$Y_{it} = X'_{it}\beta + \alpha_i + u_{it}$$

($i = 1, \ldots, n$ and $t = 1, \ldots, T_i$) where n is the number of entities (franchises), T_i is the number of time periods, X_{it} is a k- dimensional vector of the explanatory variables, and β is a k dimensional vector of parameters. The α_i values represent "entity-specific intercepts that capture heterogeneities across entities." (Hanck et al., 2019). As well, the u_{it} values are used to account for random errors in the model.

4.2 Balanced Models

When analyzing balanced models, it is important to note what, in particular, makes the data balanced. For this thesis, a balanced model is represented when $T_i = T$. This means that each entity (franchise) has the same number of data points throughout the league. Contextually, this means that no new teams have been added to the league during

the given years. The exception to this rule is a team that was added the first year that data

collection began for that league because that franchise would have data for each year

examined in this thesis. From Table 3.1, the NFL has zero new teams and the MLB has

one. The MLB is still a balanced panel because the new team (Washington Nationals)

came to Washington from Montreal, Canada in 2005, the first year that the MLB data

was collected. The MLB and the NFL are the only two balanced panel models that this

thesis contains.

4.3 Unbalanced Models

In unbalanced models, not all entities have the same number of years in their

collected data (that is, T_i's are not all the same). In other words, some franchises have

data for each year in this thesis, while other franchises are missing data from certain

years. This means that a new team was added to a certain league at some point over the

time span of data collected for that league. In this thesis, the MLS, NBA, and NHL each

contain unbalanced panels. New franchises have been prevalent in the MLS from 2015-

2018, which is why they are the only league in this thesis that has more than one new

team over their data's time span. In some cases with unbalanced panel data, attrition the

notion that some data that was present in the dataset at the start suddenly is no longer

available can be an issue. It is important to note that the unbalanced panels in this thesis

do not harm the model because no attrition is present.

4.4 The "plm" Model & Heteroscedasticity

When using this model for each league, the function "plm" in the program "R" was employed ((PLM- Stack Overflow, 2016), (Package 'sandwich', 2019), (Package 'plm', 2020)). This "plm" function allows for the elimination of time effects and control for individual objects using the "within" option. Once each league has a "plm" model in place, the next step is to test for heteroscedasticity. Heteroscedasticity is the notion that the errors given in the model's output have a non-constant variance. The goal for each model is to avoid heteroscedasticity in favor of homoscedasticity (constant variance of the error terms in the model). The method used in this thesis to test for heteroscedasticity is called the Breush-Pagan Test (Prabhakaran, 2016). This test is conducted by looking at the p-value for each league's "plm" model when utilizing the "lmtest::bptest(x)" function (where "x" is the "plm" model of interest), and comparing that with α (.05 in this case). If the p-value is less than α, the null hypothesis that the variance of the error terms is constant would be rejected. If the p-value is greater than α, the null hypothesis that the constant variance of the error terms is present would not be rejected. That is, if the p-value is less than α then there is significant evidence to conclude that heteroscedasticity could be an issue, and it must be addressed in the model(s). This thesis discovered that heteroscedasticity was present in the models for the MLB, NBA, NFL, and NHL. Each of these models will utilize homoscedastic robust standard errors to address the issue of heteroscedasticity. On the other hand, the MLS model does not need to account for heteroscedasticity in its original "plm" model. The results from this thesis's Breusch- Pagan Test for each "plm" model are shown in Table 4.1.

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	MLB	MLS	NBA	NFL	NHL
p-value	$5.883e^{-15}$	.5334	$2.491e^{-15}$	$2.44e^{-9}$	$1.586e^{-14}$

Table 4.1: Breusch- Pagan Test Results

After obtaining these p-values for each league, the "plm" models for four of the leagues must be treated for heteroscedasticity. To do this, the function "coeftest" containing "vcov." and "vcovHC" is used (Landroni, 2014). After accounting for heteroscedasticity, the models are completed and ready to be analyzed. The final results for each league are displayed in the next chapter of this thesis.

CHAPTER FIVE: RESULTS AND ANALYSIS

5.1 Holistic Results

 After each of the five models have been run, it is important to view the results all together to get an initial understanding of the data. This data is presented in Table 5.1. Note that blanks present in the table are due to the lack of that variable in the associated league's model.

	League				
Variable	MLB	MLS	NBA	NFL	NHL
CPI Adj. Operating Income		5.3667(.969)***	8.0431(1.4904)***	6.909(.704)***	
CPI Adj. Household Med. Income	.00744 (.00153)***	$7.96e^5(1.99e^{-4})$	.00355(.00105)***	.0068(.0068)***	$-5.6e^{-4}(2.1e^{-4})$**
Population	$.00014(1.28e^{-5})$***	$.00001(2.9e^{-6})$***	$8.65e^{-5}(1.8e^{-5})$***	$3.6e^{-5}(6.7e^{-6})$***	$3.6e^{-5}(5.4e^{-6})$***
NEWTEAM	467.44(152.2)**	52.19(19.35)**	-481.68(152.93)**		-6.96(57.62)
NEWFACILITY	-9.875(60.316)	17.336(18.197)	50.98(100.87)	-40.58(37.65)	-50.07(92.178)
NEWLOC			297.7(157.35).	472.2(94.055)***	
CHGID	-343.1(160.14)*		-333.85(113.03)*		-244.4(53.8)***
REGID	-153.42(35.38)***	-29.75(19.09)	37.087(18.26)*	-81.5(25.7)**	-77.46(25,69)**
Playoffs	229.38(50.37)***	14.055(9.23)	10.79(30.41)	41.51(15.86)**	68.64(25.94)**
Adj. R-Squared	.45486	.51478	.55732	.6658	.2269

Note: The MLB, NBA, NFL, and NHL were all adjusted to combat heteroscedasticity. Standard error is noted in parentheses.

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 5.1: plm Model Results

When analyzing the results in totality of this thesis, the first thing to consider is whether regional identities are significant for each league. After adjusting the models for heteroscedasticity issues, this thesis found that regional identities were significant in predicting franchise value for teams in the MLB, NBA, NFL, and NHL. These results are particularly intriguing due to the stark contrast to the results of Alexander and Kern (2004), in which they concluded that the MLB was the only league that garnered regional identity significance when determining franchise value. As Table 5.1 shows, *REGID* proved to be a significant predictor for franchise value in the MLB, NBA, NFL, and NHL, but not in the MLS.

5.2 Major League Baseball (MLB)

To analyze the predictors of franchise value in the MLB's model, it is pertinent to observe both the significant and insignificant variables. This model acknowledges the effect of *REGID* on MLB franchise valuation, though it signifies a negative coefficient. This means that, according to this thesis's model, the presence of a regional identity for a franchise in the MLB could lead to a decrease in value of that franchise. As for the other predictors in the model, *NEWTEAM*, *CHGID*, and *PLAYOFFS* were all determined to be significant in predicting franchise value in the MLB. When new teams arrive in the MLB it seems to have a positive impact on team valuation. As teams change their identity in the MLB, this model shows that this name change can negatively impact the franchise's value. It also appears that MLB team success, according to this model, has a positive effect on the valuation of franchises. This is particularly interesting in the case of the Chicago Cubs who are in the top five in 2020 MLB franchise valuation (Forbes, 2005-

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2020), yet have only won one World Series in the last century. This predictor can be misleading for a team like the Cubs, whose success seems to impact valuation less than other franchises.

5.3 Major League Soccer (MLS)

Professional soccer is quickly growing in popularity within the United Sates. A league that had just 10 franchises nearly three decades ago has blossomed into a robust collection of 24 teams (as of 2019). The stadiums have begun to fill with more fans each year as the best players in the world make the move to end their careers in the United States. Though popularity of the sport is growing here in the United States, this thesis has found that very few organizational factors play a role in explaining franchise valuation. *REGID* cannot assist to explain franchise valuation for this league, a notion that disagrees with the other four leagues tested. This may be due to a lack of regional identities within the league itself. The league boasts a lowly approximately seven percent for the number of teams garnering a regional identity. This seven percent is less than half of the second lowest league, the NBA, when it comes to the number of teams employing a regional identity. Based on this model, it is reasonable to say the regional identities have no effect on franchise valuations in the MLS, but this notion could be further tested if any of the expansion teams set to join the league in the upcoming years choose to utilize a regional identity in their name.

Along with the lack of significance for *REGID*, the model for the MLS revealed very few predictors that are significant in predicting franchise value. The insignificant variables besides *REGID* include *CPI Adj. Household Median Income*, *NEWFACILITY*,

and *Playoffs*. Given that *NEWFACILITY* is not significant in any of the leagues tested, the insignificance of this variable is not surprising. However, *CPI Adj. Household Median Income* was a unanimously significant variable in the other leagues so it is surprising that it would not be significant for the MLS. As for the *Playoffs* variable not being significant in this model, there could be a relevant explanation. The MLS features well over half of the league's teams in its playoff bracket, more than any other league being studied. Given that teams in the MLS are much more likely to make the playoffs than to be excluded, the notion of making the playoffs loses its appeal compared to the other leagues. The franchise values in the MLS are positively associated with one significant variable in this model- *NEWTEAM*. With how fast the MLS is expanding, new teams are expected to continue joining the league throughout the next six years. The large expansion of the MLS within the timeframe of this study-especially when compared with the expansion throughout the other leagues tested- makes for a unique set of significant predictor variables. As the league begins to steady, in the long run these predictors will be able to be tested to see if these results still hold.

5.4 National Basketball Association (NBA)

The NBA model that this thesis presents displays a unique combination of significant predictor variables. *REGID* is significant in predicting franchise values in the NBA according to this thesis. In fact, this study concluded that the NBA is the only league in which regional identities help to increase the value of its teams. The NBA has five teams that employ a regional identity, the most notable is surely the Golden State Warriors. This team alone has quickly increased in value with the more on-court success

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they have experienced in the past decade. This is especially interesting because the variable *Playoffs* is not significant in predicting franchise value for the NBA. The NBA has fluctuated in many categories over the course of the data collected for this study. Out of the five leagues of interest, the NBA has the largest amount of new facilities, the most teams changing identity, and the most teams relocating. That being said, the impact of those can be assessed by using the significant predictors *NEWTEAM*, *NEWLOC*, and *CHGID*. This model describes the notion that both new NBA franchises and franchises that change their name tend to see a decrease in valuation from these actions. In opposition, teams that simply change location are shown to see a positive impact on valuation from this change. Though the NBA is home to by far the most new facilities out of the five leagues tested, this thesis concluded that *NEWFACILITY* was not significant in predicting franchise value. Though teams may look to new stadiums as a method to increase their franchise valuation, as the Golden State Warriors did this season, this study suggests that this transition will not increase valuation.

5.5 National Football League (NFL)

The most valuable sports franchise in the world is an entity of the NFL, that being the Dallas Cowboys. Not only does the NFL have the highest valued franchise in the world, it also nearly doubles the other leagues analyzed in this thesis on the basis of CPI adjusted franchise value. In our model for the NFL, each predictor that was able to be tested, except *NEWFACILITY*, was determined to be significant. *REGID* was determined to be significant in the prediction of NFL franchise value, though it seems to decrease the value if a regional identity is present. According to this study, as NFL teams change

location their franchise value increases. The only two teams that changed location were the San Diego Chargers (2016) and the St. Louis Rams (2017), both of which moved to Los Angeles. It will be interesting to test whether that significance will hold as the teams remain in Los Angeles for a number of years. As for the *Playoffs* variable, its significance in predicting franchise value for teams in the NFL shows that the more successful NFL teams are on the field, the more their franchise value should increase.

5.6 National Hockey League (NHL)

The NHL is an interesting league to study in particular due to its high number of teams that utilize regional identities. Nearly 30% of the teams, the highest percentage out of any of the five leagues being analyzed, from the NHL garner a regional identity. The fact that so many teams utilize a regional identity in the NHL makes the finding that *REGID* is significant in decreasing franchise valuation all the more interesting. The reasons behind why a franchise would use a regional identity are not completely known, but their prevalence in the NHL cannot be ignored. Not only was *REGID* significant for predicting NHL franchise values, but *CHGID* and *Playoffs* were significant as well. This thesis finds that teams that change their identity see decrease in their franchise value, while successful, playoff bound teams see an increase in valuation. For the leagues in which *Playoffs* is significant, winning seems to help increase franchise valuation, a notion supported by multiple other studies cited earlier in this thesis. The only new team during the data collection years of this study was the Las Vegas Golden Knights in 2017. *NEWTEAM* is not significant for predicting franchise valuations in the NHL at this moment in time, but after the team has been in place for a longer period of time it would

be interesting to rerun the model (with new data) to see if that variable may have become

significant.

CHAPTER SIX: DISCUSSION

This thesis has given insight into the concept of regional identity significance, but extra analysis on where the regional identities derive their value persists. As referenced previously, the owner of the Arizona Coyotes believes that regional identities seek to incorporate more fans into the franchise's fanbase. This may be the case for the Coyotes, but teams in the MLB, NFL, and NHL seem to be affected in a negative way by their regional identities. Each of these leagues show that regional identities are significant in predicting franchise value, but the significance is marred by a negative coefficient. While not negative in the aspect of this study, regional identities in these three leagues have the possibility to hurt a team's valuation. This notion is not obvious to the public or else the number of teams that garner regional identities may begin to dwindle if the owners saw fit to make that change. In the case of the MLB and the NHL, changes in the identification of franchises also has the potential to lower franchise valuation, so the name change process could be a double-edged sword. We must note that correlation does not imply causation, so not all regional identities in these leagues are guaranteed to lower a franchise's value.

Throughout each of the five leagues studied in this thesis, there are multiple cities that house more than one professional sports team. The one city that must be analyzed is Phoenix, Arizona. Phoenix is considered home for the Arizona Diamondbacks (MLB), Phoenix Suns (NBA), Arizona Cardinals (NFL), and Arizona Coyotes (NHL). This city contains three teams with regional identities, a number higher than nearly every other city

in the United States. The first thing to look at when understanding why this has happened must be the proximity to other major league markets. Phoenix is significantly far away from any market on its east side, but when traveling west, multiple markets such as San Diego, Los Angeles, and Las Vegas emerge with competing professional sports franchises. Initially, it seems that Phoenix would attempt to gather a larger fan base from the surrounding area, but their attempt in the United States seems to be mitigated by the other teams in proximity. However, this is not the case for Mexico, a country with zero professional sports teams out of the five leagues considered in this thesis. Phoenix is the city closest to Mexico that consists of multiple major professional sports teams. This could draw high interest from a nation that is the constant subject of possible expansion locations. The NBA has discussed a possible expansion franchise in Mexico City, and the NFL typically plays at least one game there each year. Sports enthusiasts in Mexico may be intrigued by the nearby sports market in Phoenix, Arizona. It will be interesting to see if there is an expansion of any league into Mexico, and if so, how they would name the franchise.

Taking a step back from Phoenix and its cluster of regional identities presents the conundrum of other cities with multiple teams marked by regional identities. Tampa, Florida contains the Tampa Bay Rays (MLB), Tampa Bay Buccaneers (NFL), and the Tampa Bay Lightning (NHL). The reason for this regional identity cluster seems to be much easier to identify. It seems that teams seek to associate with the coastal part of Tampa rather than the inland portion. Tampa is known to be a popular city for tourists, with the bay area being the most heavily visited part of the city. It would make sense to associate franchises with the most popular part of the city, similar to the Golden State

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Warriors and their association to the state nickname along with the famous Bay bridge. Not to say that these associations are the primary reason for the regional identities, but it is interesting to look at the correlation between teams that utilize regional identities, and their surrounding physical characteristics.

A common phrase uttered by the great Vince Lombardi, an all-time great NFL head coach, is "Winning isn't everything, it's the only thing." In this case, franchises that make the playoffs in the MLB, NFL, and NHL can certainly make a case for that statement when it comes to team valuations. Each of these leagues in which *PLAYOFFS* is significant carries a positive coefficient for the predictor, therefore increasing franchise valuation in this model. Franchises like the New York Yankees (MLB), Dallas Cowboys (NFL), and New York Rangers (NHL) are each among the highest valued teams in their respective sports and have high historical win percentages. The positive correlation in these models between competitiveness within sports and franchise valuations truly gives monetary value to Lombardi's phrase "Winning isn't everything, it's the only thing."

Regional identities embody the main focus of this thesis, but the results of multiple other categorical predictors cannot be ignored. The fact that the variable *NEWFACILITY* is not significant for any of the five leagues is quite shocking. Recall that *NEWFACILITY* represents the franchises that begin playing in a new stadium. In reality, an increase in franchise value would be expected given the construction of a new stadium. For the predictor *CHGID*, each league in which the variable was able to be tested labeled it as significant. The coefficient for this predictor was negative for each league, as mentioned earlier. This does make some sense, logistically. If a team is in a "downward spiral" as an organization, simply a new change would not be a guarantee to

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begin a new era of success. Other than the possibility of merchandise revenue increasing there does not seem to be a fiscal advantage to rename a franchise.

Overall, the work in this thesis attempts to explain and add to the research conducted on regional identities in each of the five major league sports for franchises in the United States. This study concluded that regional identities are significant in predicting franchise valuations in the MLB, NBA, NFL, and NHL, but not in the MLS. By proxy, this study analyzed other categorical predictors that are more common to franchise valuations in the economic world. This thesis gives a new baseline when analyzing regional identities in relation to franchise valuations. The hope for this work is that it can be considered when evaluating franchises in each of the five major leagues of the United States. This thesis should not only add to economic modeling research, but also inform league officials and team owners about how franchise values can be affected by certain organizational decisions and attributes.

REFERENCES

Allen, S. (2018, March 28). The origins of all 30 MLB team names. Retrieved from

    https://www.mentalfloss.com/article/24358/whats-nickname-origins-all-30-mlb-

    team-names

Alexander, D. L., & Kern, W. (2004). The economic determinants of professional sports

    franchise values. *Journal of Sports Economics*, *5*(1), 51-66. Retrieved from

    10.1177/1527002503251715

American Community Survey (2005-2017). Population and household median income

    data. Retrieved from AmericanFactFinder.org

Anderson, J. (2020, January 28). Here's how rich every NFL team is. Retrieved from

    https://finance.yahoo.com/news/rich-every-nfl-team-090000298.html

AP (2017, January 27). List of major sports league's franchise relocations. Retrieved from

    https://www.usatoday.com/story/sports/nfl/2017/01/27/list-of-major-sports-

    leagues-franchise-relocations/97125258/

Basketball Insiders. (2016, January 20). Forbes: Knicks most valuable NBA franchise.

    Retrieved from http://www.basketballinsiders.com/forbes-knicks-most-valuable-

    nba-franchise/

Bohlin, M. (2019, February 14). NBA team values 2019: Forbes ranks every NBA

    franchise's worth. Retrieved from https://247sports.com/nba/los-angeles-

    lakers/ContentGallery/NBA-team-values-2019-Forbes-ranks-every-NBA-

    franchises-worth-129112850/#129112850_1

Consumer Price Index, 1913-. (n.d.). Retrieved from

    https://www.minneapolisfed.org/about-us/monetary-policy/inflation-

    calculator/consumer-price-index-1913-

Forbes (2005-2020). Professional sports team valuations. Retrieved from

    Forbes.com

Hanck, C., Arnold, M., Gerber, A., & Schmelzer, M. (2019). *Introduction to*

    econometrics with R. Retrieved from https://www.econometrics-with-r.org/10-3-

    fixed-effects-regression.html

Hollingdrake, B. (2010, September 2). NHL teams list. Retrieved from

    https://thehockeywriters.com/nhl-teams-list/

Humphreys, B. R., & Modello, M. (2008.) Determinants of franchise values in North

    American professional sports leagues: Evidence from a hedonic price model.

    International Journal of Sport Finance, *3*(2), 98-105. Retrieved from

    http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.585.3099&rep=rep1&t

    ype=pdf

Jasina, J., & Rotthoff, K. (2008). The impact of a professional sports franchise on county

    employment and wages. *International Journal of Sport Finance*, *3*(4), 210-227.

    Retrieved from

    https://pdfs.semanticscholar.org/a2ee/d4de6f53d9c06eed9fe93fd44f18696a8ac1.p

    df

List of All Stadiums in the United States. (2020, May 13). Retrieved from

    http://www.worldstadiums.com/

MLS Cup Playoffs. (2020, May 13). Retrieved from

     https://www.mlssoccer.com/history/mls-cup

NFL's Most Valuable Teams: How Much Each Team is Worth- 2018 rankings. (2018).

     Retrieved from https://www.azcentral.com/story/sports/nfl/2018/09/20/most-

     valuable-nfl-teams-forbes-2018-rankings-cowboys-patriots-giants-rams-

     redskins/1370429002/

NHL Records. (2020). *Year-by-year record* [data file]. Retrieved from

     https://records.nhl.com/franchises

Package 'plm'. (2020, February 25). Linear models for panel data. Retrieved from

     https://cran.r-project.org/web/packages/plm/plm.pdf

Package 'sandwich'. (2019, April 7). Robust covariance matrix estimators. Retrieved

     from https://cran.r-project.org/web/packages/sandwich/sandwich.pdf

Pollakoff, B. (2015, January 21). Forbes releases 2015 NBA franchise valuations, Lakers

     at $2.6 billion top the list. Retrieved from

     https://nba.nbcsports.com/2015/01/21/forbes-releases-2015-nba-franchise-

     valuations-lakers-at-2-6-billion-top-the-list/

Prabhakaran, S. (2016, January 13). How to detect heteroscedasticity and rectify it? [web

     log comment]. Retrieved from https://www.r-bloggers.com/how-to-detect-

     heteroscedasticity-and-rectify-it/

R Core Team (2018). R: A language and environment for statistical

     computing. R Foundation for Statistical Computing, Vienna, Austria.

     URL https://www.R-project.org/.

RealGM. (2020). Retrieved from https://basketball.realgm.com/

Reichard, K. (2017, September 15). NFL stadiums, listed oldest to newest. Retrieved

    from https://footballstadiumdigest.com/2017/09/nfl-stadiums-listed-oldest-to-

    newest/

Scelles, N., Helleu, B., Durand, C., & Bonnal, L. (2013). Determinants of professional

    sports and firm values in the United States and Europe: A comparison between

    sports over the period 2004-2011. *International Journal of Sport Finance*, *8*(4),

    280-293. Retrieved from 10.1177/1527002514538976

Stack Overflow (2016, August 7). Heteroscedasticity robust standard errors with the

    PLM package [web log comment]. Retrieved from

    https://stackoverflow.com/questions/4433490/heteroscedasticity-robust-standard-

    errors-with-the-plm-package

Staff Writer, Arizona Coyotes (2014, January 29). Coyotes announce team name will

    change to Arizona Coyotes beginning in 2014-2015. Retrieved from

    https://www.nhl.com/coyotes/news/coyotes-announce-team-name-will-change-to-

    arizona-coyotes-beginning-in-2014-15/c-702881

Torres-Reyna, O. (2007). *Panel data analysis fixed and random effects using Stata*

    [PowerPoint slides]. Retrieved from

    https://www.princeton.edu/~otorres/Panel101.pdf

U.S. Census (2018). Population and household median income data. Retrieved from

    data.census.gov