

Personal Seat Licenses:
Who's Winning this Round of
the Stadium Financing Game?

by

Esther Chao

An honors thesis submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Science

Undergraduate College

Leonard N. Stern School of Business

New York University

May 2018

Professor Marti G. Subrahmanyam

Professor David Yermack

Faculty Adviser

Thesis Adviser

Table of Contents

1	INTRODUCTION	5
2	BACKGROUND INFORMATION	7
2.1	Personal Seat Licenses	7
2.2	Implementation by Teams: PSLs as Alternative Means of Financing	8
2.2.1	<i>Low Cost of Implementation</i>	9
2.2.2	<i>Equity-Efficiency Trade-Off</i>	10
2.2.3	<i>NFL Revenue-Sharing Policy</i>	12
2.3	Reception by Fans: PSLs as Alternative Investments	12
3	DATA DESCRIPTION	15
3.1	Raw Data Collection	15
3.2	Data Cleansing	16
4	ANALYSIS #1: RETURN ON INVESTMENT (ROI)	17
4.1	Methodology	17
4.2	Findings	18
4.2.1	<i>Comparison Between Teams</i>	18
4.2.2	<i>Comparison Between First Resales vs. Subsequent Resales</i>	20
4.3	Analysis #1: Conclusion.....	21
5	ANALYSIS #2: FAMA-FRENCH-CARHART FOUR FACTOR MODEL.....	21
5.1	Methodology	21

Personal Seat Licenses	2
5.2 Findings	24
5.2.1 <i>Total Sample of PSLs</i>	24
5.2.2 <i>Fixed Effects Regression</i>	25
5.2.3 <i>Individual Franchise Regressions</i>	25
5.3 Analysis #2: Conclusion.....	26
6 DISCUSSION AND FURTHER WORK.....	27
7 APPENDIX A: Fama-French-Carhart Four Factor Model Regression Results across the Entire Sample.....	29
8 APPENDIX B: Fama-French-Carhart Four Factor Model Regression Results for Individual Teams	30

Table of Figures

1	Total Cost of Stadium Projects Funded by PSLs	8
2	Highest Face-Value Prices vs. Highest Resale Prices	13
3	Average Annualized ROI of PSLs for NFL Franchises	18
4	Average ROI of First Resales vs. Subsequent Resales	19
5	Alpha Estimations Using the Four Factor Model	25

Abstract

This thesis examines whether sports teams or fans are benefitting from the rise of personal seat license (PSL) programs in the National Football League. Using data collected from STR Marketplace, a secondary market and online brokerage for PSLs, we conducted two analyses. We first calculated the return on investment for seat licenses to determine the role of PSLs as profitable alternative financial assets. Then, we modeled an investor's excess return relative to returns on the traditional equity market to determine the efficiency of PSLs as an inexpensive means of financing for teams. We came to two corresponding conclusions: 1) PSLs are usually profitable investments and 2) sports franchises bear a higher cost of capital to issue seat licenses relative to their estimated cost of equity had they sold ownership rights on the equity market instead. Since PSLs are apparently a relatively expensive means of financing for teams, we ultimately crown licensees as the winners of this round of the stadium financing game.

1 INTRODUCTION

For the past two decades, Pat Smart has invested more than just emotion into the National Football League (NFL). He manages nearly \$200,000 worth of personal seat licenses—about \$100,000 in Baltimore Ravens licenses and the other \$100,000 in Philadelphia Eagles licenses. Personal seat licenses (PSLs) transfer stadium seat ownership rights from a sports team to the individual licensee for as long as the venue remains in use. Although a team only issues a fixed number of PSLs, these seat rights are legally allowed to be resold and transferred. Demand on the secondary market is high because season ticket holders are required to first purchase the rights to a seat through a PSL before paying face-value prices for the season tickets associated with that seat. When business was down 50 percent in Smart’s roofing company due to the slumping economy in 2008, he earned about \$40,000 from his NFL investments.¹

Since then, Smart has diversified his portfolio by acquiring seat rights for the former St. Louis Rams and the Cincinnati Bengals, referred to by journalists as “the junk-bond investment of seat licenses”.² Dialogue surrounding PSLs in the media frequently resembles language used to normally describe financial securities. While some traditional sports fans criticize seat licenses as rip-offs, theft, and “fricking ridiculous,” other individuals like Smart view them as alternative investments to the stock market. Kyle Burks created an online brokerage for these transactions in 2008 when he launched STR Marketplace, a platform connecting buyers and sellers of PSLs. He argues that after the financial crisis, “a lot of people took large sums of money out of the stock markets and were left wondering what to do with it, so they invested in PSLs because the NFL is a lot easier for them to understand than the stock market.”³ Potential investors are unsurprisingly

¹ Barker, J. (2009, June 25). *Owning A Ravens Seat Can Pay Off Big Time*. Retrieved from The Baltimore Sun.

² Deitch, C. (2009, May 14). *Black and Gold Futures*. Retrieved from Pittsburgh City Paper.

³ Deitch, C. (2009, May 14). *Black and Gold Futures*. Retrieved from Pittsburgh City Paper.

encouraged by anecdotes of Smart's success and articles exclaiming values for certain teams' licenses have increased up to 1,622.40% over ten years.⁴

However, if anecdotes and articles argue PSL investors are able to earn high returns, they imply that seat licenses are expensive for teams to issue. High resale prices indicate mispricing and unclaimed consumer surplus resulting in a prosperous secondary market. Contrastingly, the number of NFL teams implementing PSL programs has grown. Teams sell seat licenses to finance large-scale renovations or the construction of new stadiums, as opposed to traditional methods that relied on taxpayers, debt, or private investors. At a time when seat licenses are becoming increasingly prevalent because of their perceived low-cost implementation, teams should determine whether PSLs are truly an inexpensive, efficient means of financing.

PSL programs can only support both high returns for fans and low-cost financing for franchises if there is an efficient reallocation of risk. Originally borne by the franchise in pricing its seat licenses, the risk is whether the team performs well on the field and creates uncaptured consumer surplus. Arguably, loyal fans are better able to bear that risk than a team. The goal of this paper is to determine the winner, if any, in the PSL market. In the sections that follow, Part II provides more background information and offers perspectives from both parties. Part III introduces our data set of PSL transactions from the secondary market. Our two analyses take place in Parts IV and V. Part IV will examine the role of seat licenses as an alternative financial asset by calculating their annualized return on investment. Those returns will subsequently serve as inputs for the Fama-French-Carhart Four Factor Model used in Part V, providing a benchmark cost of equity for comparison with PSLs. This Model will reveal whether PSLs are outperforming the equity market and, from the team's perspective, whether PSLs are actually a

⁴ Belko, M. (2011, Nov 27). *Value booming for Heinz Field's seat licenses*. Retrieved from Pittsburgh Post-Gazette.

low-cost alternative means of funding large-scale stadium projects. By the end of the paper, we hope to have answered our question: who's winning this round of the stadium financing game?

2 BACKGROUND INFORMATION

2.1 Personal Seat Licenses

Personal seat licenses, sometimes referred to as Charter Ownership Agreements (COAs) or Stadium Builder Licenses (SBLs), are contractual agreements that entitle the licensee the right to purchase season tickets for a specific seat in the venue. Essentially subjected to a two-part pricing mechanism, season ticket holders are required to first purchase seat rights through a PSL before paying face-value prices for the actual tickets. Seat rights are revoked if licensees fail to renew their tickets annually. While some teams still offer season tickets in certain lesser-quality sections without the purchase of a PSL, others have opted to attach licenses to every seat in the venue and stop selling single-game tickets altogether. PSL licensees enjoy the same exclusive benefits of traditional non-PSL season ticket holders, including parking discounts and player meet-and-greet opportunities, but their additional payment essentially grants them the unique ability to legally resell their seat rights on a secondary market. Specific details of the contractual agreement, such as transfer processing periods and associated fees, vary by team.

Within the four major sports leagues in the U.S., seat licenses are currently implemented or prepared to be implemented by three National Basketball Association (NBA) teams, five Major League Baseball (MLB) clubs and two National Hockey League (NHL) franchises. No league compares to the NFL in terms of PSL prevalence; 19 out of 32 NFL teams currently have or are planning to issue seat licenses. The current structure of seat licenses in the NFL requires a one-time investment by the licensee to receive seat ownership rights from the team beginning at the time of construction and continuing for as long as the venue remains in use. With more than

half of their franchises issuing PSLs to finance their stadiums, we will focus on the NFL and the history of stadium financing to understand why seat licenses have become increasingly widespread as a means of funding by teams.

2.2 Implementation by Teams: PSLs as Alternative Means of Financing

The ability of a city to provide a state-of-the-art stadium is crucial in attracting or retaining a franchise. The history of financing sports facilities can be broken into three eras: the Entrepreneurial Period, the Civic Infrastructure Period, and the Public-Private Partnership Period. Beginning around 1890, venues built during the Entrepreneurial Period were privately financed by team owners. Then, the development of American cities and growing willingness of franchises to relocate led to the publicly-built facilities of the Civic Infrastructure Period from 1962 to 1991. As both the costs of stadiums and criticism from taxpayers have increased, local and state governments have become less willing to fully-finance new facilities. Since 1992, teams and governments have created public-private partnerships instead. Usually half of construction costs are subsidized, driving teams to search for alternative sources of funds.⁵

Especially in the NFL, teams have been eager to implement PSL programs to finance their new facilities as public subsidies have decreased. Rather than allocating a smaller budget for these venues, franchises are growing the revenue goal for seat license sales to cover increasing construction costs (Figure 1). Although franchises are no longer relying on taxpayers, PSL programs are not implemented without criticism. Teams are accused of being greedy, caring more about profit than the love of the game, and depriving middle- or low-income fans from attending live sporting events. Despite public discontent, we will explore three reasons why NFL teams may benefit from seat licenses as an alternative means of financing.

⁵ Leeds, M. a. (2011). *The Economics of Sports* (4th ed. ed.). Pearson Addison Wesley.

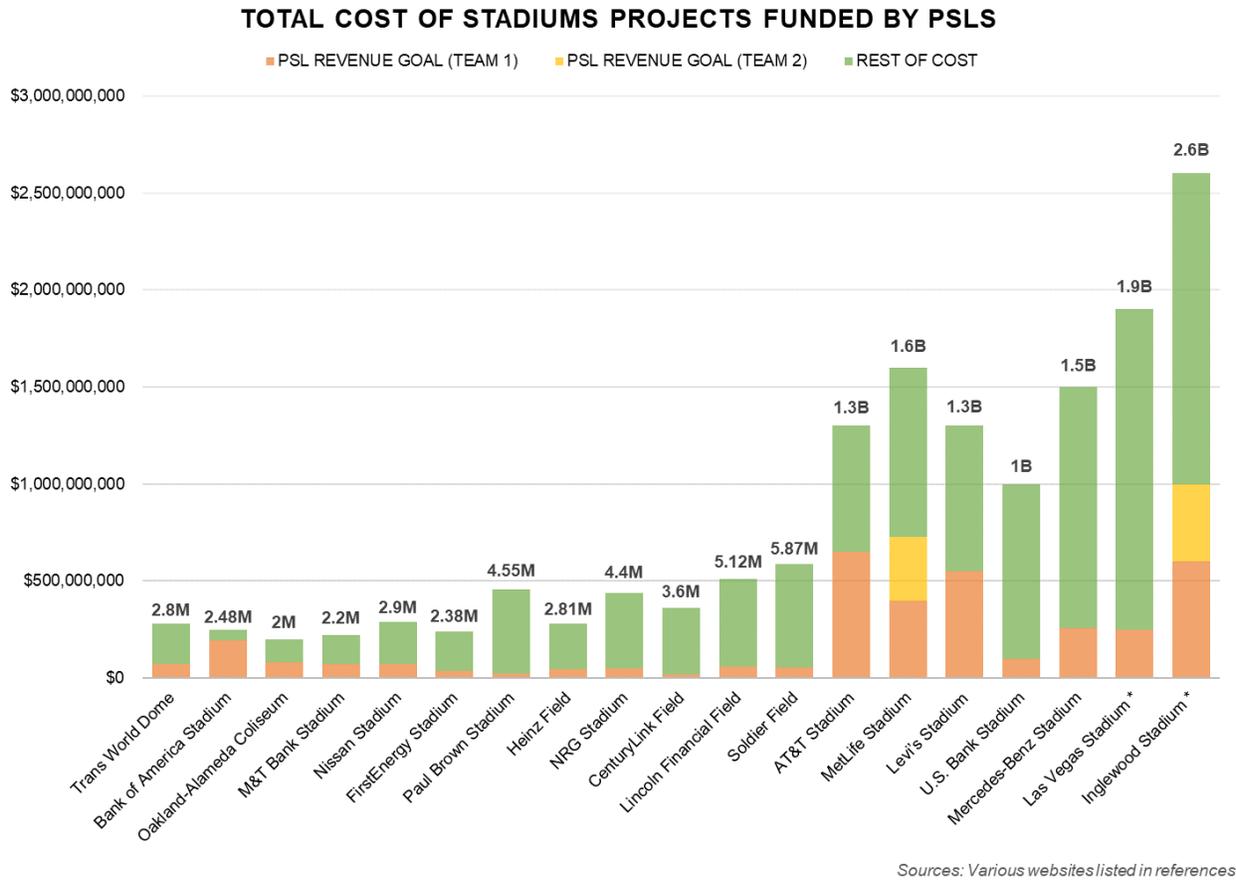


Figure 1. Total cost of renovation and construction projects partially funded by PSLs from 1995 (left) to 2020 (right). Stadiums denoted by an asterisk are expected to be completed by 2020. PSL Revenue Goals refer to original team announcements and may not reflect the realized amount raised by PSLs.

2.2.1 Low Cost of Implementation

Sports marketing executive Max Muhleman has been accredited as the creator of personal seat licenses as an alternative means of stadium financing in 1987. Charlotte, North Carolina wanted an NBA expansion team but knew it could not compete with bids from larger markets like Miami and Orlando. Muhleman organized a fund where fans put down a non-refundable deposit for their prospective season tickets. If Charlotte did not win the bid, the fans would lose their \$50 - \$200 deposits.⁶ Regardless of the risk, fans pledged 10,000 season tickets and the

⁶ Gordon, A. (2015, Dec 28). *The Creator of Personal Seat Licenses Hates Them As Much As You Do*. Retrieved from Vice.

franchise was subsequently awarded to Charlotte. To thank the dedicated North Carolinians that had helped win the bid, Muhleman suggested giving them ownership of their seats since they could not own stock in the team itself. Thus, Charter Seat Licenses were born—originally free and gifted to season ticket holders as a show of gratitude.⁷

Four years later, the people of Charlotte found themselves in a similar situation while bidding for an NFL expansion team. Former NFL player Jerry Richardson had set up credit lines with local banks to cover construction costs for a \$160 million stadium, but upon the League's announcement of a \$140 million expansion fee, Richardson turned to Muhleman for alternative funding sources. Muhleman changed the name of Charter Seat Rights to Permanent Seat Licenses—later to be changed again to Personal Seat Licenses upon the advice of lawyers—and sold roughly 50,000 PSLs at an average price of \$2,200. After Charlotte won the bid, the rest of the sports industry recognized that Muhleman had managed to raise more than \$92 million through the creation of this new product. Neil Demause, author of *Field of Schemes*, admits the appeal of seat licenses from a business perspective is straight-forward: "Once you realize that you can sell this privilege rather than offer it first-come first-served [sic] to anyone who wants, it's an obvious way to raise money."⁸ Thus, PSL programs emerged over the next two decades as a new means of funding for large-scale stadium renovation and construction projects.

2.2.2 Equity-Efficiency Trade-Off

The Los Angeles Rams' new Inglewood Stadium will be entirely privately-financed and shared with the future Los Angeles Chargers, who chose to leave San Diego after voters refused

⁷ Friedman, B. (2012, Nov 27). *Max Muhleman: Sporting Success*. Retrieved from UNC School of Media and Journalism.

⁸ Gordon, A. (2015, Dec 28). *The Creator of Personal Seat Licenses Hates Them As Much As You Do*. Retrieved from Vice.

to finance a new stadium. The situation highlighted a growing sentiment that “gone are the days where there is broad public support for taxpayer-funded stadiums.”⁹ When governments provide public subsidies to sports facilities, they rely on two basic sources of revenue: taxes and debt. Taxpayers cannot escape payment since officials must eventually raise taxes to repay loans.

When imposing a tax, governments often face an equity-efficiency trade-off. Tax analyses examine two forms of equity: vertical equity and horizontal equity. A policy is vertically equitable if it considers a person’s ability to pay and horizontally equitable if it levies taxes in proportion to the benefits received. However, policies that preserve some notion of fairness may not be efficient in minimizing deadweight loss. Deadweight loss occurs when supply and demand are not in equilibrium due to an inefficient allocation of resources. In economics, the Ramsey Rule states that sales taxes should be imposed in inverse proportion to the price elasticity of demand for the good on which the tax is placed.¹⁰ If a good is relatively price inelastic, an increase in price due to an additional tax would not greatly affect the quantity demanded. A tax placed on that good would therefore be efficient. Unfortunately, the burden may unfairly fall on citizens who do not benefit from the use of funds raised by the tax.

If we equate the one-time fee of a PSL to a tax on a season ticket, seat license programs address the equity-efficiency trade-off very well. Most stadiums have only implemented seat licenses in their most expensive seating sections. Since fans who normally purchase season tickets in those sections are relatively wealthy or corporate clients, PSLs are vertically equitable. They are also horizontally equitable because the burden of financing the stadium is borne by the citizens that will attend the games there. Finally, seat licenses are arguably efficient in theory

⁹ Kitroeff, N., & Miller, D. (2017, Jan 13). *Chargers' move shows California is sick of spending public money on the NFL*. Retrieved from LA Times.

¹⁰ Leeds, Michael, and Peter Von Allmen. *The Economics of Sports*. 4th ed., Pearson Addison Wesley, 2011.

because economists have found that professional sports teams typically price their tickets in the inelastic portion of their demand curves.¹¹ High mark-ups on tickets resold by scalpers or on online markets verify their conclusions. Therefore, “taxing” season tickets by attaching a PSL fee should minimize deadweight loss without detrimentally affecting the quantity of demand.

2.2.3 NFL Revenue-Sharing Policy

The NFL has the most egalitarian revenue-sharing model of the four major US sports leagues. League income, primarily from broadcast deals and licensing, is distributed evenly among the 32 teams. Home teams only keep 60% of their ticket sales for each game while the visiting team receives the other 40%.¹² Other sources of revenue, such as stadium concessions and the sale of luxury boxes, are not shared and serve as the major differentiating factors across teams. After the construction of the Miami Dolphins’ stadium in 1987, owners divided club-seat revenue into two categories: club tickets and club fee premiums. The ticket portion of the club seat is shared with the league as normal gate revenue, but the owners decided to waive the visiting team share (VTS) of club seat premiums as long as the fees were used in the construction of the new stadium. The VTS waiver was later extended to seat licenses in 1996.¹³ Teams reap the proceeds of PSL sales without contributing a fraction to the revenue-sharing pool.

2.3 Reception by Fans: PSLs as Alternative Investments

Unsurprisingly, the general public has criticized teams for charging an additional fee for seat rights to season tickets that previously didn’t require seat licenses. However, some fans have

¹¹ Rishe, P. (2013, Sep 19). *Super Bowl XLVIII Pricing: A Lesson In Demand Elasticity*. Retrieved from Forbes.

¹² Zegers, C. (2017, March 24). *Revenue Sharing and North America's Major Pro Sports Leagues*. Retrieved from ThoughtCo.

¹³ Vrooman, J. (2011). *The Economic Structure of the NFL*. In K. G. Quinn, *The Economics of the National Football League: The State of the Art* (pp. 7-31). Springer Science & Business Media.

embraced PSLs and capitalized on their transferability. When he created the concept, Muhleman never initially considered the potential of reselling PSLs for a profit; he had added the clause with families and friends in mind. Then, after the Hornets' inaugural NBA season in Charlotte, Muhleman saw an ad in the paper that read, "Leaving town. Two charter seat rights. \$5000." When he called, the seller said he had already received about a dozen calls and regretted not asking for \$10,000.¹⁴ As teams realized that seat licenses were an inexpensive way to raise funding, fans began figuring out they had the potential to earn a return by reselling their PSLs.

Secondary markets for seat licenses have evolved from local newspaper ads to online brokerages, such as Season Ticket Rights (STR) Marketplace. Kyle Burks founded the platform after he purchased four PSLs for the Houston Texans in the parking lot of a Galleria Mall for \$20,000.¹⁵ Realizing the high level of risk involved in such large transactions, Burks created STR Marketplace to connect buyers with sellers and facilitate the transfers. The platform partners with teams as their official PSL secondary marketplace. It collects a 10% buyer fee and 10% seller fee for each sale while the team also charges a predetermined transfer fee. It's important to note that online brokerages only facilitate the transfer of seat rights; if the seller has already purchased season tickets for the upcoming or current season, the buyer and seller must reach a separate agreement regarding the sale price and exchange of those tickets.¹⁶

Final sale prices of PSLs on the secondary market reflect uncaptured consumer surplus when compared to lower face-value prices (Figure 2). Among the nine NFL teams illustrated in Figure 3, all maximum resale prices exceed the highest price initially charged by the team except for the New York Jets; the average excess among the remaining eight teams is \$30,494.

¹⁴ Gordon, A. (2015, Dec 28). *The Creator of Personal Seat Licenses Hates Them As Much As You Do*. Retrieved from Vice.

¹⁵ *What Is A Personal Seat License (PSL) And Should I Purchase One?* Retrieved from From This Seat.

¹⁶ *How to Sell*. (n.d.). Retrieved from Baltimore Ravens PSL & Waitlist Marketplace.

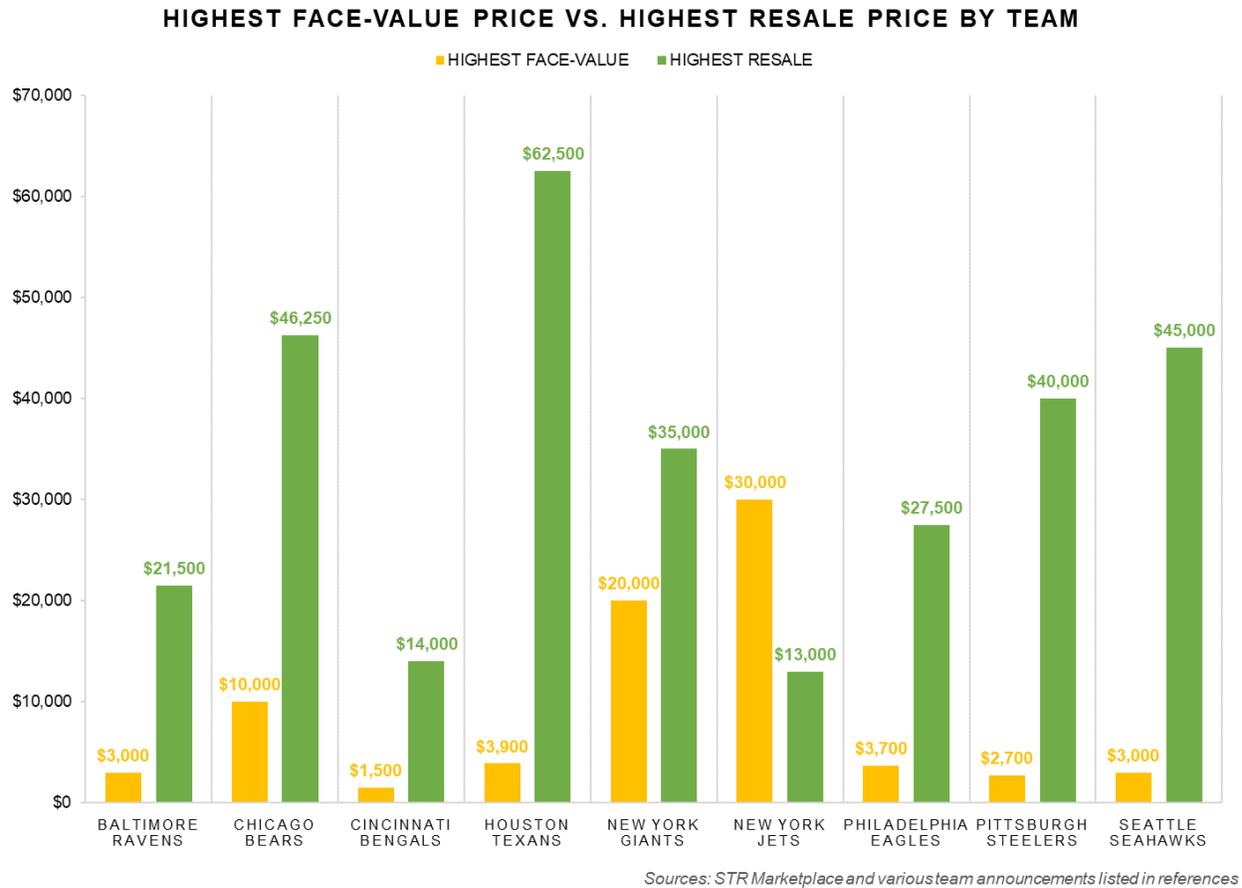


Figure 2. Comparison of the highest PSL face-value price and highest PSL resale price of nine NFL teams. Face-value prices refer to original team announcements. Resales occurred on STR Marketplace.

These observations substantiate anecdotes of higher returns and indicate that most teams are underpricing their seat licenses. Preston Hill, President of STR Marketplace, attributes this discrepancy to teams’ strategies to sell their PSLs as quickly as possible rather than maximize the price. He pointed to the Dallas Cowboys—with seat licenses from \$2,000 up to \$150,000—as “the first to put theirs on the market at what I’d say is at market value vs. what we’d call a market-clearing value.” Hill uses “market value” to refer to a fair value agreed upon by the team and its consumers, implying that high demand from fans would drive up PSL prices. “Market-clearing value” claims teams are just looking to sell out as quickly as possible.¹⁷

¹⁷ *Cowboys Stadium seats still a hot ticket as team wraps up fourth season in Arlington* (2012, Dec). Retrieved from SportsDay Dallas News.

Steven Salaga and Jason A. Winfree investigated the determinants of high PSL resale prices in their 2015 publication, “Determinants of Secondary Market Sales Prices for National Football League Personal Seat Licenses and Season Ticket Rights.” They found an inverse relationship between PSL resale prices and the face-value prices of season tickets associated with their respective seat license. Interestingly, their results also introduced the possibility of PSL asset depreciation because resale prices decreased significantly from the beginning to the end of their data set (2005 – 2009). Salaga and Winfree argue this trend derives from the shrinking window of the option to purchase season tickets with the PSL as the venue ages and the franchise moves closer to constructing a different stadium with new seat licenses.¹⁸ Besides this article, there is limited academic research regarding seat licenses. Rather than focusing on price behavior, our thesis will use secondary market sales data to uncover and estimate a licensee’s return on investment and a team’s cost of capital relative to cost of equity.

3 DATA DESCRIPTION

3.1 Raw Data Collection

Transaction-level secondary market PSL sales data was downloaded from STR Marketplace. We chose nine NFL teams for which this data was readily available: the Baltimore Ravens, Chicago Bears, Cincinnati Bengals, Houston Texans, New York Giants, New York Jets, Philadelphia Eagles, Pittsburgh Steelers, and Seattle Seahawks. Each of these franchises are assigned their own website operated by STR Marketplace; thus, there was a distinct set of detailed sales transactions available for each team. Of these nine franchises, only the Philadelphia Eagles and New York Jets fail to publicize or provide a hyperlink to the

¹⁸ Winfree, S. S. (2015). *Determinants of Secondary Market Sales Prices for National Football League Personal Seat Licenses and Season Ticket Right*. *Journal of Sports Economics*, 227-253.

Marketplace on their team site. Similarly, the New York Jets are the only team in this sample still concurrently selling seat licenses directly to season ticket holders at face-value prices.

For each sales transaction included in the teams' data sets, details are given regarding date, number of seats, seating area, section, row, and total price. The earliest transactions for each team vary depending on their original PSL issue date and the beginning of their partnership with STR Marketplace. The earliest transactions in our overall sample took place in May 2007 (Baltimore Ravens). All information was last updated by STR Marketplace in November 2017. Prior to cleaning up the raw data into our final sample, there were a total of 13,613 transactions.

3.2 Data Cleansing

Our research question ultimately assumes that fans who are purchasing seat licenses treat them as alternative financial investments to traditional markets like the S&P 500, as opposed to buying seat rights strictly out of love for the team, intentions to attend every game, or a desire for complementary benefits. Likened to investors, licensees who trade on the secondary market therefore wish to maximize their return on investment. Consequently, among all the sales that took place, we were only interested in transactions that we considered to be flips. Flips are defined as PSLs that have been both bought and resold on the Marketplace. In traditional investment contexts, flipping refers to purchasing an asset with the intention of selling it for a quick profit. Just as when consumers flip cars and real estate, we assume the underlying intention when purchasing a PSL is to sell later in the future for a good margin.

We narrowed our sample into only flips by accounting for two constraints: 1) the duplicate ID requirement and 2) a 365-day holding period. First, we identified flipped PSLs by assigning IDs consisting of the number of seats, seating location, section, and row involved in the transaction. If two or more transactions shared an identical ID, it was classified as a flipped

PSL. Although specific seat numbers were not given, we believe our assumption is justified because the quality of the seating location—the intrinsic value of the PSL—does not vary drastically within the same seating section and row. Second, we adjusted for team policies that require their PSLs to be held for a certain amount of time. For example, the Baltimore Ravens and New York Giants do not allow a seat license to be transferred more than once within a 365-day period. We applied this universal rule of a 365-day holding period to the transactions of all nine teams to assume they were viable attempts of people purchasing and reselling the same seats to generate a profit. After taking both the duplicate ID requirement and 365-day holding period requirement into consideration, our final sample contains 4,276 transactions.

When analyzing our final sample, we also wanted to compare the returns and behavior of two groups of investors within the PSL secondary market: First Resellers and Subsequent Resellers. The first time an ID appears in our final sample is known as a *First Resale*, which assumes the seller originally bought the PSL at face value from the team. Their following duplicates are classified as *Subsequent Resales* and assume the seller had originally purchased those seats from the Marketplace. These two groups could vary in return on investment due to the low face-value prices of PSLs initially charged by the team and the length of their holding periods. Our final sample consists of 1,937 First Resales and 2,339 Subsequent Resales.

4 ANALYSIS #1: RETURN ON INVESTMENT (ROI)

4.1 Methodology

The goal of this first analysis was to determine whether licensees can generate a high return by buying and selling PSLs on a secondary market. It tested the notion that seat licenses can serve as profitable alternative financial investments or potential substitutes for traditional stock. Since a financial asset's performance is normally assessed in terms of return, we

calculated the annualized return on investment (ROI) for each transaction in our sample. ROI is used to evaluate efficiency by measuring the return on an investment relative to its cost.

While all inputs were given for Subsequent Resales, this process required two assumptions regarding the purchase price and holding period of First Resales. First, we assumed that all First Resellers purchased their seat license from the team at originally-announced prices. We referred to team websites, newspaper articles, and online posts by fans to conclude credible PSL face-value prices for their associated seating sections. The only exception was the New York Jets. They were the only team in our sample who has lowered the face-value prices of seat licenses since their implementation in 2010. Although their original prices were unavailable, we believe the use of their current prices is justified and gives their fans “the benefit of the doubt” when estimating their annualized ROI, as higher face-value prices would deflate their ROI.

The second assumption fixed the same original purchase date for each First Resale of a given team, meaning that all First Resellers purchased from the team at the earliest date possible upon PSL announcement. We determined the date for each of the nine teams based on newspaper announcements and media coverage. This assumption extended the average holding period of First Resales and thus decreased our calculated annualized ROI for each transaction. Therefore, in our analysis, we understand we used a conservative estimate of the licenses’ returns.

4.2 Findings

4.2.1 Comparison Between Teams

Based on the average annualized ROI among the transactions of each team, we found that fans of seven out of nine franchises were earning a positive return on their investment (Figure 3). The only PSLs that produced negative annualized returns belonged to the two New York teams, the New York Giants (-0.74%) and the New York Jets (-25.64%). The average seat license among

our sample generated 6.01% for its investors, surpassed by returns on PSLs of the Pittsburgh Steelers, Houston Texans, and Seattle Seahawks at 6.10%, 17.44%, and 58.93%, respectively.

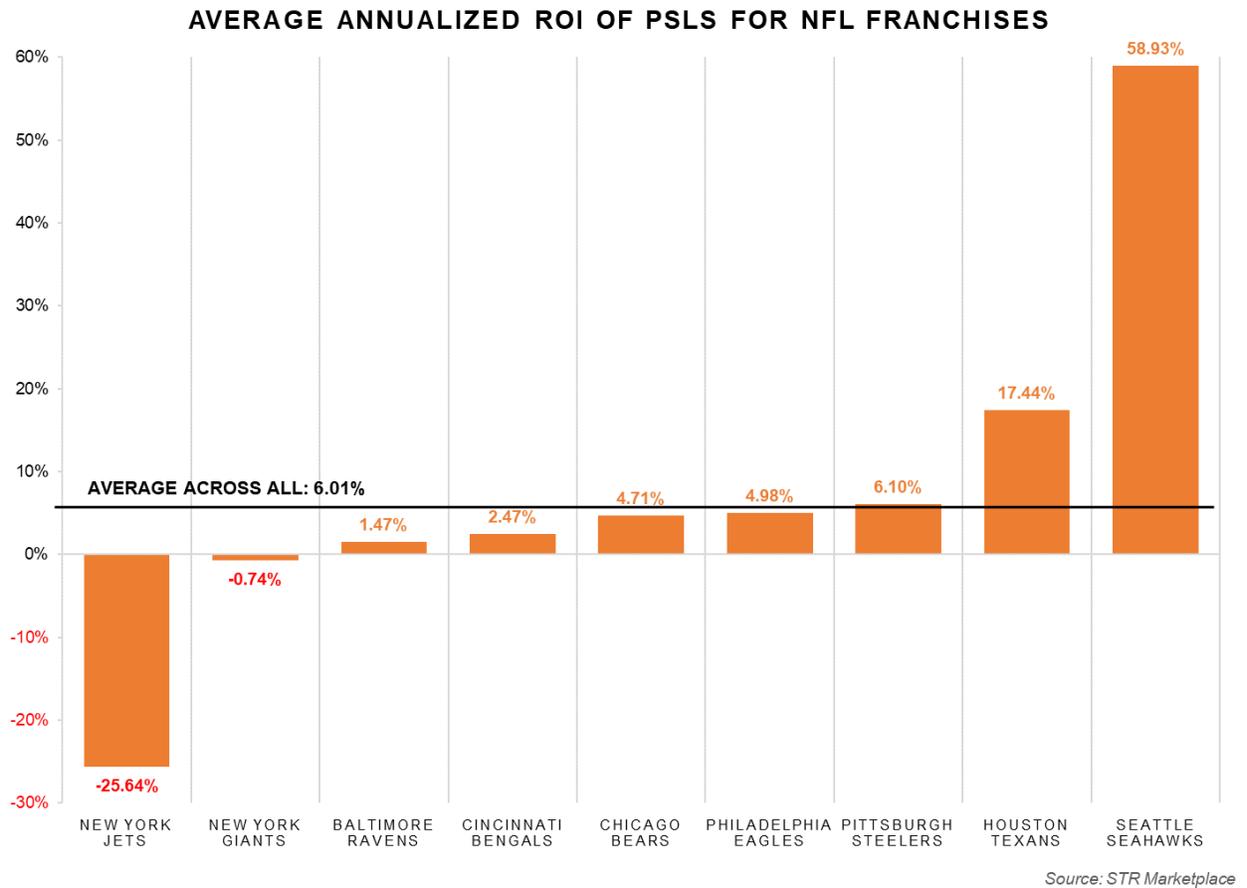


Figure 3. Average annualized ROI for seat licenses of nine select NFL franchises on STR Marketplace.

While neither this paper nor this exercise intend to determine the drivers of PSL returns on the secondary market, the whopping 58.93% earned by investors in Seattle Seahawks seat licenses deserves acknowledgement. The franchise appears to be an extreme case in terms of ability to resell for a profit. Seattle’s time frame is the shortest in our sample, dating back only to February 2012. The team made the playoffs in each of the consecutive four seasons following its partnership with STR Marketplace, winning the Super Bowl in 2013. In addition to on-field performance, the team’s low percentage of PSLs relative to their stadium capacity (12%) could also be driving high demand. More research is required to investigate this topic further.

4.2.2 Comparison Between First Resales vs. Subsequent Resales

On average, ROI for First Resales (8.48%) exceeded Subsequent Resales (3.97%). However, there was no clear indication that one method—purchasing from the team initially or purchasing a resold PSL from the secondary market—was superior to the other. First Resales for PSLs of five teams generated higher annualized ROIs than their corresponding Subsequent Resales, but the remaining four teams illustrated the opposite (Figure 4).

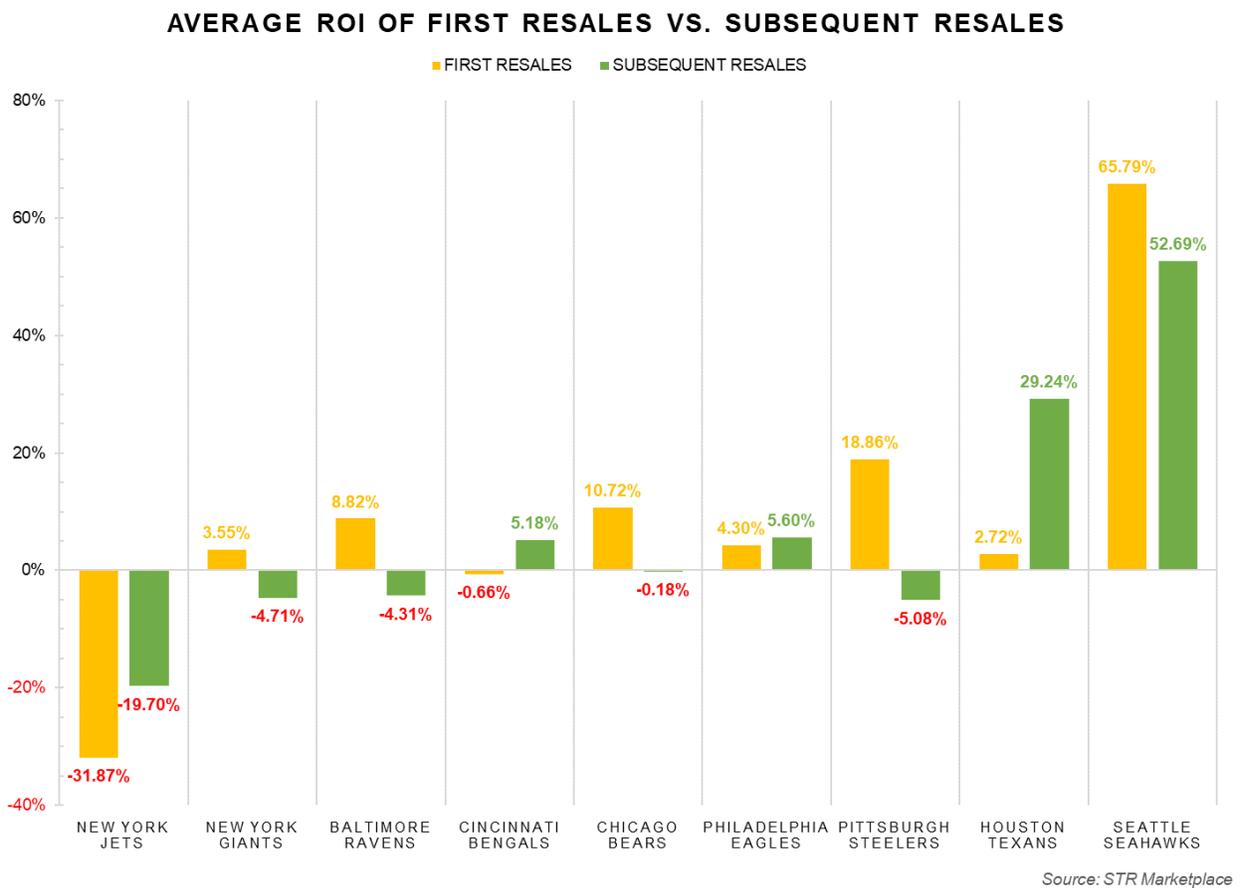


Figure 4. Comparison of the average annualized ROI of First Resales vs. Subsequent Resales of nine select NFL franchises on STR Marketplace.

We originally hypothesized First Resellers would outperform Subsequent Resellers because they purchase their PSLs at a lower face-value price from the team. In comparison, due to uncaptured consumer surplus, we assumed Subsequent Resellers would purchase at a higher

market-determined price on the secondary market. This would be consistent with the theory that teams are underpricing their seat licenses. In fact, First Resellers for seven out of the nine teams paid less for their seat rights compared to Subsequent Resellers, averaging a discount of \$2,239.55 among the entire sample. Thus, the fluctuation of returns is most likely attributed to sale price rather than purchase price. Subsequent Resellers were able to sell their PSLs at an average premium of \$47.64, but First Resellers of five teams still sold at higher prices than their counterparts. Our findings imply that trends affecting return rely on demand factors related to timing rather than purchase method. Unlike we originally hypothesized, the potential annualized ROI an investor can earn does not depend on whether the investor originally purchased on the primary or secondary market.

4.3 Analysis #1: Conclusion

Based on their annualized returns, we confirm the general notion that licensees are usually able to generate a profit by buying and reselling PSLs on the secondary market, earning an average of 6.01%. However, it's inconclusive to argue seat licenses are a great investment solely because they produce a high ROI. Financial performance should be judged relative to a benchmark. In this case, media coverage has implied seat licenses are a profitable alternative to the stock market. We tested widespread theory in our next section by using ROI to estimate a PSL investor's excess return relative to returns on the traditional equity market.

5 ANALYSIS #2: FAMA-FRENCH-CARHART FOUR FACTOR MODEL

5.1 Methodology

The objective of this second analysis was to determine whether PSLs are truly an inexpensive means of financing for teams by considering an investor's excess return over

equities. Traditional corporations raise funds in two ways: debt financing or equity financing. Cost of capital is consequently a function of both cost of debt and cost of equity; it is the rate of return expected and required to persuade investors to provide financing. From the team's perspective, we regard this number as a required payout to the licensees. Muhleman originally created personal seat licenses as close imitations of stock since U.S. sports leagues do not allow public ownership of teams. Thus, by likening PSLs to equity, we estimated a team's cost of capital to implement a seat license program relative to their cost if they had sold their ownership rights in the equity market instead. Traditional asset pricing models served as the structure for our regressions and analysis.

Widely used in finance, the Capital Asset Pricing Model (CAPM) calculates the expected return of an asset (\bar{r}_a) given its risk premium. The risk premium is the amount of compensation an investor requires for taking on additional risk, in this case relative to a risk-free asset. The CAPM is as follows:

$$\bar{r}_a = r_f + \beta_a(\bar{r}_m - r_f)$$

where:

r_f = Risk-free rate

r_m = Expected return of the market

β_a = Beta of the asset

Beta, the most crucial element of the CAPM, reflects how risky an asset is compared to the overall market, which has a beta of 1. Since an investor is already expected to earn the market risk premium ($\bar{r}_m - r_f$) simply by investing in an index like the S&P 500, a rational investor will only purchase an asset with higher risk if expecting to earn a higher return.

The model we implemented is the Fama-French-Carhart Four Factor model, expanding on the CAPM to capture more than the single factor of market risk. Factors are attributes that

drive returns of stocks, bonds and other assets. This model traditionally applies to equities and, as its name suggests, relies on four factors to explain a security's expected return: market risk, size, value, and momentum. The size factor (SMB) argues that companies with small market capitalization outperform the market in the long run. The value factor (HML) refers to a company's book value to market value ratio; high book-to-market (BTM) ratios are considered value stocks while low ratios are considered growth stocks. Fama and French assert that value stocks outperform growth stocks in the long run. Carhart later added the momentum factor (MOM), claiming that high-performing stocks will continue to climb while low-performing stocks will continue to decline. Expected return of an asset (\bar{r}_a) is calculated by:

$$\bar{r}_a = \alpha + \beta_a(\bar{r}_m - r_f) + \beta_{a,SMB}(SMB) + \beta_{a,HML}(HML) + \beta_{a,MOM}(MOM)$$

where:

SMB = A zero-investment portfolio that is long small-cap stocks and short big-cap stocks

HML = A zero-investment portfolio that is long high BTM stocks and short low BTM stocks

MOM = A zero-investment portfolio that is long stocks that have performed well over the past 12 months and short stocks that performed poorly over the past 12 months

When conducting our regression analysis, the variable we were most interested in was alpha, a risk premium above the benchmark cost of equity. Our benchmark cost of equity was constructed using the four factors, $\beta_a(\bar{r}_m - r_f) + \beta_{a,SMB}(SMB) + \beta_{a,HML}(HML) + \beta_{a,MOM}(MOM)$. A positive risk premium indicates that the cost to the team for issuing PSLs was greater than if it had sold ownership rights in the equity market; in other words, PSLs outperformed traditional equities. We approached a predictive model with the benefit of hindsight, replacing expected returns on the left side of the regression with realized ROI calculated in Section IV. The market risk factor was constructed from calculating the annualized ROI on the S&P 500 using the closing prices on the PSL purchase and sale dates of each

transaction in our sample. Returns for the zero-investment portfolios simulating size, value, and momentum factors were downloaded from Ken French's website. We implemented the process used to construct the market risk factor to compute the annualized returns of SMB, HML, and MOM as well.

While our primary focus was alpha, we also paid attention to our coefficients of beta. The factors' respective betas indicate the given asset's sensitivity to that factor. Low factor loadings indicate a lack of correlation or fit with the model and, in this case, would imply that seat licenses do not behave like equities. This would diminish the validity of our estimated alpha.

5.2 Findings

5.2.1 Total Sample of PSLs

When we regressed the entire sample of seat license returns on the S&P 500, SMB, HML, and WML using a least squares model, the alpha was 3.28%. Thus, on average, licensees earned 3.28% more than what could be attributed to market movement and traditional equity behavior captured by the four factors. In other words, the cost of capital for teams to issue PSLs was 3.28% higher than their cost of equity if they had sold ownership rights in the equity market.

It's important to note that the R-squared for this regression was very small at 1.36%. R-squared, commonly known as the coefficient of determination, measures how closely our set of PSL returns are to the fitted regression line. In this case, only 1.36% of our data could be explained by the Fama-French-Carhart Four Factor Model. Given the low R-squared, the coefficients for each of the factors were low as well. The largest loadings were on SMB (0.6094) and MOM (0.4178). This raises concern over our underlying intuition for using an asset pricing model designed for equities—perhaps PSLs do not behave like stock.

5.2.2 *Fixed Effects Regression*

Before rejecting our estimated alpha and the use of the Fama-French-Carhart Four Factor Model altogether, we considered the existence of unobserved heterogeneity. The low degree of fit with the Model could be attributed to specific individual differences across the markets of our nine NFL teams. For example, licensees in our sample could possess varying levels of willingness to pay. In order to control for these idiosyncratic differences, we implemented a fixed effects model. This analysis grouped our data by team and essentially attached a dummy variable in a regression for each group, thus “fixing” effects across teams that cannot be measured or observed. The intercept—alpha—was pushed through zero. The regression had a higher R-squared than our initial full-sample regression at 15.34% compared to 1.36%. The use of fixed effects proved seat licenses behave more like equities than previously revealed.

5.2.3 *Individual Franchise Regressions*

In addition to running a single regression for all transactions, we performed an analysis at the individual franchise level to determine how each team ranked in terms of their risk premium paid above the benchmark cost of equity (Figure 6). The Cincinnati Bengals paid the highest premium at 14.06% with the Houston Texans (13.51%), New York Giants (13.41%) and Pittsburgh Steelers (13.40%) not far behind. The degree of fit with the Fama-French-Carhart Four Factor Model varied by franchise from 6% by Philadelphia Eagles seat licenses to 48% by Pittsburgh Steelers seat licenses.

Three teams had negative alphas: the Baltimore Ravens (-1.69%), Seattle Seahawks (-6.74%), and New York Jets (-51.81%). From the team’s perspective, a negative risk premium means that the cost of issuing seat licenses was lower for teams than if they had sold ownership

rights in equity market. Thus, they benefitted from low-cost financing. It is important to note that Seattle was the only team for whom the estimated alpha was not statistically significant.

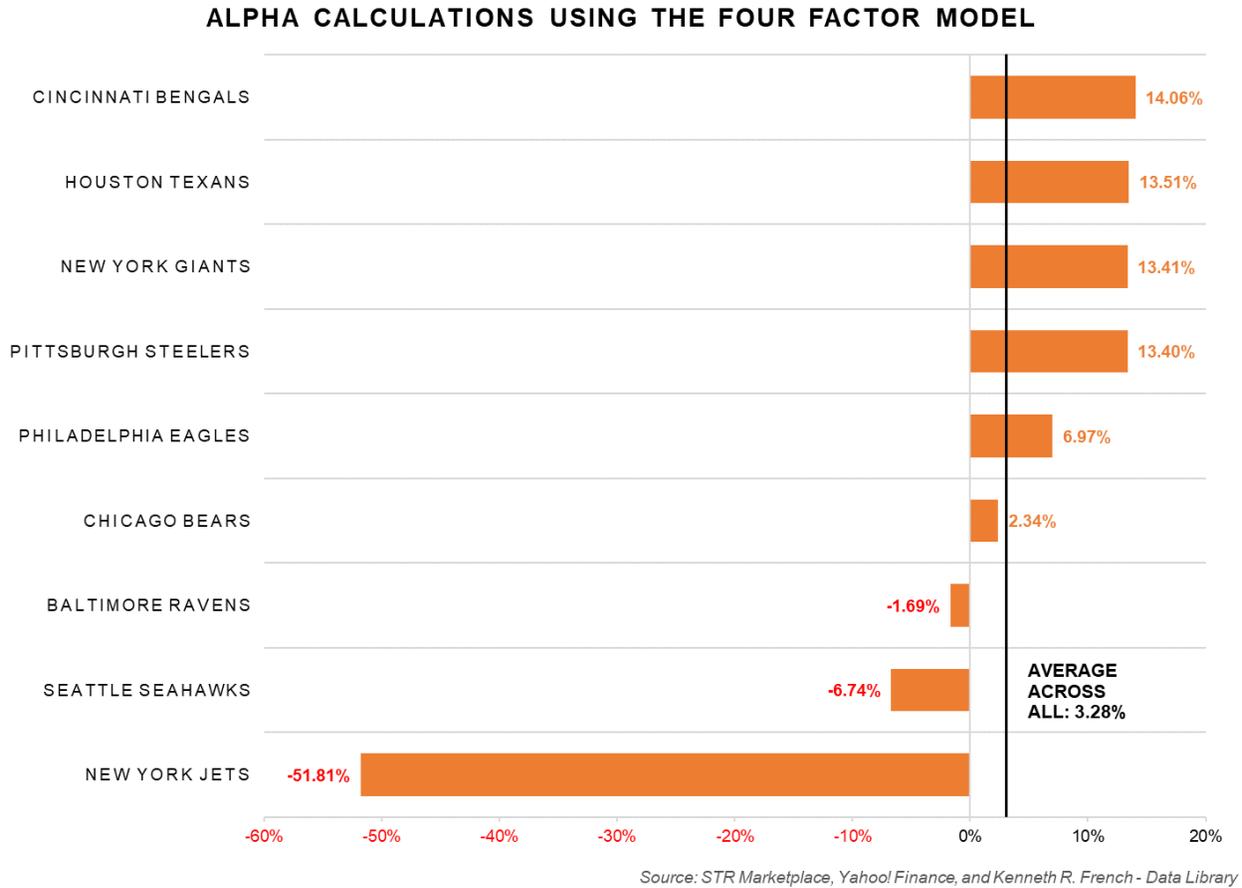


Figure 5. Comparison of risk premiums across nine select NFL teams. Alpha was estimated using least squares regressions under the Fama-French-Carhart Four Factor Model.

5.3 Analysis #2: Conclusion

Although our initial full-sample regression using the Fama-French-Carhart Four Factor Model indicated seat licenses may not behave like traditional equities, controlling for unobserved heterogeneity within our sample increased our R-squared to 15.34%. This meant we were able to input the annualized returns on investment we calculated in Analysis #1 to estimate the alpha for teams implementing PSLs at 3.28%. Their average cost of capital exceeded the estimated cost of equity. For four teams, they paid an even higher premium between 13.40% and 14.06%. We

conclude from this analysis that seat licenses are an expensive means of financing for stadium renovation and construction projects. Perhaps franchises could institute policies to capture consumer surplus through buybacks or annual PSL auctions. For example, the All England Lawn Tennis Club issues its own version of seat licenses for Wimbledon every five years. However, it is beyond the scope of this paper to determine feasibility within the NFL.

6 DISCUSSION AND FURTHER WORK

Our ROI analysis revealed seat licenses generated an average annualized return of 6.01% on the secondary market over our time frame, confirming PSLs are usually profitable investments. Using the entire sample of returns as inputs, the Fama-French-Carhart Four Factor Model estimated a positive alpha of 3.28%. This revealed that seat licenses actually outperformed the traditional equity market by 3.28% after controlling for size, value and momentum factors. Consequently, sports franchises bore a higher cost of capital to issue seat licenses relative to the cost of equity had they sold ownership rights on the equity market instead. Since PSLs are apparently a relatively expensive means of financing for teams, we ultimately crown **licensees** as winners of this round of the stadium financing game.

Looking forward, our conclusion may explain why teams are beginning to adopt alternative models for their seat licenses programs. New PSLs resemble zero-coupon bonds for fans and interest-free loans for teams. The one-time seat license fee is essentially “borrowed” by the team and returned to the licensee after a defined maturity. While we were conducting this study, two teams in the major U.S. leagues announced the use of this structure for their future seat license programs. One was the Golden State Warriors, the first team in the NBA to broadly use PSLs. Initially directing the funds to the construction of their billion-dollar Chase Center, they plan to return the original investments back to licensees after 30 years. Seat rights will not

be allowed to be resold for a value above the original price less depreciation over the number of years used; earning high returns on the secondary market is no longer possible. If the original owner sells at a loss, the team promises to return the difference at the end of the 30-year period. Observers claim this model was implemented by the Warriors to protect their licensees after local criticism toward the San Francisco 49ers and the \$80,000 PSLs used to fund Levi Stadium in 2014.¹⁹

While better public perception may be a positive externality, the NFL's Los Angeles Rams indicate an economic reason for adopting this new structure of PSL financing. The team is the first in the NFL to announce they will return initial investments sans interest to licensees after 50 years. The Internal Revenue Service (IRS) recently approved the categorization of these seat rights as loans from fans, thereby rendering the \$600 million they hope to generate through PSLs no longer taxable as income. From the Rams' perspective, PSLs are essentially a form of tax-free, interest-free debt financing.²⁰ Large tax savings will enable the team to dedicate more funds towards stadium construction costs without raising prices or the supply of PSLs. In the context of cost of capital, the team would bear cost of debt rather than equity as examined in this study. The cost of debt is the interest a company pays on its borrowings, usually represented as an after-tax number. For tax-free, interest-free loans from fans, the cost of debt would be approximately zero. Thus, if franchises continue to adopt PSLs under this new, alternative "debt" structure, they will most likely dethrone licensees as winners of the next round of the stadium financing game.

¹⁹ Rovell, D. (2017, July 20). *Warriors to become first NBA team with broad use of personal seat licenses*. Retrieved from ESPN.

²⁰ Kaplan, D. (2017, June 14). *IRS to Rams: Designing PSLs as non-taxable loans is OK*. Retrieved from American City Business Journals.

7 APPENDIX A: Fama-French-Carhart Four Factor Model Regression Results across the Entire Sample

TOTAL SAMPLE	Alpha		Market Risk Factor		Size Factor		Value Factor		Momentum Factor		R-Sq
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	
ALL	3.27873***	0.65316	0.09179**	0.04635	0.6094***	0.13457	0.09944	0.09944	0.41777***	0.05775	1.36%
Fixed Effects	-	-	0.1768***	0.04444	0.77784***	0.12954	-0.23192***	0.09001	0.54298***	0.05488	15.34%

*** Significance at 1%
 ** Significance at 5%
 * Significance at 10%

8 APPENDIX B: Fama-French-Carhart Four Factor Model Regression Results for Individual Teams

FRANCHISE	Alpha		Market Risk Factor		Size Factor		Value Factor		Momentum Factor		R-Sq
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	
Baltimore Ravens	-1.69464***	0.63019	-0.16649***	0.04833	2.13598***	0.19089	0.32329***	0.10208	0.69985***	0.0561	15%
Chicago Bears	2.33787**	1.16325	-0.08879	0.08575	1.08045***	0.29547	1.28998***	0.23459	1.14511***	0.13342	14%
Cincinnati Bengals	14.0598***	4.72274	-1.13992***	0.28533	-0.73266	0.92777	-2.79446***	0.99047	0.36691	0.68412	29%
Houston Texans	13.5074***	2.05407	1.06542***	0.12151	-1.05891**	0.43688	-0.80323***	0.27561	0.65108***	0.14854	20%
New York Giants	13.4062**	5.08149	-1.20302***	0.34384	3.10014***	0.45828	-0.01862	0.37333	-0.16078	0.29638	14%
New York Jets	-51.8117***	16.9452	1.55738	1.1179	-5.23454**	2.02737	-1.92863**	0.86958	-0.12645	0.7695	26%
Philadelphia Eagles	6.97379**	3.39685	0.14819	0.31141	-0.7844	0.74241	-1.44652*	0.83523	-0.90397*	0.45947	6%
Pittsburgh Steelers	13.4036***	1.27452	-1.25568***	0.09592	1.29869***	0.28714	0.22693	0.22615	-0.67734***	0.2112	48%
Seattle Seahawks	-6.73773	31.89939	3.46188*	1.75541	-6.68338	4.27558	1.97714	2.62844	1.59255	1.8211	9%

*** Significance at 1%
 ** Significance at 5%
 * Significance at 10%

References

- \$1 Billion And Counting For State's Taxpayer-Funded Stadiums*. (2010, Sep 17). Retrieved from Pennsylvania Watchdog: https://www.watchdog.org/pennsylvania/billion-and-counting-for-state-s-taxpayer-funded-stadiums/article_d5f040af-fd5e-5272-8a5b-aac4b41f1dd4.html
- 2017 Seating Chart*. (n.d.). Retrieved from Seattle Seahawks: <https://www.seahawks.com/tickets/seating-chart>
- About Us*. (n.d.). Retrieved from FirstEnergy Stadium: <http://firstenergystadium.com/stadium-info/about-us/>
- About Us*. (n.d.). Retrieved from MetLife Stadium: <https://www.metlifestadium.com/stadium/about-us>
- Allenbach, C. (2017, December 11). Baltimore Ravens PSL Prices. (E. Chao, Interviewer)
- AP. (2010, June 11). *NY Jets Cut Prices for Some*. Retrieved from CNBC: <https://www.cnbc.com/id/37636099>
- Baltimore Ravens. (2017). *2017 Seating Diagram & Pricing*. Retrieved from Baltimore Ravens: http://www.baltimoreravens.com/assets/pdfs/gameday/tickets/2017/Renewal-Information/SeatingDiagram_2017_PSL_Season_Ticket.pdf
- Baltimore Ravens. (n.d.). *Baltimore Ravens PSL Transfer Requests*. Retrieved from Seatacular: https://seatacular.com/wp-content/uploads/2017/01/Baltimore_Ravens_PSL_Transfer_Form.pdf
- Barker, J. (2009, June 25). *Owning A Ravens Seat Can Pay Off Big Time*. Retrieved from The Baltimore Sun: http://articles.baltimoresun.com/2009-06-25/news/0906240127_1_ravens-psls-seat-licenses
- Belko, M. (2011, Nov 27). *Value booming for Heinz Field's seat licenses*. Retrieved from Pittsburgh Post-Gazette: <http://www.post-gazette.com/local/city/2011/11/27/Value-booming-for-Heinz-Field-s-seat-licenses/stories/201111270140>
- Berger, R. (2016, May 5). *DR 139: 3% Mortgages Are Back – Is This a Good Thing?* Retrieved from DoughRoller: <https://www.doughroller.net/mortgages/3-percent-mortgages/>
- Bonsignore, V. (2018, March 7). *How much will Rams, Chargers season tickets cost in Inglewood's new stadium?* Retrieved from The Orange County Register: <https://www.ocregister.com/2018/03/07/how-much-will-rams-chargers-season-tickets-cost-in-inglewoods-new-stadium/>
- Brucas, A. (2011, July 6). *Seahawks selling charter seat licenses*. Retrieved from SeattlePI: <http://www.seattlepi.com/sports/football/article/Seahawks-selling-charter-seat-licenses-1059186.php>
- Candee, A. (2017, Aug 18). *Just how much will those Raiders seat licenses cost?* Retrieved from Las Vegas Sun: <https://lasvegassun.com/news/2017/aug/18/just-how-much-will-those-raiders-seat-licenses-cos/>
- Chicago Bears. (2012). *Tickets and Stadium*. Retrieved from Chicago Bears: <http://www.chicagobears.com/tickets-and-stadium/psl-info-and-chart.html>

- Conventions, Sports & Leisure International. (2011). *Fiscal Analysis of Proposed Downtown Stadium and Convention Center Project*. Los Angeles.
- Deitch, C. (2009, May 14). *Black and Gold Futures*. Retrieved from Pittsburgh City Paper: <https://www.pghcitypaper.com/pittsburgh/black-and-gold-futures/Content?oid=1341938>
- Donofrio, M. J. (2008, July 17). *New York Giants Personal Seat License fees and ticket prices for 2010 season in new stadium*. Retrieved from NJ.com: http://www.nj.com/giants/index.ssf/2008/07/new_york_giants_personal_seat.html
- Friedman, B. (2012, Nov 27). *Max Muhleman: Sporting Success*. Retrieved from UNC School of Media and Journalism: <http://newstories.mj.unc.edu/max-muhleman/>
- From This Seat. (n.d.). *What Is A Personal Seat License (PSL) And Should I Purchase One?* Retrieved from From This Seat: <http://www.fromthisseat.com/index.php/blog/19113-what-is-a-personal-seat-license-psl-and-should-i-purchase-one>
- Gordon, A. (2015, Dec 28). *The Creator of Personal Seat Licenses Hates Them As Much As You Do*. Retrieved from Vice: https://sports.vice.com/en_us/article/4xzg4p/the-creator-of-personal-seat-licenses-hates-them-as-much-as-you-do
- Hobson, G. (1996, December 18). *Piece of jungle has a price*. Retrieved from The Cincinnati Enquirer: http://enquirer.com/editions/1996/12/18/spt_stadium.html
- How much is your team charging for PSL's*. (2008, July 3). Retrieved from Footballguys Forums: <https://forums.footballguys.com/forum/topic/404778-how-much-is-your-team-charging-for-psls/>
- How to Sell*. (n.d.). Retrieved from Baltimore Ravens PSL & Waitlist Marketplace: <https://ravens.seasonticketrights.com/Permanent-Seat-Licenses/Sellers.aspx>
- Kaplan, D. (2017, June 14). *IRS to Rams: Designing PSLs as non-taxable loans is OK*. Retrieved from American City Business Journals: <https://www.bizjournals.com/losangeles/news/2017/06/14/irs-rams-designing-psls-as-non-taxable-loans-is-ok.html>
- Kirn, B. F. (2015, Sep 11). *New stadium's cost more than doubles that of Edward Jones Dome. Why?* Retrieved from American City Business Journals: <https://www.bizjournals.com/stlouis/news/2015/09/11/new-stadium-s-cost-is-more-than-double-that-of.html>
- Kitroeff, N., & Miller, D. (2017, Jan 13). *Chargers' move shows California is sick of spending public money on the NFL*. Retrieved from LA Times: <http://www.latimes.com/business/la-fi-chargers-taxes-nfl-20170113-story.html>
- Leeds, M. a. (2011). *The Economics of Sports* (4th ed. ed.). Pearson Addison Wesley.
- M&T Bank Stadium*. (n.d.). Retrieved from Baltimore Ravens: <http://www.baltimoreravens.com/gameday/mt-bank-stadium.html>
- Munsey & Suppes. (n.d.). *Nissan Stadium*. Retrieved from Ballparks: <http://football.ballparks.com/NFL/TennesseeTitans/index.htm>

- Notte, J. (2015, Oct 9). *5 Ways NFL Fans Lost the Personal Seat License Gamble*. Retrieved from The Street: <https://www.thestreet.com/story/13318781/1/5-ways-nfl-fans-lost-the-personal-seat-license-gamble.html>
- NY Giants PSL*. (n.d.). Retrieved from BleedBigBlue: <http://bleedbigblue.com/ny-giants-psl/>
- Pierson, D. (2002, February 14). *Pricey PSL program unveiled*. Retrieved from Chicago Tribune: http://articles.chicagotribune.com/2002-02-14/sports/0202140379_1_psl-money-ticket-holders-current-bears
- RickDenver. (2010, February 1). *Original PSL Prices*. Retrieved from Houston Texans Message Boards: <https://boards.houstontexans.com/forum/texans-discussion/texans-tailgate/tickets-parking-passes-and-psl-s/16710-original-psl-prices>
- Rishe, P. (2013, Sep 19). *Super Bowl XLVIII Pricing: A Lesson In Demand Elasticity*. Retrieved from Forbes: <https://www.forbes.com/sites/prishe/2013/09/19/super-bowl-xlvi-iii-pricing-a-lesson-in-demand-elasticity/#684eb0d2796f>
- Rovell, D. (2017, July 20). *Warriors to become first NBA team with broad use of personal seat licenses*. Retrieved from ESPN: http://www.espn.com/nba/story/_/id/20108213/golden-state-warriors-become-1st-nba-team-charge-personal-seat-licenses-new-arena
- Schulman, H. (2016, Nov 27). *49ers' on-field losses turning into big financial losses for fans*. Retrieved from SF Chronicle: <https://www.sfchronicle.com/49ers/article/49ers-on-field-losses-turning-into-big-10637751.php>
- Schulze, S. (2017, Dec 10). *Could the Bengals be leaving Cincinnati in the near future?* Retrieved from CincyJungle: <https://www.cincyjungle.com/2017/12/10/16755860/could-the-bengals-be-leaving-cincinnati-in-the-near-future>
- Seating Chart*. (n.d.). Retrieved from New York Jets: http://www.nj.com/giants/index.ssf/2008/07/new_york_giants_personal_seat.html
- Smith, B. T. (2017, Feb 11). *Facing the reality of NRG Stadium upgrades*. Retrieved from Houston Chronicle: <https://www.houstonchronicle.com/sports/columnists/smith/article/Facing-the-reality-of-NRG-Stadium-upgrades-10926138.php>
- SportsDayDFW.com. (2012, Dec). *Cowboys Stadium seats still a hot ticket as team wraps up fourth season in Arlington*. Retrieved from SportsDay Dallas News: <https://sportsday.dallasnews.com/dallas-cowboys/cowboysheadlines/2012/12/22/cowboys-stadium-seats-still-a-hot-ticket-as-team-wraps-up-fourth-season-in-arlington>
- Stadium Facts*. (n.d.). Retrieved from CenturyLink Field: <http://www.centurylinkfield.com/stadium-facts/>
- Stadium Fast Facts*. (n.d.). Retrieved from Mercedes-Benz Stadium: <http://mercedesbenzstadium.com/stadium-fast-facts/>
- Suppes, M. &. (2006, April). *Oakland-Alameda County Coliseum*. Retrieved from Ballparks: <http://www.ballparks.com/baseball/american/oaklan.htm>
- The Associated Press. (2001, July 11). *PLUS: PRO FOOTBALL; Eagles Fans to Pay For Right to Tickets*. Retrieved from The New York Times: <http://www.nytimes.com/2001/07/11/sports/plus-pro-football-eagles-fans-to-pay-for-right-to-tickets.html>

- Vrooman, J. (2011). The Economic Structure of the NFL. In K. G. Quinn, *The Economics of the National Football League: The State of the Art* (pp. 7-31). Springer Science & Business Media.
- Winfrey, S. S. (2015). Determinants of Secondary Market Sales Prices for National Football League Personal Seat Licenses and Season Ticket Rights. *Journal of Sports Economics*, 227-253.
- Wolfe, M. (2000). *Cost of Capital*. Retrieved from <http://facpub.stjohns.edu/~wolfem/222/capcost.htm>
- Zegers, C. (2017, March 24). *Revenue Sharing and North America's Major Pro Sports Leagues*. Retrieved from ThoughtCo: <https://www.thoughtco.com/revenue-sharing-and-north-americas-major-pro-sports-leagues-326039>