

A Data-Driven Approach to Evaluate the Worthiness of Markets for Professional Sports Franchises

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Abstract

In this work we examine the characteristics of markets currently with professional sports franchises as well as potential markets for franchises from a number of data-driven perspectives. We consider sports franchises from the five major professional sports leagues in the United States and Canada: Major League Baseball (MLB), Major League Soccer (MLS), the National Basketball Association (NBA), the National Football League (NFL) and the National Hockey League (NHL). We study 85 markets within the U.S. (42 currently with at least one professional franchise) and seven markets within Canada (all with at least one professional franchise).

The guiding perspective of our work is to determine if markets with franchises are worthy of those franchises relative to potential markets that may be more worthy for franchise relocation or expansion. From this perspective, we both introduce a number of new approaches for analysis as well as obtain many interesting results. Our work makes a number of contributions:

1. We are able to determine which combination of professional sports franchises are more likely to be paired or not paired together within a market.
2. We build on the idea that franchises in different professional leagues vary in their stature to both define the concept of franchise stature and compare the total stature of markets with their size.
3. We identify that nearby markets within a state may be considered as a regional market and make use of these state regional sports markets in our analyses.
4. We observe that in addition to market size, the inherent interest in a sport may be important for attracting a franchise to a market. We define a means to measure this inherent interest using the source of players within each league.
5. We develop an approach based on market size and sport interest to determine if one market is more worthy for a professional sports franchise than another. We use this approach to determine the current markets that are least worthy of their franchise and the potential markets that are most worthy of a franchise in each professional sport.
6. We make use of this common methodology to compare the most and least worthy markets for franchises across all professional sports.

Taken together, the results of our study help explain why it makes more sense that smaller markets such as Green Bay, Buffalo and New Orleans have NFL franchises. The results show that Las Vegas, Nashville and Salt Lake City are among the least worthy markets in more than one professional sports league. Finally, the results identify potential markets that are the most worthy for new franchises such as Orlando and the San Antonio/Austin region for the NFL as well as Houston for the NHL.

1 Introduction

In this work we examine the characteristics of markets currently with professional sports franchises as well as potential markets for franchises from a number of data-driven perspectives. We consider sports franchises from the five major professional sports leagues in the United States and Canada: Major League Baseball (MLB), Major League Soccer (MLS), the National Basketball Association (NBA), the National Football League (NFL) and the National Hockey League (NHL). We consider the number and location of franchises in these leagues as of Spring 2021 thus we do include the new Austin franchise of the MLS in our study, but do not include the upcoming Seattle franchise of the NHL [8] or future franchises (Charlotte, St. Louis, Sacramento) announced by MLS [16].

The guiding perspective of our work is to determine if markets with franchises are worthy of those franchises relative to potential markets that may be more worthy. These potential markets are of interest for franchise relocation or expansion. With this perspective, there are many issues to explore including how to define a market, determine its size and understand market support for franchises that do not all have the same stature. In addition to market size, an important issue to explore is the extent to which inherent interest in a sport contributes to the location of a franchise in that market.

Our work is important because it takes both a data-driven and comprehensive approach to evaluating the worthiness of markets for professional sports franchises. In particular, we

- examine franchises in five professional sports league,
- explore more than one definition of a market,
- consider four metrics for the size of a market,
- propose and employ a new approach to measure the interest for a sports league based on the origin of players in the league,
- analyze the franchises in a sports market from multiple perspectives, and
- apply these analyses to both U.S. and Canadian markets.

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2. We build on the idea that franchises in different professional leagues vary in their stature to both define the concept of franchise stature and compare the total stature of markets with their size.
3. We identify that nearby markets within a state may be considered as a regional market and make use of these state regional sports markets in our analyses.
4. We observe that in addition to market size, the inherent interest in a sport may be important for attracting a franchise to a market. We define a means to measure this inherent interest using the source of players within each league.

5. We develop an approach based on market size and sport interest to determine if one market is more worthy for a professional sports franchise than another. We use this approach to determine the current markets that are least worthy of their franchise and the potential markets that are most worthy of a franchise in each professional sport.
6. We make use of this common methodology to compare the most and least worthy markets for franchises across all professional sports.

In the remainder of this paper we enumerate the three research questions we explore in Section 2. We describe the data-driven methodology we employ in Section 3. Sections 4- 6 show results from our analysis for each of the three research questions. We conclude with a summary of our work and suggest future work in Section 7.

2 Research Questions

The motivation for our work leads to three primary research questions we seek to answer. In the following, we pose each of these questions as well as examine relevant prior work that has been done on each.

2.1 Relationship of Sports Franchises Within a Market

Our first research question asks whether there are sports franchise combinations that are more common or less common within the same market. This idea of exploring the relationships between franchises in market was motivated by a model for predicting National Football League sites for expansion, which considered many factors [4]. One of those factors was the number of other professional sports team in the same market because “the other sports could be considered substitute goods, or, on the other hand, a measure of fan interest for sports in general (a complement good).”

While this factor was not found to be the most important for that work, it does suggest a broader question to explore in understanding the relationship between sports franchises in a market. We seek to explore these potential relationships more fully by comparing the extent of overlaps found between franchises of different sports leagues within the same market.

2.2 Number and Stature of Professional Franchises within a Market

Our second research questions seeks to explore if the number and stature of franchises in a market is appropriate for the size of the market. Previous studies have compared the number of professional sports franchises with the size of the market [11, 28]. These studies determine a best fit regression between these two values for each market to determine which markets have a surplus or deficit of franchises relative to what is projected based on market size.

While straightforward to do, this approach of counting franchises is problematic as a decision must be made on which leagues to consider. For example [28] does not include Major League Soccer, which is a reflection that the stature of franchises in this league is not as much as for other leagues. There are similar discrepancies for the value of franchises between other sports leagues. For example, the average value of an NFL team is more than four times that of an NHL team [1] indicating there is much more stature for a market to host an NFL team than an NHL team. These

discrepancies lead us to seek a definition for “franchise stature,” which can be used to compare the total stature of franchises in a market with its size.

2.3 Worthiness of Current and Potential Markets to Support Professional Sports Franchises

Our third, and primary, research question seeks to identify the least worthy markets currently with a franchise for a particular sports league and the most worthy markets currently without a franchise in that same sport. This question not only requires work on market determination and appropriate size metrics to use, but also to understand the inherent interest for the sport within the market.

Determining this local interest for a sport is not easy to do. NFL interest was determined using “Monday Night Football” Nielsen ratings in [4], but this factor was not found to be significant and this approach does not generalize to other sports. Another piece of prior work we were involved with sought to use high school sport participation in the U.S. as a measure of interest for the sport [7], but the data were incomplete, not recent and only applied to the U.S. Reports appear periodically on the best cities for sports, such as [15, 24, 27]. These reports are interesting, but often focus on the success of the local sports teams and do not provide objective measures for fan interest in a sport. We seek an approach to gauge market interest in a sport that is objective as well as provides insight for both current and potential markets.

3 Methodology

The methodology we employ to answer these questions includes much gathered data and analyses with these data. Details on the collection the data and how they are used is described in the following.

3.1 Market Determination

Not all sports franchises have a home venue in the geographic boundaries of a major city nor are all of the fans of these franchises in the cities themselves. Thus a common approach for defining the market of a franchise is to use Metropolitan Statistical Areas (MSAs) as defined by the Office of Management and Budget (OMB) for U.S. Bureau Census data [21]. MSAs not only define the geographic boundaries of a metropolitan area, but a wealth of statistical data is also available for them. As of March 2020, there are 394 MSAs defined. Extending this concept, the OMB also defines Combined Statistical Areas (CSAs), which are further aggregations of metropolitan and micropolitan statistical areas [20]. As of March 2020, there are 172 CSAs in the U.S.

While prior work has often used MSAs to define a sports market, in this work we define markets based on the CSAs as the concept of a fan base is a better match for this broader definition. In addition, we incorporate the 210 Designated Media Areas (DMAs) as defined by Nielsen based on the number of TV homes [19]. The scopes of these DMAs are largely aligned with CSAs, but provide another perspective on the definition of a franchise market. One discrepancy between these two market definitions is where Washington D.C. and Baltimore are in the same CSA, but different DMAs. They are treated as a single market in our work with their respective DMA sizes combined.

For our study set of markets we included all in the top 75 of either DMA or CSA (based on population) markets, which ensures Green Bay is included as the lowest ranked media market (67th) currently with a professional sports franchise. The result is a total of 85 U.S. markets considered in our work. 42 of these markets currently have at least one professional sports franchise. A list of these markets and the current number of sports franchises for each is shown in Appendix A. A list of the remaining U.S. markets considered without a current franchise are shown in Appendix B. A map showing the location and size of all 85 markets is also available [30].

In our work we also consider the seven Canadian markets already with professional sports franchises. Comparable Canadian DMAs from Nielsen are not available, but we use Canadian definitions and data for Census Metropolitan Areas [6] for these markets. These markets are also shown in Appendix A and mapped in [30].

3.2 Market Size

Previous studies of professional sports markets [4, 7, 11, 28, 23] have employed a variety of metrics to characterize the size of a current and potential sports franchise market. These include MSA population, per-capita income, media market size, population growth and the number of Fortune 500 companies.

In this work, we consider four metrics to characterize the size of markets size: 1) CSA population size (2019 estimate) [20]; 2) Nielsen 2020 DMA Rankings based on number of TV homes [19]; 3) MSA median household income (2019) [5]; and 4) number of Fortune 500 with headquarters in the market in 2020 [10].

The top-10 markets for each of these size metrics are shown in Table 1. The table in Appendix A shows the values of these metrics for all markets with at least one current professional sports franchise. The table in Appendix B shows the values for all other considered potential U.S. markets. Appendix A also shows 2016 population data [6] for the seven Canadian markets with a franchise.

Table 1: Top-10 Markets for Each Size Metric

Rnk	Market Size Metric							
	Population		Media		Median Income		Fortune 500	
	Market	(M)	Market	(M)	Market	(\$K)	Market	Cnt
1	New York	22.59	New York	6.82	SF-Oak-SJ	104.9	New York	75
2	Los Angeles	18.71	Los Angeles	5.15	Boston	81.5	SF-Oak-SJ	38
3	Chicago	9.83	WashDC-Balt	3.39	New York	79.8	Chicago	35
4	WashDC-Balt	9.81	Chicago	3.26	Seattle	78.1	Dallas	24
5	SF-Oak-SJ	9.67	Boston	2.85	WashDC-Balt	74.4	Houston	22
6	Boston	8.29	Philadelphia	2.76	Denver	67.2	Boston	20
7	Dallas	8.06	Dallas	2.56	Los Angeles	66.7	WashDC-Balt	17
8	Houston	7.25	Miami	2.47	Philadelphia	66.6	Atlanta	16
9	Philadelphia	7.21	SF-Oak-SJ	2.36	Hartford	65.1	Minneapolis	15
10	Miami	6.89	Houston	2.33	Minneapolis	64.3	Philadelphia	13

3.3 Market Franchise Stature

Another measure of a market size is the stature of professional sports franchises that it supports. Prior work has examined the number of professional franchises supported in a market [11, 28], but these works have not considered that the stature of having a franchise in one sport is not necessarily the same as having one in another sport. As a means to more accurately account for this variation, we use prior work that estimates the average value of a franchise in MLB, the NBA, the NFL and the NHL [1]. In addition, we use values for MLS teams as reported in [25] to compute the average value of a franchise in MLS. These average franchise values (in descending order) are shown in Table 2.

Table 2: Average Franchise Value and Derived Franchise Stature Points for Each League

League	Ave. Franchise Value (\$B)	Franchise Stature Points
NFL	2.860	9
NBA	2.123	7
MLB	1.852	6
NHL	0.667	2
MLS	0.313	1

Using the average franchise value as a basis, we divide each average value by that of an average MLS franchise (the smallest) to derive numeric ratios, which we call Franchise Stature Points (FSPs). These are shown for each league in Table 2. The FSPs show the relative stature of an NFL franchise for a market is nine times that for an MLS franchise in a market based on average franchise values. The stature of an NBA franchise is second most, followed by an MLB franchise, which has three times the stature of an NHL franchise.

We use these derived Franchise Stature Points to determine the total FSPs for each market containing at least one professional sports franchise, which are shown along with the number of franchises in the last two columns of the table in Appendix A. A map showing the location and total FSPs for the 42 U.S. and 7 Canadian markets with at least one franchise is also available [30].

The table shows that markets with at least two franchises in each sport (New York, Los Angeles) have at least 50 FSPs. Three markets (Chicago, WashDC-Balt, SF-Oak-SJ) have at least one team in all leagues and more than one time in at least one other for between 30 and 40 FSPs. Six markets with exactly one franchise in each of the five leagues (Boston, Dallas, Philadelphia, Miami, Minneapolis, Denver) have a total of 25 FSPs. Four other markets (Detroit, Phoenix, Houston, Atlanta) have franchises in four leagues for 23 or 24 FSPs. The market with the least franchise stature, Austin, has a single FSP with its new MLS franchise.

3.4 Market Sport Interest

The final measure of a market that we seek to use in our work is the inherent interest for the sport of the professional sports league. This is a difficult value to determine for markets with professional teams and even more difficult to project for markets currently without teams. Rather than try to determine this value directly we use the source of players in each league as a measure of interest for that league. Our rationale is if the best athletes in a geographic area play a particular sport (and

ultimately go on to the professional sport league) then there is inherent interest in the sport both directly by players and indirectly by fans.

This approach is appealing because it can be applied uniformly across sports and be applied to markets currently with franchises as well as potential markets. We examine where players are from that participate in each professional sports league. For this work we use roster information provided by Stats Crew for teams in each of the professional sports leagues, for example the NFL [26]. We collect and analyze the hometown information for each player on a team roster for 20 seasons from the 2000 to 2020 seasons for each team in each of the five sports leagues over this time period. In analyzing the data, we ignore players where the hometown is not shown (a relatively small fraction) and consider each season as unique so the hometown of a player is counted each time that the player is on a seasonal roster.

The results are interesting and allow us to compare the origin of players from across the five professional sports leagues. As a starting point, Table 3 shows the top-10 countries that contribute players to each of the leagues. Not surprisingly, nearly all players in the NFL are from the U.S. with clear majorities for the NBA and MLB. Just over half of MLS players are from the U.S. with only 22% of NHL players from the U.S. Canada provides half the players in the NHL with a number of European countries providing a measurable number of players. In MLB, the Dominican Republic contributes 10% of players followed in contribution by Venezuela and other Latin American countries.

Table 3: Top-10 Pct. Contribution by Country Based on Hometown of Players on Team Rosters 2000-2020 Seasons

Rnk	League									
	MLB		MLS		NBA		NFL		NHL	
	Country	Pct	Country	Pct	Country	Pct	Country	Pct	Country	Pct
1	U.S.	72.6	U.S.	54.7	U.S.	82.0	U.S.	96.7	Canada	50.7
2	Dom. R.	10.2	Canada	3.8	France	1.2	Canada	0.5	U.S.	21.9
3	Venez.	6.5	Argentina	3.2	Spain	1.0	Germany	0.5	Sweden	6.7
4	Prto Rico	2.7	Brazil	2.8	Brazil	0.8	Jamaica	0.3	Czech R.	5.2
5	Mexico	1.4	Colombia	2.6	Yugo.	0.8	Samoa	0.2	Russia	4.0
6	Cuba	1.4	England	2.4	Canada	0.7	Nigeria	0.2	Finland	3.9
7	Canada	1.3	Jamaica	2.3	Australia	0.7	Australia	0.2	Slovakia	1.6
8	Japan	1.0	France	1.8	Germany	0.6	Liberia	0.1	Germany	0.9
9	Panama	0.6	Csta Rica	1.5	Croatia	0.6	England	0.1	Switz.	0.8
10	S. Korea	0.4	Ghana	1.4	Turkey	0.6	Haiti	0.1	Neth.	0.6

Given our focus in determining the relative interest in a sport for markets within the U.S. and Canada, Table 4 shows similar top-10 results based on the state or province of players with a hometown in the U.S. or Canada (as a percentage of all players). These results show that California ranks first among U.S. states for the contribution of players in four of the five leagues with a high contribution of 16% in MLB. In contrast, the top-5 rankings for the NHL are Canadian provinces with Ontario providing 21% of all players in the NHL.

Table 4: Top-10 Pct. Contribution by State/Province Based on Hometown of Players on Team Rosters 2000-2020 Seasons

Rnk	League									
	MLB		MLS		NBA		NFL		NHL	
	St/Pr	Pct	St/Pr	Pct	St/Pr	Pct	St/Pr	Pct	St/Pr	Pct
1	CA	16.4	CA	11.9	CA	11.7	CA	11.8	ON Can	20.9
2	TX	6.8	TX	4.4	NY	5.7	FL	9.8	AB Can	8.1
3	FL	6.4	NY	3.7	IL	5.4	TX	9.7	QC Can	7.7
4	IL	3.0	ON Can	2.4	TX	5.2	GA	5.2	BC Can	5.4
5	GA	3.0	OH	2.3	FL	3.6	OH	4.8	SK Can	4.2
6	NY	2.5	PA	2.3	PA	3.5	LA	4.1	MN	3.9
7	OH	2.4	MO	2.2	MI	3.3	PA	3.5	MI	3.2
8	PA	1.9	NJ	2.1	OH	3.1	MI	3.0	NY	2.9
9	NC	1.5	VA	2.0	GA	3.0	IL	2.9	MB Can	2.8
10	VA	1.5	IL	1.9	LA	3.0	AL	2.9	MA	2.5

While the results in Table 4 are again interesting they do not directly show the relative interest for a sport since it is expected that a populous state such as California would contribute a high percentage of professional athletes. To compensate for the population of each state/province, we divide the contribution percentage shown in Table 4 by the percentage of its population relative to the whole of the U.S using 2010 (the mid-point of our 20 years of collected data) population data. A ratio of 1.0 indicates a state/province that contributes the same percentage of players as would be expected by its population, a ratio of 2.0 means it contributes twice as many players as would be expected, and a ratio of 0.5 means it contributes half as many players as would be expected. Note: We use the total U.S. population to compute the ratio for Canadian provinces for consistency. The resulting top-10 state/province ratios for each league are shown in Table 5.

Table 5: Top-10 Ratio of Player Contribution Relative to State/Province Population

Rnk	League									
	MLB		MLS		NBA		NFL		NHL	
	St/Pr	Ratio	St/Pr	Ratio	St/Pr	Ratio	St/Pr	Ratio	St/Pr	Ratio
1	CA	1.36	MO	1.14	LA	2.02	LA	2.82	SK Can	12.47
2	MS	1.23	CO	1.03	MS	1.80	MS	2.27	PE Can	7.54
3	FL	1.05	CA	0.99	IL	1.29	AL	1.88	MB Can	7.23
4	LA	1.00	MD	0.78	IN	1.20	SC	1.87	AB Can	6.82
5	GA	0.96	VA	0.77	MD	1.11	GA	1.64	ON Can	5.03
6	HI	0.94	NH	0.74	AR	1.08	FL	1.62	BC Can	3.77
7	KY	0.91	HI	0.74	MI	1.02	HI	1.54	NT Can	3.69
8	SD	0.90	NJ	0.73	GA	0.97	NE	1.32	NS Can	3.09
9	DE	0.90	OR	0.71	CA	0.97	OH	1.27	QC Can	3.01
10	OK	0.88	WA	0.69	AL	0.96	TX	1.19	MN	2.26

The results in Table 5 show much more variation among states/provinces. The results show that California is the top per-capita producer of MLB players while Missouri has the highest per-capita production of MLS players. Louisiana is notable in that it is the highest per-capita producer of players for both the NBA and the NFL. In sharp contrast, nine Canadian provinces are the top per-capita producers of NHL players with Minnesota the only American state in the top-10. Per-capita ratios for all leagues in each state/province are shown in Appendix C. Maps showing the range of per-capita ratios across all states for each league are also available [30]. In analyzing the worthiness of each market to support a professional franchise in a sport, we translate these ratios to interest values for the sport based on the state/province of the market.

4 Results for Relationship of Sports Franchises Within a Market

The previous section defines our methodology for determining the markets we consider, their size, the stature of their franchises and inherent interest within a market for a sport. In this and the following sections we use this methodology to answer the three primary research questions posed in Section 2.

For our first research question we look at the relationship between franchises within a market. In seeking to answer the question of which professional sports are most and least likely to exist together within the same market, we do not directly consider the size or sport interest of a market.

We use the data in Appendix A for the 42 U.S. and 7 Canadian markets with at least one professional sports franchise in answering this question. The largest markets, such as New York and Los Angeles, support more than one franchise in a sport so the number of markets for a league is smaller than the number of franchises. The count of franchises and markets for each league is:

- MLB: 30 franchises in 26 markets (one in Canada),
- MLS: 27 franchises in 25 markets (two in Canada),
- NBA: 30 franchises in 28 markets (one in Canada),
- NFL: 32 franchises in 30 markets, and
- NHL: 31 franchises in 28 markets (seven in Canada).

Table 6 shows the results of our analysis where each entry in the table shows the likelihood (percentage) that a market with a league franchise on the given row also has a league franchise in the given column. For example, the first row of the table shows that 65% of the markets with an MLB franchise also have an MLS franchise. Across the diagonal, the results in the table show that 68% of the markets with an MLS franchise also have an MLB franchise.

There a number of notable results in the table. If we look at the results on the diagonal of the table, which show the percentage of markets with multiple franchises in the same league, we see that MLB has double the number of markets with multiple franchises in the same league. Not only do New York and Los Angeles have multiple franchises (as is the case for all other leagues), but so do the Chicago and WashDC-Balt markets.

Table 6: Percentage of Professional Franchises for Different Leagues in Same Market (Considering All U.S. and Canadian Markets)

	League	... Then here is the likelihood (%) it has a franchise in the league of this column				
		MLB	MLS	NBA	NFL	NHL
If a market	MLB	15	65	69	85	65
has a	MLS	68	8	68	68	64
franchise	NBA	64	61	7	68	50
in a league	NFL	73	57	63	7	60
on this row...	NHL	61	57	50	64	7

Results off of the diagonal in the table show that most percentages are in the 60%. If we look at the smaller percentages, we see that 57% of markets containing an NFL or NHL franchise also have an MLS franchise. The NBA and the NHL have the least amount of overlap in franchises between two leagues within the same market. In each case, only 50% of the markets containing a franchise in one league have a franchise in the other league. If we only consider U.S. markets (results not shown in the table) then the NHL/NBA percentage does increase to 62%, but in the U.S. only 48% of NBA markets also have an NHL franchise. These results indicate that the combination of NBA and NHL franchises is the least likely to occur in a market and indicate there may well be some amount of competition for a market to support franchises in each league given their respective seasons are aligned. These results are particularly interesting in that Seattle has been awarded an NHL franchise in the coming year [8], but there are also reports that Seattle is the leading contender for a new NBA franchise [13, 29]. Results in Table 6 suggest this is the least likely franchise combination in a market.

Table 6 also shows higher percentages. It shows 73% of NFL markets have an MLB franchise. Across the diagonal, it shows that 85% of MLB markets also have an NFL franchise indicating a high market overlap between franchises in these two leagues. Specifically there are only four markets, St. Louis, San Diego, Milwaukee and Toronto, with an MLB franchise, but without an NFL franchise. Looking at each of these cases, the NFL currently has no franchises in Canadian markets, St. Louis and San Diego have previously had NFL franchises, and Milwaukee has an NFL franchise in the nearby within-state market of Green Bay.

5 Results for Number and Stature of Professional Franchises within a Market

We next look at the size of markets and the stature of franchises in different sports leagues to understand markets that have relatively too many or too few professional franchises based on the stature of the franchises they do have. In this part of the study we focus on only U.S. markets because we have a more complete and uniform set of size metrics for these markets. Again, Appendix A shows the total number of Franchise Stature Points (FSPs), as defined in Section 3.3, for each of the markets with at least one franchise.

As indicated in Section 3.2 we considered four potential metrics (population, media market

size, median income, number of Fortune 500 companies) for measuring the size of a market. For each metric we normalized each value by the maximum market value (New York in each case) and created a scatter plot with a point for each market based on its normalized size and number of FSPs. Such a scatter plot is shown in Figure 1 with a linear best fit line starting from the origin of the graph. This is the line that most closely follows the relationship between market size and FSPs. An R^2 goodness-of-fit measure is then computed to determine how well this line fits the data.

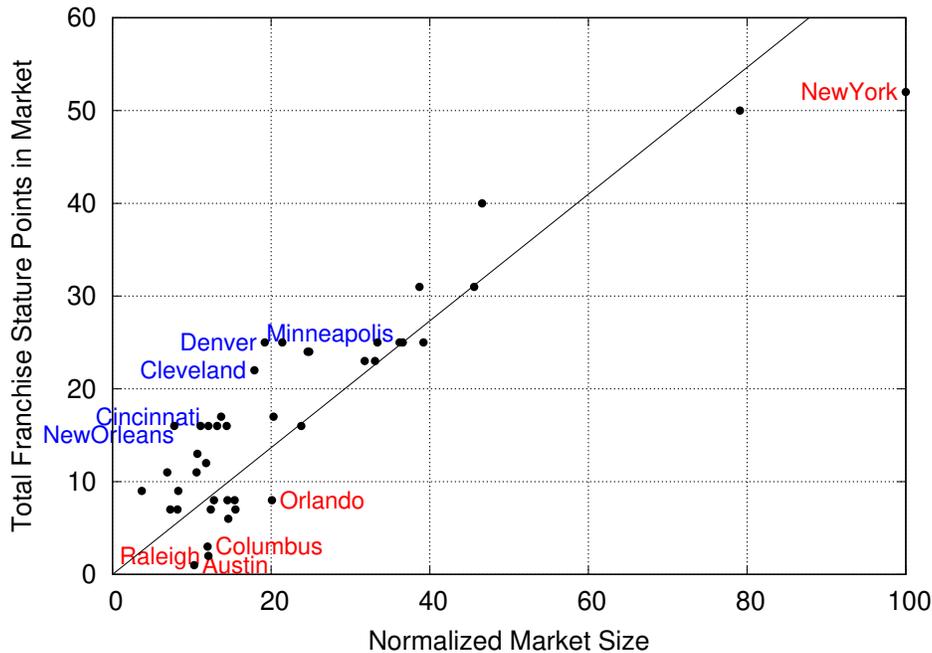


Figure 1: Total Franchise Stature Points for Each Market

We first experimented with each of the four potential size metrics and found using the media market size resulted in the best R^2 goodness-of-fit value of 0.7607. Using the population of the market resulted in the next best R^2 value of 0.6419. The use of either median income or the number of Fortune 500 companies resulted in significantly lower goodness-of-fit values. We also tested a fifth “weighted median income” metric where we multiplied the population of a market by its median income, but this contrived metric also produced a lower goodness-of-fit value.

Based on the results of our tests we used population, media market size or a combination of both to represent the size of a market in our work. Population alone was used for size when including Canadian markets in our analysis. The normalized market size shown in Figure 1 uses equal weighting of population and media market size for a market. The goodness-of-fit value for the best fit line in the graph is 0.7193.

5.1 Markets with Too Much and Too Little Franchise Stature

The results in Figure 1 show the relationship between market size and FSPs for each of the 42 U.S. markets with at least one professional sports franchise. The ten labeled points in the graph show

the five markets with the most surplus franchise stature (text in blue) and the five markets with the most deficient franchise stature (text in red). These markets are summarized in Table 7.

Table 7: Top-5 Current Markets with Too Much and Too Little Franchise Stature

Too Many Franchise Stature Pts				Too Few Franchise Stature Pts			
Market	Actual	Projected	Surplus	Market	Actual	Projected	Deficit
Denver	25	13.1	11.9	New York	52	68.3	-16.3
New Orleans	16	5.4	10.6	Raleigh	2	8.3	-6.3
Minneapolis	25	14.6	10.4	Austin	1	7.1	-6.1
Cleveland	22	12.3	9.7	Orlando	8	13.8	-5.8
Cincinnati	16	7.6	8.4	Columbus	3	8.2	-5.2

As shown in the table and Figure 1, Denver has the most surplus stature (FSPs) relative to its size followed by New Orleans and Minneapolis. Each of these is in excess of ten FSPs where the stature of a NFL team is nine points. In contrast, New York has a deficit of 16 FSPs indicating the market could support another NFL and NBA team. Raleigh and Austin are the next most deserving current markets for additional professional sports franchises.

Table 8 shows the FSP deficits for the top-5 markets currently without any professional sports franchises (these markets are not shown in Figure 1). It shows Hartford (which formerly had a NHL franchise), Greenville and Norfolk are the largest such markets.

Table 8: Top-5 Potential Markets with the Most Projected Franchise Stature Points

Market	Projected
Hartford (CT)	6.7
Greenville (SC)	6.2
Norfolk (VA)	6.2
Greensboro (NC)	5.7
Louisville (KY)	5.4

5.2 Identification of State Regional Sports Markets

In Section 3.2 we choose to use the population of a market’s Combined Statistical Area (CSA) because it is a broader representation of a market than an MSA. However even the concept of a CSA does not include all nearby markets, which is illustrated in the results shown in Figure 1 and Table 7. For example, each of Denver and New Orleans have nearby markets (Colorado Springs and Baton Rouge) that are within the same state. Similarly, Cincinnati has Dayton nearby and Columbus is also relatively close so while Figure 1 shows Cincinnati as having too much franchise stature and Columbus not enough based on their respective sizes, a consideration of what we refer to as “state regional sports markets” would result in a better match between size and franchise stature.

In defining what is needed for a state regional sports market we identify three requirements:

1. The principal city of each market of the region must be in the same state. This requirement is because the influence of a market with sports franchise often extends beyond the market itself to state boundaries, but drops off significantly across the boundary, particularly when the adjoining state has a professional sports franchise. This behavior is evident on maps of NFL team popularity [14].
2. The principal city in each market of the region must be “nearby” each other, which in our definition is 120 miles or approximately two hours driving distance.
3. The principal city of a market is clearly nearer to one in-state market than another.

Using these requirements for what constitutes a state regional sports market and considering the 85 markets listed in Appendices A and B, we identify 14 such regional markets in the U.S. (including nearby markets in Virginia for DC), which are shown in Appendix D. These regional markets can be grouped into three types (identified using a '/' between the market names in the region):

includes a market with a current franchise(s) and a market without a franchise: Phoenix/Tucson (AZ), Denver/Colorado Springs (CO), WashDC-Balt/Richmond (DC), New Orleans/Baton Rouge (LA), Buffalo/Rochester (NY), and Oklahoma City/Tulsa (OK);

includes only markets currently without a franchise: Louisville/Lexington (KY) and Greenville/Columbia (SC); and

includes multiple markets currently with franchises: Los Angeles/San Diego (CA), SF-Oak-SJ/Sacramento (CA), Tampa/Orlando (FL), Cincinnati/Columbus/Dayton (OH), San Antonio/Austin (TX), and Milwaukee/Green Bay/Madison (WI).

The metrics for these regional markets are computed based on the sum of metrics for the constituent markets. As can be seen, in some cases these regional markets extend what are already large markets into even larger ones. These state regional sports markets allow us to understand if the franchise stature for a region is a better fit than it might be when looking at specific markets within the region. We also consider the use of regional markets for further analysis.

5.3 Markets with Too Much and Too Little Franchise Stature When Considering State Regional Sports Markets

We repeat our analysis of franchise stature compared with market size by also considering these state regional sports markets we have identified. The goodness-of-fit value for the relationship between size and FSPs improves to 0.7609 when considering these regional markets.

Table 9 shows the top-5 results for markets with too much and too little franchise stature. The markets are similar as to those shown in Table 7, but for the regional markets the surplus has been reduced and Cincinnati is dropped as its regional market with Columbus and Dayton is a better match for projected FSPs. The New York market again has the biggest deficit, but both the San Antonio/Austin and Los Angeles/San Diego. regional markets have a deficit in franchises.

Table 10 shows that the regional markets of Greenville/Columbia and Louisville/Lexington are the two most deserving markets currently without a professional franchise.

Table 9: Top-5 Current Markets with Too Much and Too Little Franchise Stature (Considering State Regional Sports Markets)

Too Many Franchise Stature Pts				Too Few Franchise Stature Pts			
Market	Actual	Projected	Surplus	Market	Actual	Projected	Deficit
Minneapolis	25	14.1	10.9	New York	54	68	-14.0
Cleveland	23	12.8	10.2	SA/Austin	8	14.9	-6.9
Denver/ColoSp	25	15.3	9.7	LA/SD	58	63.9	-5.9
Mil/GB/Mad	22	12.4	9.6	Raleigh	2	7.9	-5.9
NO/BR	16	7.8	8.2	OKC/Tulsa	7	9.4	-2.4

Table 10: Top-5 Potential Markets with the Most Projected Franchise Stature Points (Considering State Regional Sports Markets)

Market	Projected
Grnv/Colum (SC)	9.1
Louis/Lex (KY)	8.4
Hartford (CT)	6.4
Norfolk (VA)	6.0
Greensboro (NC)	5.5

6 Results for Worthiness of Current and Potential Markets to Support Professional Sports Franchises

While the previous section provides interesting results on markets that are relatively under- or over-served with professional sports franchises overall, these results do not necessarily reflect what is in the best interests of a sport league, which is making the decisions on where its franchises are located. Another problem with the previous results is they only account for the size of a market and not what is the inherent interest for a sport in the market.

As a means to account for sport interest, we translate the player contribution ratios shown for each state/province in Table 4 and Appendix C into normalized sport interest values with a range of 0-100. We translate a ratio of 1.0 (contribution as expected) to a normalized value of 50. A ratio of 2.0 (twice the expected contribution) is translated to a normalized value of 75 and a ratio of 3.0 (or higher) is translated to a value of 100. Similarly a ratio of 0.5 (half the expected contribution) is translated to a normalized value of 25 and a ratio of 0.33 (or lower) is translated to a value of 0. Ratios between these given benchmarks are interpolated appropriately to interest values.

The same per-state sport interest values are applied to all markets within the state. For a given sport, we plot the normalized size against the normalized sport interest for each market. In markets with more than one current franchise the normalized market size is divided by the number of franchises in the market. An example is shown in Figure 2 for current and potential NFL markets where markets within a state region are grouped. Market size in this graph is based on media market size. Separate colors are used for points of current (red) and potential (blue) NFL markets.

A few of the markets are labeled for illustration.

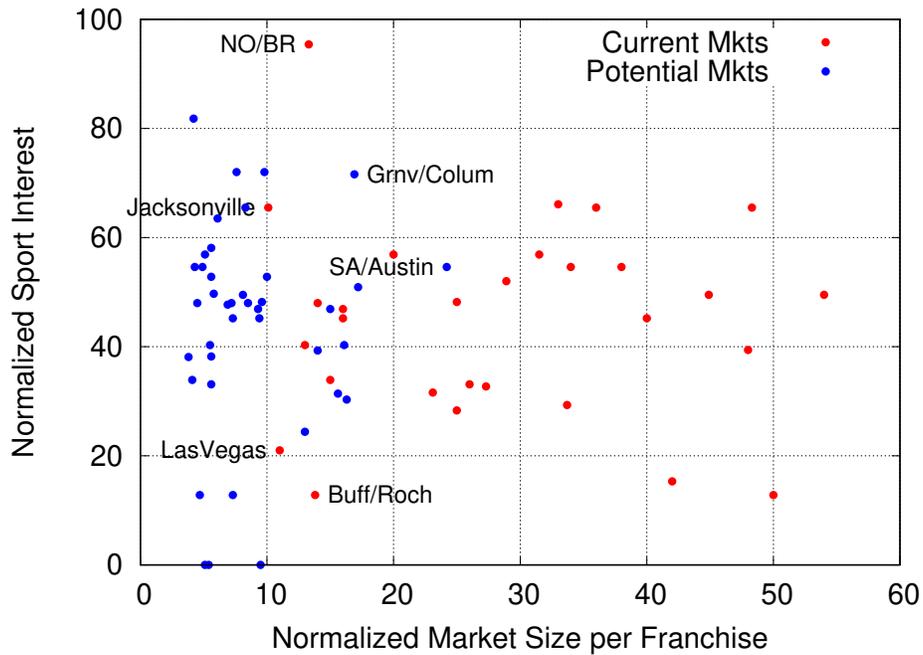


Figure 2: Size and Sport Interest for NFL Current and Potential Markets (Considering State Regional Sports Markets)

As expected, the current markets tend to be the largest although as found in the previous section this expectation is not always followed. We use a scatter plot such as this to illustrate when one market is more *worthy* of a franchise than another. If a first market is larger in size and has more interest in a sport than a second market then we define that the first market is more worthy of a franchise in that sport than the second market. Note the first market is also more worthy if it is larger by one measure and the same for the other measure.

Returning to Figure 2, the labeled San Antonio/Austin regional market (currently without a franchise) is more worthy than each of the labeled Las Vegas and Buffalo/Rochester markets because it is both bigger in size and has more NFL interest than either of these current markets. As shown, the San Antonio/Austin market is also more worthy than many other (unlabeled) current markets. Similarly, the Las Vegas and Buffalo/Rochester markets are not only less worthy than the San Antonio/Austin market, but also of the Greenville/Columbia market and many other (unlabeled) potential markets. In analyzing results for each of the five professional sports we focus on these two perspectives: 1) the current markets that are less worthy than the highest number of potential markets; and 2) the potential markets that are more worthy than the highest number of current markets.

Note that with this definition of worthiness, it is not always the case that one market is more or less worthy than another. Returning again to Figure 2 we do not know if the San Antonio/Austin market is more or less worthy than the Jacksonville market. It is larger in size, but it has less sport interest than Jacksonville. Similarly, it is larger in size, but it has less sport interest than New Orleans/Baton Rouge. In fact, no other market can be more worthy than New Orleans/Baton Rouge

because it has the highest NFL sports interest value based on results in Table 5. This inability to determine an ordering between all pairs of markets is simply a reflection that the “right” weights to assign to market size in relation to sports interest are not known. Only when one market is better or worse than another on both measures do we define that one market is more worthy for a franchise than the other.

Now that we have established this concept of worthiness for markets within a professional sports league, we use it to analyze the current and potential markets in the U.S. for each of the five leagues. In each case we first do the analysis based on the originally defined markets and then we repeat the analysis after constituent markets are associated with their appropriate state regional sports market. In each case we do separate analyses using population and media market to estimate market size and average the resulting counts of more or less worthy markets. We show up to five such markets if they are more or less worthy than at least three other markets.

After doing this analysis for a sports league, we consider if existing markets with a franchise would be more worthy to add one more franchise by artificially adding one franchise to the market and reducing the per-franchise size. We also examine the worthiness of Canadian markets for a franchises in each sport using population as the only market size metric. Finally we do compare our analytical results for each sport with recent media reports on expansion/relocation plans for each league.

6.1 Major League Baseball

Table 11 shows the least worthy current markets and most worthy potential markets for MLB. The results show that Milwaukee and Cincinnati are the two least worthy markets currently with a franchise based on market size and inherent sports interest. It shows Orlando is the most worthy potential market.

Table 11: Least Worthy Current Markets and Most Worthy Potential Markets for Major League Baseball

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Milwaukee	11.5	Orlando	7.5
Cincinnati	7.5	Portland	5.0
Kansas City	5.0	Sacramento	4.5
Pittsburgh	3.5	San Antonio	3.0

Table 12 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. It shows that each of Milwaukee and Cincinnati are part of larger regional markets and are no longer as unworthy for a current franchise. In terms of worthy potential markets, Orlando is part of a regional market with Tampa, which already has a franchise. The table shows that the San Antonio/Austin regional market is now the most worthy market without a MLB franchise.

In terms of adding another franchise to an existing market (results not shown in a table), the Los Angeles/San Diego and Tampa/Orlando regional markets have the most worthiness. No additional

Table 12: Least Worthy Current Markets and Most Worthy Potential Markets for Major League Baseball (Considering State Regional Sports Markets)

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Kansas City	5.0	SA/Austin	6.0
Pittsburgh	4.0	Portland	3.0

Canadian markets have worthiness for another franchise as inherent interest in baseball is minimal.

Recent reports show a small amount of overlap with our analytical results for potential expansion markets. In July 2018, Baseball Commissioner, Rob Manfred was quoted as saying “Portland, Las Vegas, Charlotte, Nashville in the United States, certainly Montreal, maybe Vancouver, in Canada” could be potential expansion markets [3]. More recently, Nashville, Montreal, Austin, Portland, San Antonio, El Paso, and Las Vegas are suggested for potential expansion teams [18].

6.2 Major League Soccer

Table 13 shows the least worthy current markets and most potential worthy markets for MLS. The results show that Salt Lake City and Nashville are the two least worthy markets currently with a franchise based on market size and relatively little inherent sports interest. It shows St. Louis is the most worthy potential market.

Table 13: Least Worthy Current Markets and Most Worthy Potential Markets for Major League Soccer

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Salt Lake City	10.0	St. Louis	6.0
Nashville	9.5	San Diego	5.5
Austin	7.0	Sacramento	5.5
Columbus	4.0	Phoenix	5.0
Cincinnati	4.0	Cleveland	5.0

Table 14 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. It again shows Salt Lake City and Nashville as the least worthy existing markets. It now shows the Phoenix/Tucson regional market as the most worthy potential market.

In terms of adding another franchise to an existing market, the Los Angeles/San Diego, New York and SF-Oak-SJ/Sacramento markets have the most worthiness. Inclusion of Canadian markets in our analysis results in Vancouver being one of the least worthy current markets for a franchise (comparable to Nashville). There are no worthy potential Canadian markets for a MLS team.

Beyond Austin for the 2021 season, MLS has already announced the three markets of Charlotte, St. Louis and Sacramento for future franchises [16] with the latter two appearing as worthy markets

Table 14: Least Worthy Current Markets and Most Worthy Potential Markets for Major League Soccer (Considering State Regional Sports Markets)

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Salt Lake City	9.5	Phx/Tucs	4.0
Nashville	7.5	St. Louis	3.0

in our analyses for new or additional franchises.

6.3 National Basketball Association

Table 15 shows the least worthy current markets and most potential worthy markets for the NBA. The results show that Oklahoma City and Milwaukee are the two least worthy markets currently with a franchise based on market size and inherent sports interest. It shows Seattle and San Diego are the most worthy potential markets for expansion/relocation.

Table 15: Least Worthy Current Markets and Most Worthy Potential Markets for the National Basketball Association

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Oklahoma City	15.5	Seattle	9.5
Milwaukee	9.0	San Diego	6.5
Salt Lake City	6.0	St. Louis	4.0
San Antonio	5.0	Pittsburgh	4.0
Memphis	5.0	Nashville	4.0

Table 16 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. It shows that Oklahoma City and Milwaukee are much more worthy of a franchise when they are considered as part of a regional in-state market. That change leaves Salt Lake City and Memphis as the least worthy markets for current franchises. The table also shows that consideration of the Cincinnati/Columbus/Dayton regional market results in it being the most worthy market for a franchise even though none of the three constituent markets rate high for worthiness. Seattle continues to be identified as a worthy market.

In terms of adding another franchise to an existing market, the Los Angeles/San Diego, New York and SF-Oak-SJ/Sacramento markets have the most worthiness for the NBA. No additional Canadian markets evaluate to be worthy for a franchise.

A recent report mentions Seattle, Las Vegas, Louisville and Kansas City as possible cities for expansion [29]. Another report cites Seattle as the leader contender for a franchise with Las Vegas, Vancouver, San Diego, Louisville, Mexico City, Nashville, St. Louis, and Montreal as possibilities [13].

Table 16: Least Worthy Current Markets and Most Worthy Potential Markets for the National Basketball Association (Considering State Regional Sports Markets)

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Salt Lake City	6.0	Cin/Col/Day	8.0
Memphis	4.5	Seattle	7.5
OKC/Tulsa	3.0		

6.4 National Football League

Table 17 shows the least worthy current markets and most worthy potential markets for NFL. The results show that as their own markets, Green Bay and Buffalo are surpassed in both market size and sport interest by a large number of potential markets. Las Vegas is also less worthy than many potential markets. Orlando, Sacramento and San Diego are the three most worthy potential markets for a franchise.

Table 17: Least Worthy Current Markets and Most Worthy Potential Markets for the National Football League

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Green Bay	36.5	Orlando	12.5
Buffalo	22.5	Sacramento	7.0
Las Vegas	10.0	San Diego	6.5
Kansas City	6.0	Columbus	5.5
Indianapolis	5.5	St. Louis	5.0
		San Antonio	5.0

Table 18 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. It shows Green Bay and Buffalo are each part of larger state regional sports markets making them more worthy for a current franchise, although Buffalo/Rochester is still the on the least worthy list. As shown, Las Vegas is the least worthy market in this analysis. The table shows that the San Antonio/Austin regional market is the most worthy potential market for a franchise.

In terms of adding another franchise to an existing market, the regional markets of Los Angeles/San Diego, SF-Oak-SJ/Sacramento and Tampa/Orlando are the most worthy of adding an additional franchise to those already in these regional markets and correspond to the three most worthy individual markets in Table 17. No additional Canadian markets has worthiness for another franchise as inherent interest in the NFL is minimal.

We see our results for the San Antonio/Austin market match speculation on expansion teams where responses from a roundtable of sports reporters suggest Austin, Montreal, Portland, San

Table 18: Least Worthy Current Markets and Most Worthy Potential Markets for the National Football League (Considering State Regional Sports Markets)

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Las Vegas	7.5	SA/Austin	9.0
Buff/Roch	7.0	OKC/Tulsa	6.0
Indianapolis	4.5	Grnv/Colum	6.0
Kansas City	4.0	St. Louis	4.0
Nashville	3.0		

Diego and Oklahoma City as possible locations [17]. Another sports staff suggest Austin and London for move of existing teams with St. Louis, Birmingham, Toronto and Omaha as expansion possibilities [9]. Similarly, Oakland, Toronto, Portland, Mexico City and San Antonio are cited by another source [12].

6.5 National Hockey League

Table 19 shows the least worthy current markets and most worthy potential markets for the NHL. The results show that Las Vegas, Nashville, Columbus and Raleigh are all less worthy than many potential markets as these markets have little or no inherent sport interest in modest sized markets. The most worthy potential markets of Houston and Atlanta also have little inherent interest, but are larger than existing markets with franchises.

Table 19: Least Worthy Current Markets and Most Worthy Potential Markets for the National Hockey League

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Las Vegas	15.0	Houston	9.5
Nashville	13.0	Atlanta	9.0
Columbus	12.5	Seattle	7.5
Raleigh	11.5	Orlando	7.0
St. Louis	7.0	Portland	6.5
Pittsburgh	7.0	Cleveland	6.5

Table 20 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. It shows much the same results for both more worthy and less worthy markets as Table 19 with the regional markets for the current Columbus market and the potential Milwaukee/Green Bay/Madison market being more worthy.

In terms of adding another franchise to an existing market, the Los Angeles/San Diego, SF-Oak-SJ/Sacramento and New York are the most worthy U.S. markets to add another franchise.

Table 20: Least Worthy Current Markets and Most Worthy Potential Markets for the National Hockey League (Considering State Regional Sports Markets)

Least Worthy Current Markets		Most Worthy Potential Markets	
Current Market	Cnt More Worthy Potential Mkts	Potential Market	Cnt Less Worthy Current Mkts
Las Vegas	15.0	Houston	8.5
Nashville	13.5	Atlanta	7.5
Raleigh	13.0	Mil/GB/Mad	6.0
St. Louis	8.0	Seattle	5.5
Pittsburgh	8.0	SA/Austin	5.5

Each Canadian market in our study already has a franchise, but our analysis shows that Toronto would be among the worthiest current markets for another franchise.

Media reports have Quebec City and Houston as the next logical cities for NHL expansion [2]. Another report cites Houston, Quebec City, Kansas City and possibly Atlanta as expansion locations [22].

6.6 All Professional Sports Leagues

Because we use the same concept of worthiness for evaluating markets for each league, we can compare the per-league results with each other to determine the least worthy current and most worthy potential markets across all sports leagues, which are shown in Table 21. These results show that Green Bay and Buffalo for the NFL are the least worthy markets in all of professional sports. Oklahoma City for the NBA and Las Vegas, Nashville and Columbus for the NHL are the next least worthy in all of professional sports.

Table 21 also shows that Orlando for an NFL franchise is the most worthy potential market across all of professional sports. Houston for the NHL, Seattle for the NBA and Atlanta for the NHL are the next most worthy markets for a franchise.

Table 22 shows results for the same analyses, but grouping markets into state regional sports markets where applicable. These results are particularly interesting because they show how these regional markets change the results of the analysis. Small markets such as Green Bay and Buffalo are more deserving of franchises when considered in the context of nearby in-state markets. The three least worthy current markets are now Las Vegas, Nashville and Raleigh in the NHL as these markets are not the biggest and have no inherent interest in professional hockey. Las Vegas, Nashville and Salt Lake City all appear for two leagues on the least worthy list because of relatively lower size and inherent sports interest.

After consideration of regional markets, Table 22 shows that the San Antonio/Austin region for the NFL is the most worthy market across all of professional sports based on market size and sports interest. Houston for the NHL is the next most worthy market as it does not have inherent hockey interest, but it is a top-10 market in size. The table does show that the Cincinnati/Columbus/Dayton regional market is next most worthy for an NBA team followed by Atlanta for the NHL and Seattle for the NBA.

In terms of adding another franchise to an existing market, our analysis finds the Los Ange-

Table 21: Least Worthy Current Markets and Most Worthy Potential Markets Across All Professional Sport Leagues

Least Worthy Current Markets			Most Worthy Potential Markets		
Current Market	Lg	Cnt More Worthy Potential Mkts	Potential Market	Lg	Cnt Less Worthy Current Mkts
Green Bay	NFL	36.5	Orlando	NFL	12.5
Buffalo	NFL	22.5	Houston	NHL	9.5
Oklahoma City	NBA	15.5	Seattle	NBA	9.5
Las Vegas	NHL	15.0	Atlanta	NHL	9.0
Nashville	NHL	13.0	Orlando	MLB	7.5
Columbus	NHL	12.5	Seattle	NHL	7.5
Milwaukee	MLB	11.5	Sacramento	NFL	7.0
Las Vegas	NFL	10.0	Portland	NHL	6.5
Salt LakeCity	MLS	10.0	Cleveland	NHL	6.5
Nashville	MLS	9.5	San Diego	NBA	6.5
Milwaukee	NBA	9.0	San Diego	NFL	6.5

Table 22: Least Worthy Current Markets and Most Worthy Potential Markets Across All Professional Sport Leagues (Considering State Regional Sports Markets)

Least Worthy Current Markets			Most Worthy Potential Markets		
Current Market	Lg	Cnt More Worthy Potential Mkts	Potential Market	Lg	Cnt Less Worthy Current Mkts
Las Vegas	NHL	15.0	SA/Austin	NFL	9.0
Nashville	NHL	13.5	Houston	NHL	8.5
Raleigh	NHL	13.0	Cin/Col/Day	NBA	8.0
Salt Lake City	MLS	9.5	Atlanta	NHL	7.5
St. Louis	NHL	8.0	Seattle	NBA	7.5
Pittsburgh	NHL	8.0	Grnv/Colum	NFL	6.0
Nashville	MLS	7.5	Mil/GB/Mad	NHL	6.0
Las Vegas	NFL	7.5	OKC/Tulsa	NFL	6.0
Buff/Roch	NFL	7.0	SA/Austin	MLB	6.0
Salt Lake City	NBA	6.0			

les/San Diego regional market is the most deserving for an additional NFL franchise. New York for an additional NBA team is the next most worthy market followed by the Los Angeles/San Diego region for an additional NBA franchise and the SF-Oak-SJ/Sacramento region for an additional NFL franchise. Inclusion of Canadian markets in our analysis finds Vancouver for MLS as one of the least worthy markets across all of professional sports.

7 Summary and Future Work

In this work we examine the characteristics of markets currently with professional sports franchises as well as potential markets for franchises from a number of data-driven perspectives. We consider sports franchises from the five major professional sports leagues in the United States and Canada: Major League Baseball (MLB), Major League Soccer (MLS), the National Basketball Association (NBA), the National Football League (NFL) and the National Hockey League (NHL). We study 85 markets within the U.S. (42 currently with at least one professional franchise) and seven markets within Canada (all with at least one professional franchise).

The guiding perspective of our work is to determine if markets with franchises are worthy of those franchises relative to potential markets that may be more worthy for franchise relocation or expansion. From this perspective, we have both introduced a number of new approaches for analysis as well as obtained many interesting results.

The NBA and the NHL have the least amount of overlap in franchises between two leagues within the same market. In each case, only 50% of the markets containing a franchise in one league have a franchise in the other league. The results are consistent if we only consider U.S. markets and indicate there may well be some amount of competition for a market to support franchises in each league given their respective seasons are aligned. These results are particularly interesting in that Seattle has been awarded an NHL franchise in the coming year, but there are also reports that Seattle is the leading contender for a new NBA franchise.

Using the same analysis, our results show that 73% of NFL markets also have an MLB franchise and 85% of MLB markets also have an NFL franchise. These results are the highest for market overlap between any two leagues. Specifically there are only four markets, St. Louis, San Diego, Milwaukee and Toronto, with an MLB franchise, but without an NFL franchise. Looking at each of these cases, the NFL currently has no franchises in Canadian markets, St. Louis and San Diego have previously had NFL franchises, and Milwaukee has an NFL franchise in the nearby within-state market of Green Bay.

Another novel aspect of our work is to consider not just the number, but the stature of professional sports franchises that a market supports. The stature of a franchise in one sport is not necessarily the same as one in another sport. We use estimates of the average value of a franchises in all five leagues to derive numeric ratios, which we call Franchise Stature Points (FSPs). MLS is the league with the smallest average franchise value and each MLS franchise is assigned one FSP. The relative stature of an NFL franchise for a market is nine times that for an MLS franchise based on average franchise values and each NFL franchise is assigned nine FSPs. The stature of an NBA franchise is second most with seven FSPs followed by an MLB franchise with six FSPs, which has three times the stature of an NHL franchise with two FSPs.

We compare the size of markets with the total stature of franchises in these markets to understand markets that have relatively too many or too few professional franchises. We find Denver has

the most surplus FSPs relative to its size followed by New Orleans and Minneapolis. In contrast, New York has the biggest deficit indicating the market could support additional teams. Raleigh and Austin are the next most deserving current markets for additional professional sports franchises.

In performing this analysis, we identify cases where the relationship between market size and total franchise stature is better correlated if we consider the existence of near-by markets within the same state. We introduce the concept of “state regional sports markets,” to describe such regional markets and identify 14 containing at least two of the markets considered in our work. One example is the Milwaukee/Green Bay/Madison regional market in Wisconsin. Another is the New Orleans/Baton Rouge market in Louisiana. Tampa/Orlando is a regional market consisting of two already-large markets when we include these regional markets in our work.

We obtain a better match between market size and franchise stature if we consider these regional markets in our analysis. The New York market again has the biggest deficit, but now San Antonio/Austin and Los Angeles/San Diego regional markets have a deficit in franchise stature relative to total market size.

In the final portion of our study we seek to not only consider market size, but inherent sport interest of the market to determine the worthiness of each market for a franchise in the given sports league. Rather than try to determine this interest value directly we use the source of players in each league as a measure of interest for that league. Not surprisingly, nearly all players in the NFL are from the U.S. with clear majorities for the NBA and MLB. Just over half of MLS players are from the U.S. with only 22% of NHL players from the U.S. Canada provides half the players in the NHL.

Given our focus in determining the relative interest in a sport for markets within the U.S. and Canada, we determine the contribution of each state/province relative to its population. These results show that California is the top per-capita producer of MLB players while Missouri has the highest per-capita production of MLS players. Louisiana is notable in that it is the highest per-capita producer of players for both the NBA and the NFL. In sharp contrast, nine Canadian provinces are the top per-capita producers of NHL players with Minnesota the only American state in the top-10.

Combining these values for interest in a sport with market size, we are able to identify when one market is more worthy than another for a professional franchise in each of the five leagues we consider. If a first market is larger in size and has more interest in a sport than a second market then we define that the first market is more worthy of a franchise in that sport than the second market.

We use this concept of market worthiness to identify the least worthy current markets and most worthy potential markets for each of the five leagues. Because we use the same concept of worthiness for evaluating markets for each league, we can compare the per-league results with each other to determine the least worthy current and most worthy potential markets across all sports leagues. Based on home markets alone, Green Bay and Buffalo for the NFL as well as Oklahoma City for the NBA are the least worthy markets in all of professional sports. However when these smaller markets are considered in the context of their in-state regional markets then the three least worthy current markets in all of professional are Las Vegas, Nashville and Raleigh in the NHL. Las Vegas, Nashville and Salt Lake City all appear for two leagues on the least worthy list because of relatively smaller size and inherent sports interest.

In terms of worthy markets, Orlando for an NFL franchise is the most worthy potential market across all of professional sports. Houston for the NHL. Seattle for the NBA and Atlanta for the NHL are the next most worthy markets for a franchise. Taking into consideration of regional

markets shows that the San Antonio/Austin region for the NFL is the most worthy market across all of professional sports based on market size and sports interest with Houston for the NHL as the next most worthy market.

In terms of adding another franchise to an existing market, our analysis finds the Los Angeles/San Diego regional market is the most deserving for an additional NFL franchise. New York for an additional NBA team is the next most worthy market for an additional NBA franchise. Inclusion of Canadian markets in our analysis finds Vancouver for MLS as one of the least worthy markets across all of professional sports.

Taken together, the results of our study help explain why it makes more sense that smaller markets such as Green Bay, Buffalo and New Orleans have NFL franchises. The results show that Las Vegas, Nashville and Salt Lake City are among the least worthy markets in more than one professional sports league. Finally, the results identify potential markets that are the most worthy for new franchises such as Orlando and the San Antonio/Austin region for the NFL as well as Houston for the NHL.

There are many directions for future work. One direction is consider additional measures of market size and attractiveness. Our results show that Las Vegas is one of the least worthy markets for each of the NHL and NFL yet its franchises in each sport are relatively new. Other factors such as growth or entertainment impact of a market could be considered. Other measures of local sports interest could also be considered as it may not be necessarily true that production of players for a sports league correlates directly to interest. Finally, the definition of what constitutes a state regional sports market could be further examined.

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A Information About Current Markets with Professional Sports Franchises

Table 23: Information About Markets Currently with a Professional Franchise

ST/ PR	Market	Cnt League Franchises					Market Size Metric				Franchises	
		MLB	MLS	NBA	NFL	NHL	Pop (M)	Media (M)	Med Inc (\$K)	F500 Cnt	Total Cnt	Stature Points
NY	New York	2	2	2	2	3	22.59	6.82	79.8	75	11	52
CA	Los Angeles	2	2	2	2	2	18.71	5.15	66.7	13	10	50
IL	Chicago	2	1	1	1	1	9.83	3.26	63.5	35	6	31
DC	WashDC-Balt	2	1	1	2	1	9.81	3.39	74.4	17	7	40
CA	SF-Oak-SJ	2	1	1	1	1	9.67	2.36	104.9	38	6	31
MA	Boston	1	1	1	1	1	8.29	2.85	81.5	20	5	25
TX	Dallas	1	1	1	1	1	8.06	2.56	58.7	24	5	25
TX	Houston	1	1	1	1	0	7.25	2.33	58.9	22	4	23
PA	Philadelphia	1	1	1	1	1	7.21	2.76	66.6	13	5	25
FL	Miami	1	1	1	1	1	6.89	2.47	61.0	8	5	25
GA	Atlanta	1	1	1	1	0	6.85	2.27	54.6	16	4	23
MI	Detroit	1	0	1	1	1	5.34	1.74	54.2	10	4	24
AZ	Phoenix	1	0	1	1	1	5.00	1.88	48.1	5	4	24
WA	Seattle	1	1	0	1	0	4.90	1.76	78.1	11	3	16
FL	Orlando	0	1	1	0	0	4.16	1.49	45.2	2	2	8
MN	Minneapolis	1	1	1	1	1	4.03	1.70	64.3	15	5	25
CO	Denver	1	1	1	1	1	3.62	1.53	67.2	10	5	25
OH	Cleveland	1	0	1	1	0	3.59	1.37	55.5	7	3	22
CA	San Diego	1	0	0	0	0	3.34	0.98	63.7	2	1	6
OR	Portland	0	1	1	0	0	3.26	1.11	59.9	1	2	8
FL	Tampa	1	0	0	1	1	3.19	1.80	48.9	4	3	17
MO	St. Louis	1	0	0	0	1	2.91	1.10	56.9	8	2	8
NC	Charlotte	0	0	1	1	0	2.80	1.13	53.9	8	2	16
UT	Salt Lake City	0	1	1	0	0	2.64	0.95	54.5	0	2	8
CA	Sacramento	0	0	1	0	0	2.64	1.32	58.8	0	1	7
PA	Pittsburgh	1	0	0	1	1	2.60	1.08	60.2	8	3	17
TX	San Antonio	0	0	1	0	0	2.57	0.92	48.7	3	1	7
OH	Columbus	0	1	0	0	1	2.53	0.88	52.5	6	2	3
MO	Kansas City	1	1	0	1	0	2.50	0.90	55.0	2	3	16
IN	Indianapolis	0	0	1	1	0	2.46	1.05	56.4	4	2	16
NV	Las Vegas	0	0	0	1	1	2.31	0.74	48.8	4	2	11
OH	Cincinnati	1	1	0	1	0	2.28	0.83	56.0	7	3	16
TX	Austin	0	1	0	0	0	2.23	0.74	62.0	1	1	1
NC	Raleigh	0	0	0	0	1	2.08	1.03	57.9	2	1	2
TN	Nashville	0	1	0	1	1	2.06	0.98	60.7	5	3	12
WI	Milwaukee	1	0	1	0	0	2.05	0.84	58.5	6	2	13
LA	New Orleans	0	0	1	1	0	1.51	0.62	54.4	1	2	16
OK	Oklahoma City	0	0	1	0	0	1.48	0.67	48.9	2	1	7
FL	Jacksonville	0	0	0	1	0	1.47	0.69	51.4	3	1	9
TN	Memphis	0	0	1	0	0	1.37	0.58	48.0	3	1	7
NY	Buffalo	0	0	0	1	1	1.20	0.58	52.3	1	2	11
WI	Green Bay	0	0	0	1	0	0.37	0.39	53.0	0	1	9
ON	Toronto	1	1	1	0	1	5.93				4	16
QC	Montreal	0	1	0	0	1	4.10				2	3
BC	Vancouver	0	1	0	0	1	2.46				2	3
AB	Calgary	0	0	0	0	1	1.39				1	2
AB	Edmonton	0	0	0	0	1	1.32				1	2
ON	Ottawa	0	0	0	0	1	1.32				1	2
MB	Winnipeg	0	0	0	0	1	0.78				1	2

B Information About Potential Markets for Professional Sports Franchises

Table 24: Information About Potential U.S. Markets for a Professional Franchise

ST	Market	Market Size Metric			
		Pop (M)	Media (M)	Med Inc (\$K)	F500 Cnt
VA	Norfolk	1.86	0.68	52.0	3
NC	Greensboro	1.69	0.64	44.9	2
KY	Louisville	1.49	0.64	52.1	1
SC	Greenville	1.48	0.79	45.4	0
CT	Hartford	1.47	0.89	65.1	4
MI	Grand Rapids	1.41	0.65	50.3	1
AL	Birmingham	1.32	0.67	53.4	1
CA	Fresno	1.31	0.55	45.5	0
VA	Richmond	1.29	0.56	58.6	7
PA	Harrisburg	1.27	0.64	53.9	2
FL	Ft. Myers	1.20	0.56	52.1	1
NY	Albany	1.17	0.50	39.9	0
NM	Albuquerque	1.16	0.65	44.0	0
NY	Rochester	1.16	0.36	53.2	1
TN	Knoxville	1.15	0.49	47.6	0
OK	Tulsa	1.12	0.51	56.5	3
AZ	Tucson	1.09	0.42	45.5	0
OH	Dayton	1.08	0.45	49.2	0
TX	El Paso	1.06	0.30	37.6	0
TN	Chattanooga	1.00	0.31	47.4	1
NE	Omaha	0.99	0.38	58.9	5
HI	Honolulu	0.97	0.41	61.2	0
SC	Columbia	0.96	0.37	46.5	0
TX	McAllen	0.93	0.33	27.4	0
AR	Little Rock	0.91	0.47	46.6	1
WI	Madison	0.89	0.34	62.1	1
IA	Des Moines	0.88	0.39	55.0	2
LA	Baton Rouge	0.85	0.29	49.4	0
ID	Boise	0.83	0.26	47.9	2
OH	Toledo	0.83	0.35	48.3	5
IN	South Bend	0.81	0.28	48.0	1
WV	Charleston	0.78	0.37	45.3	0
CO	Colorado Springs	0.75	0.33	51.1	0
KY	Lexington	0.75	0.43	58.6	0
NY	Syracuse	0.73	0.32	52.1	0
WA	Spokane	0.73	0.38	47.8	0
KS	Wichita	0.68	0.38	52.1	1
MS	Jackson	0.67	0.28	44.7	0
AL	Mobile	0.65	0.52	40.0	0
ME	Portland	0.65	0.35	60.0	0
PA	Wilkes Barre	0.55	0.50	47.4	0
MO	Springfield	0.47	0.37	42.6	1
VA	Roanoke	0.31	0.38	48.4	0

C Player Sport Contribution Percentage and Ratio to Expected

Table 25: State/Province Sport Contribution

ST/ PR	US Pct.	Pct. Contribution of Players					Ratio of Contribution to Expected				
		MLB	MLS	NBA	NFL	NHL	MLB	MLS	NBA	NFL	NHL
AK	0.23	0.18	0.02	0.10	0.14	0.46	0.79	0.09	0.42	0.59	1.98
AL	1.55	1.31	0.14	1.48	2.91	0.04	0.84	0.09	0.96	1.88	0.03
AR	0.94	0.51	0.02	1.02	0.86	0.00	0.54	0.02	1.08	0.92	0.00
AZ	2.07	1.13	1.18	0.30	1.13	0.09	0.55	0.57	0.14	0.55	0.04
CA	12.07	16.37	11.90	11.71	11.85	0.62	1.36	0.99	0.97	0.98	0.05
CO	1.63	0.62	1.68	0.58	0.96	0.35	0.38	1.03	0.35	0.59	0.22
CT	1.16	0.76	0.29	0.43	0.57	0.72	0.66	0.25	0.37	0.49	0.62
DC	0.19	0.20	0.44	1.47	0.87	0.05	1.04	2.24	7.55	4.45	0.25
DE	0.29	0.26	0.06	0.27	0.13	0.06	0.90	0.21	0.93	0.44	0.20
FL	6.09	6.40	1.85	3.56	9.85	0.24	1.05	0.30	0.58	1.62	0.04
GA	3.14	3.00	1.80	3.05	5.16	0.06	0.96	0.57	0.97	1.64	0.02
HI	0.44	0.42	0.33	0.02	0.68	0.00	0.94	0.74	0.04	1.54	0.00
IA	0.99	0.56	0.07	0.65	0.97	0.09	0.57	0.07	0.66	0.99	0.09
ID	0.51	0.17	0.16	0.13	0.34	0.00	0.34	0.32	0.25	0.68	0.00
IL	4.16	3.00	1.91	5.38	2.92	1.18	0.72	0.46	1.29	0.70	0.28
IN	2.10	1.35	0.78	2.51	1.28	0.33	0.64	0.37	1.20	0.61	0.16
KS	0.92	0.61	0.46	0.52	0.63	0.00	0.67	0.50	0.56	0.68	0.00
KY	1.41	1.28	0.17	0.83	0.81	0.00	0.91	0.12	0.59	0.57	0.00
LA	1.47	1.46	0.15	2.96	4.14	0.00	1.00	0.10	2.02	2.82	0.00
MA	2.12	0.98	1.10	0.95	0.89	2.55	0.46	0.52	0.45	0.42	1.20
MD	1.87	0.74	1.45	2.07	1.28	0.09	0.40	0.78	1.11	0.68	0.05
ME	0.43	0.12	0.09	0.09	0.06	0.06	0.28	0.21	0.20	0.14	0.14
MI	3.20	1.03	1.28	3.27	2.99	3.21	0.32	0.40	1.02	0.93	1.00
MN	1.72	0.65	0.76	0.90	0.92	3.89	0.38	0.44	0.53	0.54	2.26
MO	1.94	1.26	2.21	1.60	1.40	0.47	0.65	1.14	0.82	0.72	0.24
MS	0.96	1.18	0.32	1.73	2.18	0.00	1.23	0.33	1.80	2.27	0.00
MT	0.32	0.08	0.05	0.00	0.23	0.03	0.24	0.16	0.00	0.73	0.11
NC	3.09	1.52	1.60	2.69	2.75	0.10	0.49	0.52	0.87	0.89	0.03
ND	0.22	0.15	0.00	0.15	0.11	0.28	0.70	0.00	0.71	0.49	1.30
NE	0.59	0.42	0.16	0.12	0.78	0.06	0.71	0.28	0.20	1.32	0.10
NH	0.43	0.17	0.32	0.12	0.02	0.25	0.40	0.74	0.27	0.04	0.58
NJ	2.85	1.45	2.08	2.67	2.87	0.59	0.51	0.73	0.94	1.01	0.21
NM	0.67	0.22	0.28	0.13	0.18	0.00	0.34	0.43	0.20	0.27	0.00
NV	0.87	0.65	0.15	0.49	0.40	0.05	0.74	0.17	0.56	0.46	0.06
NY	6.28	2.50	3.70	5.71	2.52	2.89	0.40	0.59	0.91	0.40	0.46
OH	3.74	2.38	2.31	3.07	4.76	0.50	0.64	0.62	0.82	1.27	0.13
OK	1.22	1.07	0.44	0.64	1.26	0.09	0.88	0.36	0.53	1.04	0.08
OR	1.24	0.93	0.88	0.95	0.69	0.02	0.75	0.71	0.77	0.56	0.02
PA	4.11	1.95	2.26	3.50	3.45	0.63	0.47	0.55	0.85	0.84	0.15
RI	0.34	0.23	0.18	0.00	0.05	0.21	0.67	0.54	0.00	0.14	0.63
SC	1.50	0.91	0.13	1.42	2.80	0.04	0.61	0.09	0.95	1.87	0.03
SD	0.26	0.24	0.01	0.19	0.16	0.00	0.90	0.04	0.73	0.60	0.00
TN	2.06	1.35	0.77	1.80	1.91	0.00	0.66	0.38	0.88	0.93	0.00
TX	8.14	6.76	4.41	5.21	9.66	0.25	0.83	0.54	0.64	1.19	0.03
UT	0.90	0.19	0.19	0.29	0.63	0.16	0.21	0.22	0.32	0.70	0.18
VA	2.59	1.49	2.00	1.47	2.88	0.09	0.57	0.77	0.57	1.11	0.03
VT	0.20	0.04	0.00	0.00	0.01	0.04	0.21	0.00	0.00	0.03	0.22
WA	2.18	1.48	1.49	1.88	1.30	0.17	0.68	0.69	0.86	0.60	0.08
WI	1.84	0.56	0.55	1.30	1.06	0.88	0.31	0.30	0.71	0.58	0.48
WV	0.60	0.20	0.09	0.46	0.19	0.00	0.33	0.15	0.77	0.32	0.00
WY	0.18	0.10	0.04	0.15	0.14	0.00	0.56	0.22	0.84	0.74	0.00
AB	1.18	0.04	0.21	0.00	0.02	8.06	0.03	0.18	0.00	0.02	6.82
BC	1.43	0.54	0.35	0.01	0.08	5.38	0.38	0.24	0.01	0.06	3.77
MB	0.39	0.02	0.03	0.03	0.00	2.83	0.06	0.08	0.07	0.00	7.23
NB	0.24	0.09	0.00	0.00	0.00	0.30	0.35	0.00	0.00	0.00	1.22
NS	0.30	0.00	0.10	0.00	0.01	0.92	0.00	0.34	0.00	0.02	3.09
NT	0.01	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	3.69
ON	4.16	0.47	2.38	0.55	0.23	20.92	0.11	0.57	0.13	0.06	5.03
PE	0.05	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	7.54
QC	2.56	0.11	0.67	0.11	0.10	7.70	0.04	0.26	0.04	0.04	3.01
SK	0.33	0.02	0.06	0.00	0.05	4.17	0.05	0.18	0.00	0.14	12.47

D State Regional Sports Markets

Table 26: State Regional Sports Markets

ST	State Regional Sports Market	Constituent Markets	Distance
AZ	Phx/Tucs	Phoenix, Tucson	113
CA	SF-Oak-SJ/Sac	SF-Oak-SJ, Sacramento	88
CA	LA/SD	Los Angeles, San Diego	120
CO	Denver/ColoSp	Denver, Colorado Springs	71
DC	WashDC-Balt/Rich	WashDC-Balt, Richmond	109
FL	Tampa/Orlando	Tampa, Orlando	84
KY	Louis/Lex	Louisville, Lexington	78
LA	NO/BR	New Orleans, Baton Rouge	81
NY	Buff/Roch	Buffalo, Rochester	77
OH	Cin/Col/Day	Cincinnati, Columbus, Dayton	107
OK	OKC/Tulsa	Oklahoma City, Tulsa	107
SC	Grnv/Colum	Greenville, Columbia	103
TX	SA/Austin	San Antonio, Austin	80
WI	Mil/GB/Mad	Milwaukee, Green Bay, Madison	117