"Tweeting for Tickets:" The Role of Social Media Marketing in Sports Franchises

Rajiv Suresh

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Department of Economics
Stanford University, Stanford, CA 94305
rsuresh1@stanford.edu

Under the direction of:
Professor Wesley Hartmann, Associate Professor of Marketing, Stanford Graduate School of Business

With special thanks to:
Professor Marcelo Clerici-Arias, Director of Honors Programs, Stanford Department of Economics
Mr. Kevin Cote, Director of Digital Marketing, Golden State Warriors

Abstract

In recent years, social networks like Facebook and Twitter have become extremely useful marketing tools. Recent literature has shown that the use of social networks by corporations is important for building brand equity and consumer relationships. Additional research has shown that a consumer's emotional connection to a product or brand can lead to more consistent habits from the consumer. While a general hypothesis that increased use of social media marketing by corporations will lead to higher sales is intuitive, testing this in many consumer-facing businesses is difficult because it is difficult to attribute sales from increased social media activity to a consumer's emotional attachment to the brand. Additionally, identifying specific time windows to compare changes in social media use and sales is difficult. This study builds on the current literature by looking specifically at social media use in the world of sports, where "fandom", an extreme form of emotional attachment, is present, and ticket sales can be measured game-to-game, so there are clear time benchmarks between which we can analyze changes in social media activity. In particular, this paper looks to exploit these characteristics of the sports world by analyzing the Twitter activity of franchises in the National Basketball Association (NBA). The results of the analysis show significant association between game attendances and both short-term and long-term Twitter activity measures. These effects increase and remain significant when looking only at teams located in "small markets", cities with a TV population less than 3 million. Collectively, these results suggest that social media activity is associated with sales through the construct of consumers' emotional attachment with a brand.

I. Introduction & Motivation

The growth of social media networks like Twitter, Facebook, Instagram, and Pinterest has led to unprecedented levels of communication and interaction between people. The use of social media has not been limited to individuals, as consumer-facing enterprises now use social media as a marketing tool to interact with customers, grow their support base, and build their brand. Kumar et al. (2013) demonstrates that even for very small businesses in developing countries, an intuitively unlikely place for a successful social media campaign, social media can have tremendous impact.

From a brand-building perspective, social media marketing tools can help companies through more frequent and specific messaging. Social media also makes it possible for brands to interface directly with their consumers, which allows these corporations to build an emotional connection with and loyalty from with their customers. However, there are many different factors that play into a consumer feeling an emotional connection with a specific brand/product. As such, isolating the degree to which social media marketing facilitates building an emotional connection with a brand is challenging.

Examining the use of social media marketing within the world of sports can give important insight into the question of whether social media use can impact sales through the emotional bond a consumer has with a brand. Sports franchises are ultimately businesses looking to create a profit, in addition to achieving success on the field or court. Their "consumers" are the passionate individuals that support the team by purchasing tickets and merchandise, attending games, and by tuning in to watch the team play on TV. In fact, "Fandom," the phenomenon of actively following and supporting a specific team, can be considered an extreme form of the emotional connection a consumer has with a brand or product. Social media marketing allows sports franchises to expand their reach to new fans, stay in close contact with their existing fan base, and build a strong community, the same way it does for other businesses. In some franchises, like the Golden State

Warriors, there is already a heavy emphasis on social media use. As Mr. Cote, Senior Director of Digital Marketing of the Golden State Warriors, describes, the use of social media in sports is "the perfect marriage in that [teams] have fans, not customers, and those fans are passionate about following the team and letting their voice be heard, and also interacting [through social media]" (see Appendix A for full interview transcript). As such, the emotional connection a fan has with a team is likely to be fostered and encouraged by that team's social media use. This paper uses social media data from Twitter and attendance data for the 30 teams in the National Basketball Association (NBA), and examine the link between social media use and ticket sales, consistent with the marketing ideas established above.

Looking at short-term Twitter use between Home Games provides the ability to look at specific time windows and get a more precise view of the impact of increased social media use. This solves the timing issue that is present in attempting similar analyses for other businesses. For example, while new product launches could be used as benchmarks, they often occur infrequently and, as a result of the amount of time between these, there are additional confounding factors related to sales. On the other hand, an NBA team will play multiple games in a week, providing us with specific small windows that limit the number of long-term confounding factors that could contribute to changes in attendance and sales. This gives us better insight into the efficacy of additional activity on social media.

The analyses in this paper show that there are significant correlations between attendance and more recent Twitter activity. The significance and magnitude of the correlations remain consistent for short-term activity when controls for both Home and Away team quality are included. The result of this analysis, when put in context and extrapolated through a full season, shows a potential revenue increase of over $400,000 for an NBA franchise. When analyzing a specific subsection of teams that have lower attendance numbers, all correlations become insignificant,

suggesting that other external factors play a significant role in deterring fans from attending games. Looking only at "small market" teams, meaning teams that are in cities with a TV population less than 3 million, the correlations of the social media measures increase and remain significant, demonstrating increased efficacy of social media use in smaller markets.

The results have direct implications for sports franchises, primarily on whether they should be more or less active on social media outlets. Franchises like the Golden State Warriors have moved beyond pure content promotion on social media channels to engaging in a dialogue with fans and other franchises in the NBA, as well as having players interact with fans around the world, whether the team is performing well or not. This has allowed teams to build a strong emotional connection with many of their fans. Other franchises can be less active, as a result of different ownership or management philosophies (Appendix A). Especially because many franchises run "lean" on the business side, understanding where to allocate resources to enhance social media presence can be extremely important. My findings suggest that franchises that are less active on social media may have misallocated their resources, as they are forgoing an opportunity to maintain an engaged fan base and build emotional connections with their fans and thereby lose revenues. The indirect implication of my findings go beyond the use of social media purely converting to one-time sales, as it can generate future sales through the emotional connection and loyalty mechanisms it fosters.

II. Literature Review

A. The Role of Emotion in Consumer Behavior

At a high-level, the first goal is to understand the role of emotions in consumer behavior. For an individual's perspective, Lee, Amir, and Ariely (2009) look at products that elicit strong emotional responses, and find that these products are more likely to yield consistent preferences from consumers. They distinguish between the "emotional system" and "cognitive system" and look

to find which one is "more important" in a consumer's decision-making. After outlining, from a psychological angle, how emotions could promote consistency, they set up experiments looking at the degree of intransitivity to compare whether choices are more consistent when individuals' relative reliance on emotional responses is greater. These experiments included showing pictures and names of products to consumers with different stimuli, like color versus black-and-white photos, photos versus text only, and increasing the load on the subjects' cognitive capacity. What they found was that there were fewer inconsistencies with color pictures versus black and white, fewer inconsistencies when the subjects' trust in their emotions was encouraged, and fewer inconsistencies when subjects' cognitive capacity had a high load. Ultimately, their experiments imply that marketers should look to use rich stimuli that would tap into consumer's emotions. Social media can be considered one example of the "affect-rich stimuli" that Lee, Amir, and Ariely (2009) describes, as it engages users and is done in an environment with lots of "noise" (i.e., online) that would hone on a user's emotional system.

B. Social Media Use, Marketing, and Exposure

Another stream of literature examines social media by focusing on what motivates individuals to be active on different platforms. Toubia and Stephen (2013) explore both the intrinsic utility and image-related utility that an individual gains from posting on Twitter. By using an intervention on Twitter in which they exogenously added followers to a treatment group, they find that the difference in posting rate between this treatment and the control group is not significant. After splitting the users into quintiles based on the initial number of followers, Toubia and Stephen (2013) finds that in the first, third, and fifth quintiles there is not a significant difference in posting rate. The difference between the treatment and the control groups in the second quintile is significant, while in the fourth quintile the opposite effect is present – the treated were more likely to significantly decrease their posting rates as compared to the control group. The second quintile's

results demonstrate intrinsic utility, as posting content increases the intrinsic utility a person receives, so users continue to post more content. The fourth quintile has results that demonstrate image-related utility as there is diminishing marginal utility to additional followers at this level. These patterns in the fourth and fifth quintiles are especially key, as this is where many high-profile individuals and celebrities will fall, with their higher follower counts. While Toubia and Stephen (2013) follows a series of literature that focuses on why people post, the current analysis examines the consequence of such activity specifically within a business setting. Toubia and Stephen's (2013) finding assists with this analysis by giving sports franchises an understanding of how they can incentivize their players to interact with fans, as part of their social media strategy.

Understanding the use of social media in business within a larger framework is a critical step in analyzing the efficacy of social media marketing in sports business. Kim and Ko (2012) look at luxury fashion businesses, and how their activity on social media impacts customer equity drivers (value, brand, relationship), customer equity (behavioral measure that looks at purchasing habits of consumers), and purchase intention (a customer's interest in buying the product, as it relates to attitude and brand). The hypotheses they test are as follows: 1) social media impacts drivers of customer equity, 2) the drivers of customer equity impact customer equity, 3) the drivers of customer equity impact purchase intention, and 4) purchase intention impacts customer equity. After conducting a survey with respondents in Seoul, Korea using Louis Vuitton as the brand of study, they find that social media outlets entertain customers with free content, enable customized information, create interaction that leads to word-of-mouth effects and include fashion and trend attributes. They also find that the customer equity drivers have no influence on customer equity – though this could be due to the fact that their measure for customer equity was not very robust, and that competition among luxury fashion brands makes it difficult for consumers to maintain loyalty to a single brand. This issue that Kim and Ko (2012) encountered with competition in the luxury

fashion market is solved for by looking at sports franchises, since many true fans will typically be loyal to one team. Ultimately, they find that brand equity, value equity, and relationship equity are influential and have positive impacts, which points to the importance of social media marketing activities. Additionally, the specific construct they use is similar to the framework described earlier in this paper, validating the purpose of this research. Understanding the constructs through which social media marketing can impact sales gives a detailed context to the analysis conducted later in the current study.

Looking at social media marketing in different contexts is also an important step before understanding the use of social media in sports franchises. Kumar et al. (2013) looks at specific social media marketing tactics in the context of a small ice cream operation in India. While the business itself might not be directly comparable to sports franchises, the marketing techniques are relatable since this small ice cream operation depends on a "grassroots movement" in order to generate its sales, and sports franchises depend on "grassroots movements" in order to generate a large fan following which, in turn, leads to higher revenues through ticket sales and TV ratings.

There is also literature that looks at the motivation for athletes to expose themselves to media members. Treme and Allen (2011) explore whether media exposure for NFL rookies affects draft position and rookie salaries. They discuss the many definitions of the popularity-driven "superstar effect," focusing primarily on the Rosen (1981) and Adler (1985) definitions. Treme and Allen (2011) outlines the impact an NFL wide receiver could have on a franchise, and take receivers as utility-maximizing individuals, the franchises as profit-maximizing institutions, and the draft pick as a function of play attributes, media exposure, and physical ability, along with other controls. Using data on prospective wide receivers from 2001-2006, the authors find that media presence was a significant factor in determining the first-year salaries for wide receivers in the NFL. This is confirmed even when quantile analysis and 2SLS regressions were performed. The result is

significant because it could indicate that this trend continues through the career of a professional, leading to more attention-seeking by individuals who understand this economic payoff to greater media exposure. While the paper fails to extend their results beyond that of a rookie entering the NFL, Treme and Allen (2011) demonstrates how media exposure can convert to monetary gains through a type of "brand building", as each receiver would be building their personal brand by exposing themselves to the media. This paper is particularly important for the current analysis, because of the role that direct player interaction with fans can play in a social media strategy, as they might on specific media days (Appendix A).

C. Variation in Game-to-Game Ticket Sales and TV Ratings

There is a significant literature on the variation in game-to-game ticket sales in sports. While many papers focus on Major League Baseball (MLB), the factors examined are largely universal across all sports, and can be extrapolated to the NBA – the focus of the current paper. Beckman et al. (2012) explores these factors. Using data on tickets sold for MLB games, Beckman et al. use a linear regression model that includes a vector of game-team-year specific variables, a set of year dummy variables, and a set of home-team fixed effects. While they do identify that many potential factors could be included in the vector of game-team-year specific variables, only a few of these are included based on the significance from previous relevant literature. The authors find that the probability of a home team win is significant, along with playoff status, interleague play, interleague rivalries, distance from the home team's stadium to the visiting team's stadium, and stadium age (classified newly constructed or recently constructed). Their results show that there is no statistically significant relationship between home team winning probability and attendance. Interleague rivalries have consistently drawn more fans than other games, though this effect is becoming smaller. Playing in a new stadium used to have significant positive effects until about 2004. Since 2004, the effect has been negative for newly opened stadiums. The results generally support that attendance is lower the

further back a team is in the playoff race, and that ticket sales are consistently higher for teams that qualified for the playoffs the previous season. The visiting team's attractiveness is also strongly correlated with ticket sales, as were games scheduled on weekends versus weekdays. Overall, while the signs of these observations are generally consistent over the seasons, the magnitude and statistical significance varies with on the specific time period analyzed. The value of the Beckman et al. (2012) paper comes from the variables included in their model that can be applied to the current analysis.

Though the literature on the determinants of TV rating variation is less robust, some do make an attempt to understand the determinants of TV viewership of sporting events. This can be useful in identifying the true demand for sporting events, and can be extended to the analysis done in this paper, as some of the factors that cause fans to tune in for a game on TV could also draw them to the stadium for a game. Feddersen and Rott (2011) explore the factors that play into successful television sport broadcasts by analyzing broadcasts of the German national football (soccer) team. This paper is comparable to Beckman et al. (2012) in its analysis, though the different output measure makes it unique. The authors identify that the type of match played is particularly important for national football TV ratings and interest in the matches. As such, they separate non-competitive matches (friendlies), from tournament matches (World Cup, UEFA EURO). Even within the tournaments they distinguish between the rounds, as interest is likely to be higher for later round matches. Their regression analysis includes dummy variables for the competitions themselves, the coaches during the particular match, the average number of international matches played by all players on the roster as a proxy for experience effects, recent events measured by goal difference in the last match played, FIFA ranking of the opponent to measure quality of opponent, long term aspects of opponent attractiveness, kickoff time, home game effects, the impact of the specific broadcasting channel, seasonal effects, and the effects of student holidays. After eliminating the

insignificant variables in a stepwise manner, Feddersen and Rott (2011) finds that the type of match is significant, and the absolute value of the effect increases with the importance of the match. The authors also find that viewers prefer watching a team whose players have experience, and that the quality of the opponent has a significant impact on television demand. Additionally, kickoff time, broadcast network, and weather conditions all have significant effects on TV demand. There is no impact by recent history or seasonality, and no difference in impact between UEFA EURO and the FIFA World Cup. Overall, the value of this paper comes in the applicability of its framework. While the specific sample selected does not apply directly to the current analysis, the model chosen in Feddersen and Rott (2011) provides a basis for understanding how game and team factors can influence sales and demand through the proxy of TV Ratings.

Another study that provides insights into variations in TV ratings is Tainsky and McEvoy (2012). This study is interesting in the fact that it uses broadcast data in markets that do not have local teams for the National Football League. Using data for games that were televised in the 12 largest areas without an NFL team, they analyze the specific factors that influence demand for TV broadcasts in these markets. Using a model that is similar to that of Feddersen and Rott (2011), the authors account for the quality of the teams involved, the uncertainty of the match adapted from Bill James' baseball metric, a dummy for whether the teams are divisional rivals, the distance of the teams from the stadiums, an indicator for whether there was another game going on at the same time, an indicator for the kickoff time slot, and dummy variables for the months and for the 32 NFL franchises. They find that team quality has a positive impact on ratings, match uncertainty is negative and significant, alternate games at the same times are significant, which supports the idea of diminished demand when there is a close "substitute" game, that two of the months were significant, and that 12 of the franchise effects were significant at the 5% level. As a result, there are some seasonal and franchise effects that should be taken into account. The use of markets without

local teams is particularly interesting in this paper, signaling a potential value in differentiating between ratings in markets that have teams and markets that do not. The model built, while similar to those in other papers referred to above, still incorporates new variables that can be taken into account when looking at variation in demand. Thus, again, this paper provides a very useful framework that can be built upon, especially given the unique sample it focuses on.

Fort (2004) discusses ticket pricing at sporting events, which can be important for assessing attendance figures in sports, as pricing can influence a fan's willingness to attend a game. After building a theoretical model around the idea that inelastic pricing can be a result of profit-maximization, Fort (2004) shows that inelastic pricing at the gate for tickets can be a result of the relationship between a specific team's local TV revenues, the marginal cost of talent, and the average of the rest of the teams' local TV revenues. The paper concludes with a discussion of the NFL, where Fort describes how the NFL is a league that usually prices tickets to sell-out stadiums, and that this could be because of non-ticket revenues tied to attendance. This line of thought could also be applied to attendance figures for the NBA if there is little variation in the data for attendance. Such exploration is significant for the study of the factors that impact attendance, as it calls for further work into other leagues where ticket pricing may not play as big of a role in drawing fans to stadiums, and for future models to use pricing as an additional variable.

III. Data

The data analyzed in this paper primarily consists of two types. First, there is the social media activity, captured through activity on Twitter. Then there is the home game attendance data, which was captured mainly from Basketball Reference (www.basketballreference.com).

The Twitter data was collected using a service called ExportTweet, which allows users to download a given timeline of Tweets. Unfortunately, due to restrictions placed by Twitter on their API, the download service is capped at 3200 Tweets per Twitter account. This meant that the time

frame covered was not consistent from team to team, since some teams might have tweeted 3200 times in a few weeks while others might not use Twitter as frequently, so 3200 Tweets might go back a few months for them. After downloading a user's timeline, the tweet frequency could then be calculated in STATA by collapsing a team's timeline by date.

For the attendance data, I set up a crawler via import.io, a service that allows users to scrape data off of any webpage. The crawler ran on BasketballReference.com, a site that has stored every Box Score from the NBA since 1946. At the bottom of every Box Score is the official attendance figure for that specific game, which the crawler captured. The crawler was also set to gather information on which teams were playing that night, their individual records at that specific point in time, and the stadium they played in.

Both datasets were merged in STATA and joined on Home Team and Date. I focused not on the daily frequency of Tweets, but primarily on the number of Tweets leading up to the previous game day and the number of Tweets that were posted between the last game day and the current game day. This second measure could give us some insight into the short-term effect of the Tweets that are most likely to impact the current night's attendance, while the first captures any aggregate long-term effect of social media use. In order to eliminate any confounding factors that could come from including Tweets during a time when there were no games played, the dataset focuses on a timeframe from the start of the current (2014-15) NBA Season (October 29, 2014) until mid-season (February 24, 2015).

IV. Analysis/Identification

The basic model used in this paper focuses on the capacity filled in a stadium as the independent variable, and both the number of Tweets between two game days ("Recent Tweets") and the summed prior tweets ("Old Tweets") as the independent variables. I use capacity utilization rather than raw attendance numbers because of the variation in arena sizes in the NBA, shown in

Chart 1. Capacity Utilization ("CapUt") normalizes and adjusts for this. In this model, there is an issue of endogeneity – whether the Twitter activity itself is a product of the attendance in a stadium, as this could be an indicator of greater resources that a franchise can put into social media. Given this issue, I searched for instrumental variables.

One potential instrumental variable would be injuries to players, which are seemingly random. These injuries are usually posted on social media, which implies a correlation to both Recent and Old Tweets and satisfies the inclusion restriction. However, this potential instrument does not satisfy the exclusion restriction, since injuries to players could influence whether fans attend home games or not. For example, an injury to a star player could drastically reduce a fan's willingness to attend a game because that team's likelihood to win the game is now reduced, or the fan was particularly interested in watching that player. Another potential instrument I considered was salary cap limitations for a franchise.[1] The amount a particular franchise spends on its players is somewhat random. This satisfies the exclusion restriction, especially since the salary value of players on the court is something that many fans are unaware of when they buy a ticket to a game. However, it is difficult to know whether this would have an immediate impact on the frequency of social media use. If a team is over the salary cap by a small amount, there are usually exceptions that allow a franchise to move forward without any consequences. However, being over the salary cap limit by a large amount leads to the imposition of a luxury tax. Such a tax could limit a franchise's resources, which could lead to fewer resources used towards social media marketing. Drawing such a conclusion is difficult because salary cap changes are typically tracked only three times during the season – before the start of the season, after the trade deadline, and at the start of the offseason. Given the time frame of the Twitter data gathered, there are only two of these time boundaries that can be used in analyses, and even then the impact a salary cap penalty could have on the budget for a

[1] The salary cap is a limit on the amount of money a team can spend on player salaries. The NBA has what is called a "soft cap", meaning that there are exceptions to the cap.

franchise might not change what they devote to social media until months later. Because of this, salary cap changes are not a viable instrumental variable because they do not satisfy the inclusion restriction. Because of the difficulty in finding an instrument that satisfies both the inclusion and exclusion restriction with this structure and time frame of the data, it was most effective to proceed with OLS regressions with fixed-effects. This will give some insight into the magnitude and direction of the effect, and once we consider the potential bias and direction of the bias, we can begin to approach the question of the impact of social media use on sales for sports franchises.

The first regression is a simple OLS regression of "CapUt" on the natural logs of "Recent Tweets", and "Old Tweets" with fixed effects for individual teams, as represented in equation (1), modeled for a given Home team, *i* and a given Gameday, *t*.

$$\textbf{(1)}\ CapUt_{it} = \ln(RecentTweets_{it}) + \ln(OldTweets_{it}) + HomeTeamFE_i$$

After establishing the baseline correlation, controls were included for both Home team and Away team win differential ("HomeWinDiff" and "AwayWinDiff") as proxies for team quality, similar to how Beckman et al. (2012) included variables for team "attractiveness" and Home team "win probability". The fundamental aspect that these variables measure is the quality of the teams, and thus including the two win differential measures in equation (2) leads to a more complete analysis. *j* represents a given visiting Away team on the Gameday *t*. Table 1 shows summary statistics for the variables included in equation (2).

$$\textbf{(2)}\ CapUt_{it} = \ln(RecentTweets_{it}) + \ln(OldTweets_{it}) + HomeWinDiff_{it} + AwayWinDiff_{jt} + HomeTeamFE_i$$

Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CapUt	704	.929271	.1190521	.5033206	1.091006
Recent Tweets	704	112.571	106.6339	6	779
Old Tweets	704	1350.222	1009.677	10	5848
HomeWinDiff	704	.2017045	12.83107	-35	34
AwayWinDiff	704	-.1775568	12.43949	-33	33

This analysis from equation (2) is then repeated for the bottom five teams in terms of average Capacity Utilization over the time period studied. This analysis was run with the idea that social media marketing efforts could be more important for the teams that struggle to fill their stadiums because of other factors. Table 2 shows the average filled stadium capacity for each of the thirty NBA teams; those selected for this specific analysis are marked. The results of these analyses are described in the following section. As mentioned above, it is important to approach these with some caution due to the issue of endogeneity mentioned above. This is discussed in more detail in the context of the specific results. The analysis for equation (2) is also repeated for small-market teams, in a fashion similar to the analysis done in Tainsky and McEvoy (2012). The rationale behind this analysis is that for "small market" teams, social media might not be as effective, as the population being reached is smaller and potentially less engaged with channels like social media. The "small market" teams were determined by looking at the 2014-15 Nielsen North American TV Market Rankings. For this paper, any city with a TV population of less than three million is considered "small market". The cities with NBA teams and their rankings are shown in Table 3, with the chosen cities indicated.

One phenomenon worth discussing is the fact that some teams end up averaging a full stadium for every game, or have averaged a "sell-out" stadium for the time period studied in this paper. While this may seem unusual, it in fact is possible – teams typically report a game as "sold-out" if all the tickets have for the arena have been sold, and this is not an uncommon occurrence in

the NBA – for example, the Golden State Warriors have had 100+ sellout games dating back to last season. While there are other significant factors that would be contributing to these sellouts, social media engagement could be a contributing factor to keeping fans involved. One other point to be noted is that this analysis does *not* consider standing room seating when calculating Capacity Utilization, which is why many teams actually have a Capacity Utilization mean over 100%. This is how this metric is calculated in other sources, namely ESPN, and thus this paper adopts a similar methodology.

Table 2. Average Stadium Capacity Filled By Team

Home Team	Mean(Capacity)
Philadelphia 76ers	.690185*
Detroit Pistons	.7064538*
Minnesota Timberwolves	.7125439*
Milwaukee Bucks	.7768989*
Denver Nuggets	.7932296*
Orlando Magic	.8900193
Charlotte Hornets	.9029554
Indiana Pacers	.9099517
Phoenix Suns	.9199646
Boston Celtics	.9290957
Atlanta Hawks	.9345236
Utah Jazz	.9366594
Memphis Grizzlies	.9473987
Brooklyn Nets	.9513285
Sacramento Kings	.9566542
New Orleans Pelicans	.9637161
Miami Heat	.9925649
Los Angeles Lakers	.997114
Toronto Raptors	.9981006
Cleveland Cavaliers	1
Golden State Warriors	1
New York Knicks	1
Oklahoma City Thunder	1
San Antonio Spurs	1
Portland Trailblazers	1.001479
Los Angeles Clippers	1.003417
Houston Rockets	1.00723
Chicago Bulls	1.021264
Dallas Mavericks	1.047442

* - Team selected for "poor attendance" subsection regression

Table 3. NBA Cities by Nielsen TV Market Ranking (2014-15)

Rank	City	Population (in millions)[2]
1	New York	19,201
2	Los Angeles	14,251
3	Chicago	8,971
4	Toronto	7,627
5	Philadelphia	7,621
6	Dallas/Fort Worth	6,717
7	San Francisco-Oakland-San Jose	6,390
8	Boston	6,253
9	Washington D.C.	6,215
10	Atlanta	6,023
11	Houston	5,937
12	Phoenix	4,732
13	Detroit	4,729
14	Minneapolis	4,463
15	Miami	4,213
16	Denver	4,040
17	Orlando	3,800
18	Cleveland	3,791
19	Sacramento	3,473
20	Portland**	2,977
21	Charlotte**	2,977
22	Indianapolis**	2,973
23	San Antonio**	2,352
24	Salt Lake City**	2,315
25	Milwaukee**	2,304
26	Oklahoma City**	1,817
27	Memphis**	1,686
28	New Orleans**	1,654

** - Team selected for "small market" subsection regression
(Source: 2014-15 TV Basics Report from the TV Bureau of Canada)

V. Results

At a basic level, looking at charts of both "CapUt" and "Recent Tweets" over time shows that an increase "Recent Tweets" can predict increases in Capacity. While charts showing this comparison for all 30 NBA teams are included (see Appendix B), the charts in Section VII.A–VII.C show this for teams that demonstrate three league-wide trends. For some teams, there is little to no variation in Capacity, as with the Golden State Warriors (Chart 2), the Oklahoma City Thunder

[2] Population of Age 2 or older within a TV Household

(Chart 3), and the San Antonio Spurs (Chart 4), suggesting the presence of multiple external factors contributing to a fan attending a game. For others, like the Brooklyn Nets (Chart 5) and the New Orleans Pelicans (Chart 6), there is a more direct and clearer relationship between higher activity on social media activity and attendance. For many of the other teams, there are instances where Twitter activity and Capacity Utilization move together, like the Charlotte Hornets (Chart 7), the Dallas Mavericks (Chart 8), the Indiana Pacers (Chart 9) to name a few. The relatively ambiguous results from this basic single-team analysis calls for more detailed regression analysis that encompasses the league as a whole.

Table 4 shows the result from our basic regression, modeled in Equation (1). This basic regression shows that for a 1% increase in "Recent Tweets", there is a correlated 1.09084% increase in attendance, and for a 1% increase in "Old Tweets," there is a correlated 0.91397% increase in attendance. Only "Recent Tweets" is significant at the 5% level, suggesting further analysis is necessary, given that this basic regression alone will suffer from bias. This leads to the regression modeled in equation (2). Table 5 shows the results for this regression, which shows that the correlated increases for "Recent Tweets" and "Old Tweets" remains relatively consistent, at 1.03662% and 0.88696% increases in Capacity Utilization, respectively, per 1% increase in Tweets. "Recent Tweets" also maintains its significance, while "Old Tweets" remains insignificant. Of the two new factors, only Away team quality has a significant correlation, with an additional win for the Away team increasing the Capacity Utilization by 0.0583%. The insignificance of Home team quality is counterintuitive and surprising, especially given the importance of this factor in previous literature.

Table 4. Baseline Regression Results - Equation (1)

	Coefficient (S.E.)	t-statistic	p-value	95% Confidence Interval	
Recent Tweets	.0109084 (.0025619)	4.26	0.000	.0056687	.0161482
Old Tweets	.0091397 (.0051116)	1.79	0.084	-.0013146	.019594

Table 5. Expanded Regression Results - Equation (2)

	Coefficient (S.E.)	t-statistic	p-value	95% Confidence Interval	
Recent Tweets	.0103662 (.0025748)	4.03	0.000	.0051002	.0156322
Old Tweets	.0088696 (.0050138)	1.77	0.087	-.0013848	.019124
Home Win Diff	.000948 (.0006778)	1.40	0.173	-.0004383	.0023344
Away Win Diff	.000583 (.0002165)	2.69	0.012	.0001402	.0010259

The size of these effects may seem small, but they can convert to a number of fans being brought into a stadium as the result of just a 1% increase in Tweets. To put the results from the Expanded Regression (Table 5) in context, if a team averages 200 Tweets between games, an additional 2 Tweets between game days could lead to an increase of about 198 ticket sales from game to game using the numbers from Equation (2) and the NBA average stadium size of 19,182 seats. Over the 41 home games in a season, this translates to a total increase of 8,118 ticket sales. Using the 2014-15 average of NBA ticket prices of $53.98 (from the Statista NBA Dossier), this leads to an increase in revenue of over $400,000 dollars for a franchise. This estimate can be considered conservative, as it does not take into account how the additional 2 Tweets between game days play into the equation through "Old" Tweets after the initial game day period.

Away team quality is also a significant factor in the expanded regression for Equation (2). Based on the results, having an opponent with an additional win will lead to an additional 11 ticket

sales for a given game, and an additional $593.78 per game – it does not make sense to compound this result over a season, because additional wins for opponents could also mean fewer wins for the current Home Team, and this could negatively impact their attendance.

The third regression, which runs the same regression shown in Equation (2), but limits the data to the teams that have had poor attendance this season (shown in Table 2), demonstrates an interesting phenomenon, summarized in Table 6. While the size of the effect of social media activity increases, the effects for both "Recent Tweets" and "Old Tweets" are insignificant. Given the framework of this paper, the insignificance of both factors is counterintuitive. This could occur for a few reasons – perhaps Capacity Utilization in a stadium is not a reliable indicator of true demand for these teams because other factors keep fans from attending the games, or the reputation of the franchise has been so tarnished with the fan base that more Tweets and a marginal improvement in team quality alone will not draw fans into the stadium.

Table 6. Poor Attendance Subsection Regression Results - Equation (2)

	Coefficient (S.E.)	**t-statistic**	**p-value**	**95% Confidence Interval**	
Recent Tweets	.011792 (.0048969)	2.41	0.074	-.0018038	.0253879
Old Tweets	.0026087 (.034944)	0.07	0.944	-.0944113	.0996287
Home Win Diff	.0008068 (.0018419)	0.44	0.684	-.004307	.0059207
Away Win Diff	.0007362 (.0008333)	0.88	0.427	-.0015773	.0030497

Table 7. Small Market Subsection Regression Results - Equation (2)

	Coefficient (S.E.)	t-statistic	p-value	95% Confidence Interval	
Recent Tweets	.0169067 (.0047147)	3.59	0.007	.0060345	.0277788
Old Tweets	.0159634 (.0043926)	3.63	0.007	.005834	.0260927
Home Win Diff	-.0017791 (.0006164)	-2.89	0.020	-.0032005	-.0003578
Away Win Diff	.0002917 (.0003729)	0.78	0.457	-.0005683	.0011517

The final regression analysis runs Equation (2) for the "small" market teams as defined above. The results from this analysis (Table 7) show that the quality of a team's opponent becomes insignificant, suggesting that fans are less concerned with the quality of the product on the court in small markets, perhaps because the game is one of fewer entertainment options in these smaller markets. One interesting result in this subsection is the change in sign and significance of Home team quality. While confusing, the significance is likely a result of the use of clustered errors in the regression, as when the regression was run without clustered errors, the correlation between Home team quality and Capacity Utilization was insignificant. The influence of "Recent Tweets" not only remains significant in this analysis, but also increases, contrary to the logic with which this regression was run. Additionally, in this analysis, the correlation between "Old Tweets" and "CapUt" increases and becomes significant. This may suggest that the efficacy of social media marketing increases in smaller markets because of the lack of external noise and other distractions in these settings, and because the given team is a primary form of entertainment for "small market" cities. In addition, fans in the smaller markets might have already built a relationship with the team, and so an increase in social media use and dialogue is more effective as fans are prepared to pay attention to these channels.

VI. Conclusion & Discussion

I set out to explore whether increased activity on social media would yield an increase in sales, through the framework of brand equity and relationship building – emotional constructs that can impact a consumer's decisions. Kim and Ko (2012) builds a similar framework. In order to isolate this effect, I chose to use sports franchises as a proving ground for this methodology, as in sports, the emotional connection for a consumer is at an extreme through "fandom", limiting the number of outside factors that would convert social media use to sales. In analyzing both attendance data and the number of Tweets from the official NBA account of all 30 teams during the 2014-15 season (up until February 24, 2015), I ran basic regressions in an attempt to draw out the effect of additional social media use on ticket sales and Home Game attendance.

The results at face value are promising – they show that short-term social media use is strongly correlated with attendance, even when controlling for team fixed-effects and the quality of play by both the Home team and the visiting opponent. This positive relationship between social media use and attendance, suggests, in the larger construct, a direct relationship between Twitter use and sales. The results also counter intuitively show that the quality of the Home team is insignificant, through the quality proxy measures. When I specifically look at the teams who have done poorly with regards to attendance – the correlations for all Twitter activity, both recent and long-term, and Home and Away quality are insignificant. This suggests that these franchises are affected by other factors keeping their attendance numbers low, such as previous poor seasons or poor fan experiences, to the point that reaching out and engaging with them via social media or improving the quality of the product (team) will not draw fans to the stadium. When "small market" teams are analyzed, the impact of social media activity increases and is significant. This opens a potential avenue for future research to take a closer look at these small markets to isolate why this may be. At

first glance, it seems that the lack of external noise and factors that compete for a fan's attention may cause social media activities to be more effective in these "smaller markets," as fans will have a greater chance to pay attention to these specific channels.

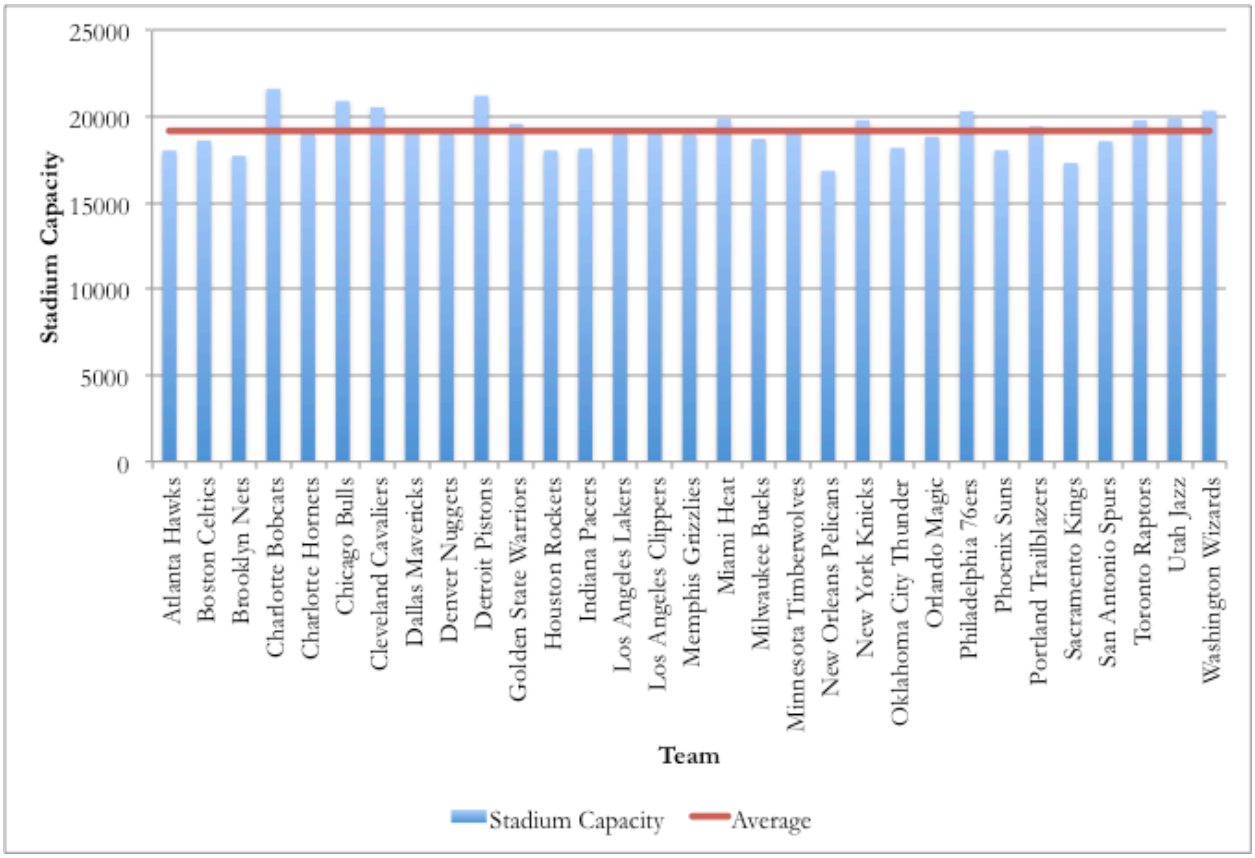
While these correlations are promising, there is an issue of endogeneity and bias at hand. Potential instrumental variables were considered, though none of them proved to satisfy both the inclusion and exclusion restrictions. Given this, I will attempt to understand the direction of the bias. One source of endogeneity comes from the fact that Capacity Utilization itself may have an impact on social media use, as franchises attempt to stay "in the moment" by constantly posting the latest news for the team and franchise (see Appendix A). A specific instance of this occurs as teams Tweet or post to Facebook when they have sellout crowds. Additionally, as attendance is essentially a measure of sales, greater attendance also would mean that a franchise has more resources to devote towards social media. Because of these positive relationships, it is plausible to say that the estimations we have found are likely overestimates.

Another potential issue is the time frame of the data. This specific analysis looks at a very small window of about four months, due to the limitations that Twitter has on publicly available data. Ideally, from a research standpoint, the data would span many years and we could analyze attendance numbers and social media use over time. Future research should look to gather data that spans a larger time frame, which will make any analysis more robust. It should also look across different social media platforms, to see if there is any one platform that is most effective. One other piece of analysis that will make the answers to the research questions more viable is specific content analysis to determine what type of post is the most effective. This will, in the larger framework, guide organizations to consider what resonates best with their consumer base – product information, promotions, direct player interaction, etc. Future research should then extend the definition of sporting event demand beyond just stadium attendance to include additional

determinants like TV Ratings. Such future research should also look at what the mitigating factors are to the potential $400,000+ increase in revenue that was cited earlier, as there will be diminishing returns to posting, so it will be useful to find the point at which these diminishing returns begin. This can then be extended to find what the optimal level of posting will be for a franchise or business. Ultimately, while this exploratory paper has laid the foundation for such analysis and has shown that there is a relationship between social media activity and sales in the sports world, there is a lot of room for this analysis to be taken and built upon. With more robust future research in the testing ground of sports, we can begin to understand the relationship between a consumer's emotional connection with a brand and sales for businesses as a whole.

VII. Charts

Chart 1. NBA Arena Capacities By Team



A. Evidence of Other Factors Outweighing Twitter Use

Chart 2. Recent Tweets & Capacity Utilization Over Time Charts: Golden State Warriors

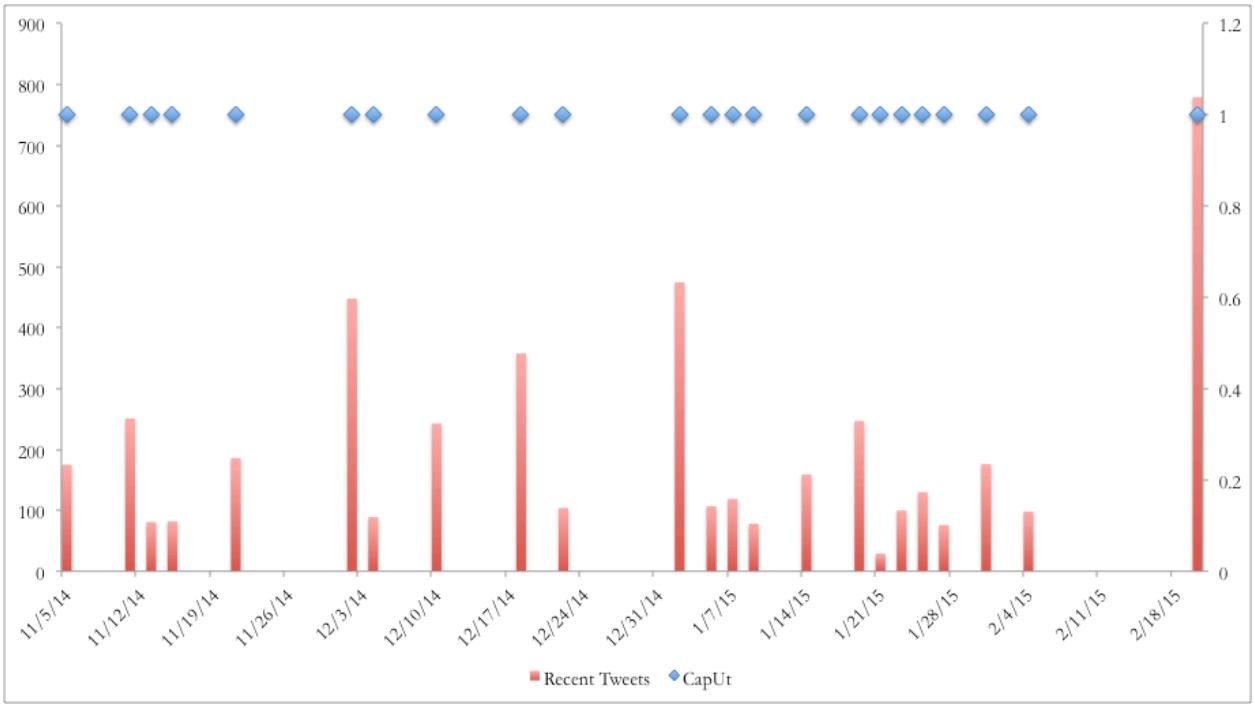
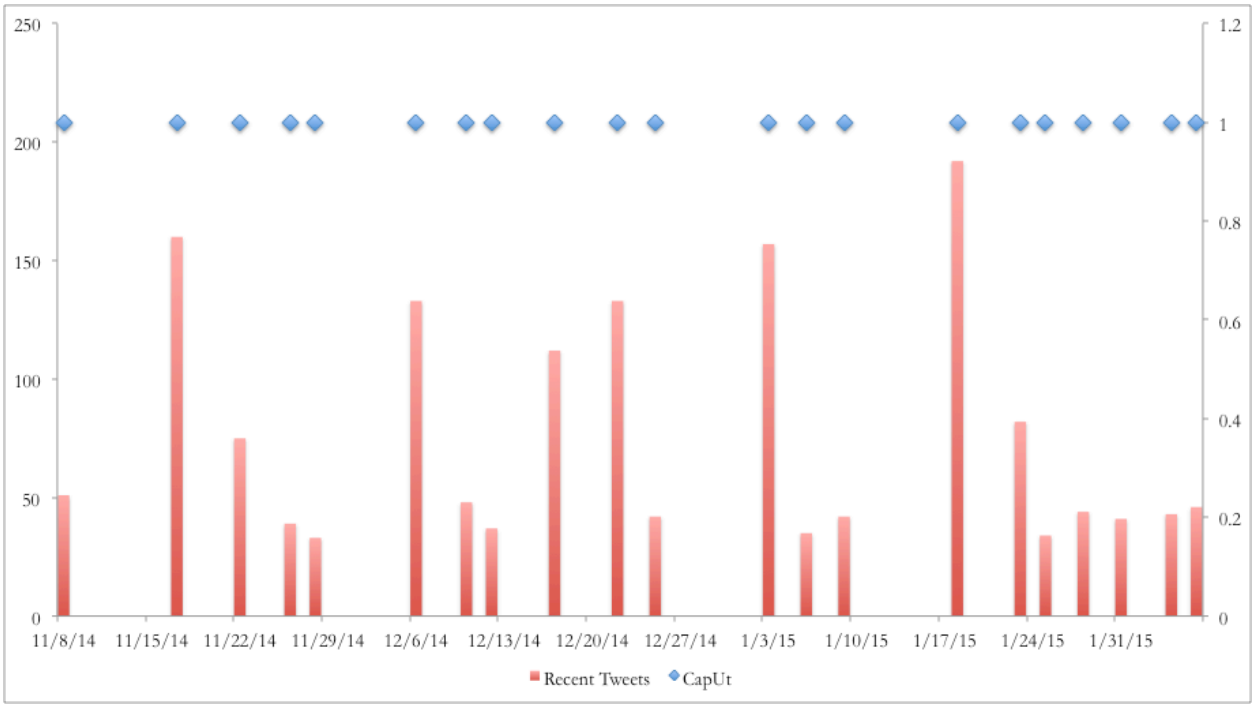


Chart 3. Recent Tweets & Capacity Utilization Over Time Charts: Oklahoma City Thunder

Chart 4. Recent Tweets & Capacity Utilization Over Time Charts: San Antonio Spurs



B. Twitter Use Having An Immediate Impact

Chart 5. Recent Tweets & Capacity Utilization Over Time Charts: Brooklyn Nets

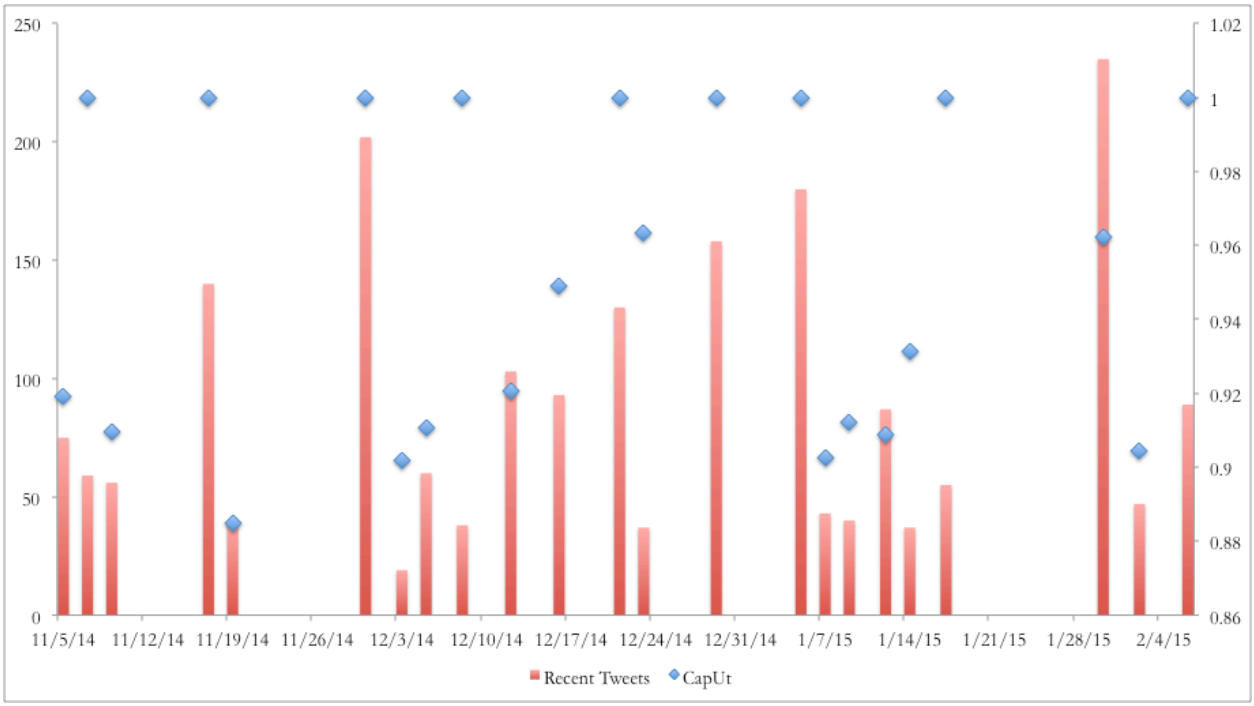
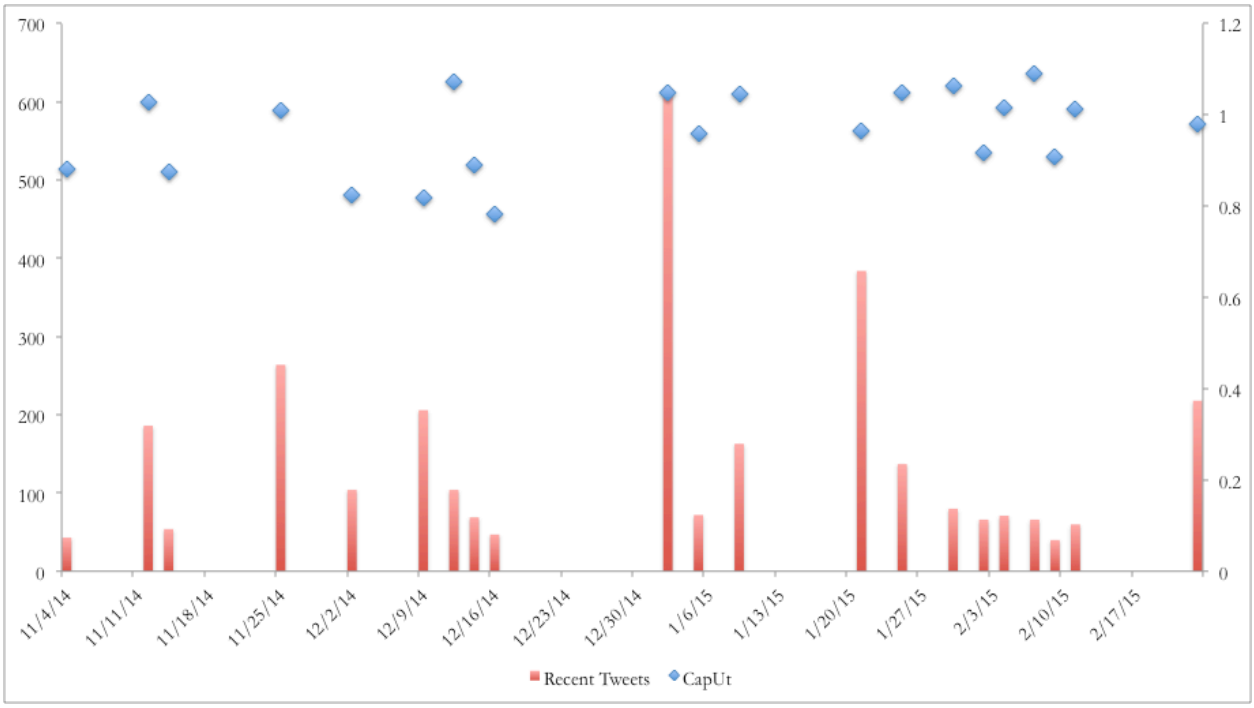


Chart 6. Recent Tweets & Capacity Utilization Over Time Charts: New Orleans Pelicans



C. Twitter Influence with Other Factors Present

Chart 7. Recent Tweets & Capacity Utilization Over Time Charts: Charlotte Hornets

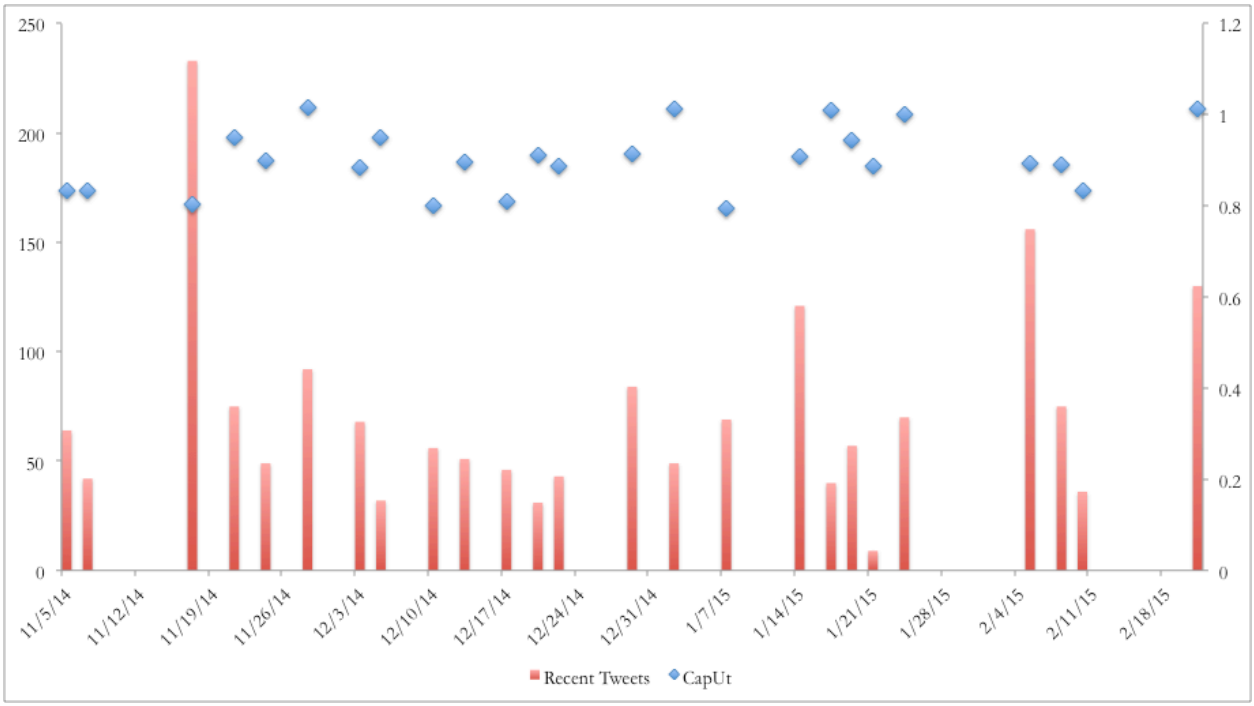


Chart 8: Recent Tweets & Capacity Utilization Over Time Charts: Dallas Mavericks

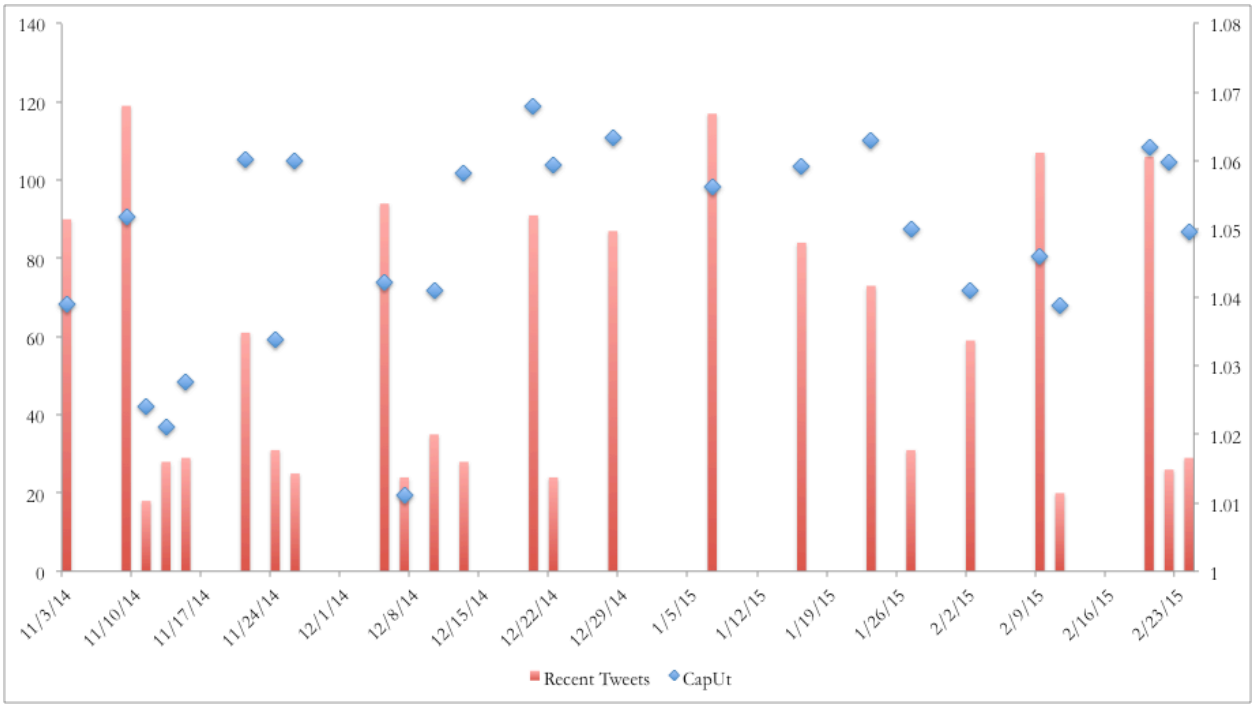
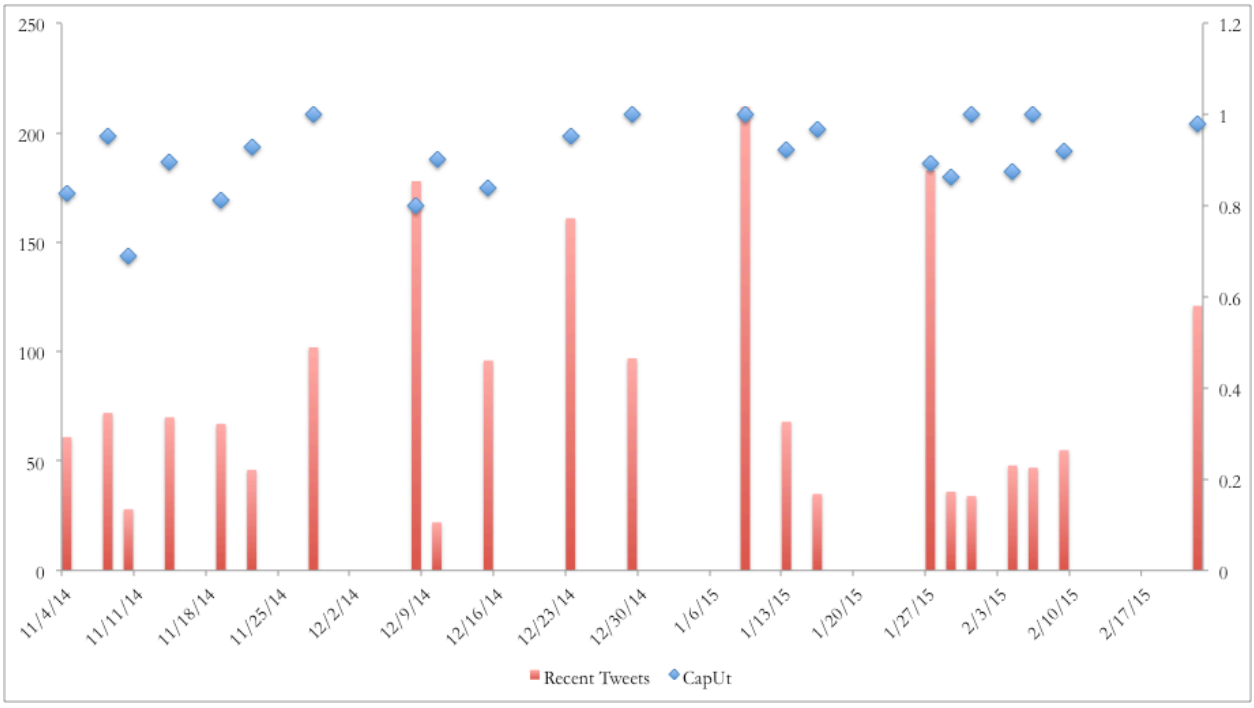


Chart 9. Recent Tweets & Capacity Utilization Over Time Charts: Indiana Pacers



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Appendix A: Interview with Mr. Kevin Cote of the Golden State Warriors

The transcribed interview occurred over the phone on April 10, 2014 between the author, Rajiv Suresh (RS) and Mr. Kevin Cote (KC), Senior Director of Digital Marketing at the Golden State Warriors. The purpose of the interview was to gain insight and background into how social media channels are used and managed in a NBA franchise.

RS: My thesis is focusing on drawing a relationship on social media use and ticket sales, but what I want to focus this interview on is the motivation behind using social media in sports franchises and how that has evolved over time.

KC: From a broad perspective over the last 7 or 8 years, it's really interesting to see where it has gone, and I think that sports and social media are the perfect marriage in that we have fans, not customers, and those fans are passionate about following the team and letting their voice be heard, and also interacting. That's kind of what social allows for. And how it's evolved is that initially when we started using Facebook and twitter, a lot of it was just another channel to get our messages out, whether it was game-related or marketing-related – it was just another channel, another platform to get that message out. How it's evolved is that it's become, obviously, more of a dialogue instead of just a monologue. From us just promoting our own stuff to conversations with fans, a way to consume content and not just promote it. That's where Facebook and Twitter really changed social media platforms. 75% of our video views now come from Facebook, from their native video player – so it's now about fans consuming the content, not just looking for ways to link to somewhere else. For the conversational nature, it's conversational among the teams: we have a fun banter with each other sometimes, we're able to provide customer service to fans who reach directly out to us, and it also applies to our players – our players are able to instantly connect to fans whether it's through our channels or their own. The big winner in all of that is the fan.

RS: You mentioned players can reach out through the team's channel, how often does this happen?

KC: So, they have their own accounts, but we like to include them in our own channel as much as possible. So every year, for example, the first official day of the season is called "Media Day", and we've kind of branched that off into our own thing called "Tweet-ia Day". For the last four years, basically what that is, is we have a two hour live stream with the players, every player sits down for an interview, all the questions come from fans via social, and we also have a "Media Hub" area. This year for example, we had all 5 social channels – Facebook, Twitter, Instagram, Snapchat, and Weibo – players basically went down the line and took over our accounts. So they would Facebook Q&A and answer questions directly, or take over our Twitter account and talk to fans that way, or take over our Instagram account and take pictures and selfies, they took over our Snapchat account and helped us run a contest for an autographed basketball, [and] they took over our Weibo account and, with translation, sent messages to fans in China. So, that's one example of how they use our own [channels]. And then, you know, when they practice and are on the road, they may not have their phones and be to connecting with fans, and so we can act as that messenger for them. So, it's a great way, especially when you have players like Steph Curry who are superstars in their own right, and it amplifies everything you do, but also it's a great way to work together to interact, from the fan to the player, to all of us.

RS: On the logistical side, on your end, what motivates you all to Tweet? How many people do you have on it? What does the operational side of it look?

KC: So, including myself, there are 7 people on the Digital team. But we oversee everything from web, the website, social media, e-mail marketing, global technology, and in-venue experience. We all

kind of co-habit the scope of it. You can think of us as a relatively small company, and there's a lot going on – whether it's the team or the business side, so we all know how to do everything. That being said, as far as social goes, we have a couple people really starting to focus on that. We have one person, among other things, she helps run our Snapchat account. Snapchat is a way different social media platform, with the way it has to be produced and captured natively on the app. We have another person who focuses a lot on Twitter and Facebook, but there's still a lot of help and a lot of collaboration with the other members of the team. More so than that, there's also help collaborated from the rest of the organization, when we talk about that we want to be called "digitally fit". And that means that everyone in the organization should have an appreciation for and understanding of social media. So, a lot of times we can't be everywhere at every time, there could be multiple events going on – there could be practice at the same time there's a corporate sponsorship event, and so we constantly have people from our organization who are adept at capturing those moments – maybe not posting them, but sending us pictures, sending us videos, relaying posts those on our social channels.

RS: So, it really just varies who is posting?

KC: Yeah, it varies – we are constantly communicating, we have places where we schedule out certain types of things, but we like to be as in the moment as possible. We have different environments, you know, in the office we can easily talk to each other, there's the venue, where we are all capturing things in the moment – you know, prior to the game, during the game, after the game. There are practices and road-trips and things like that, so we are always in constant communication about what we are posting, where we are posting it, and ideas for what we want to do. You know, like last night when Steph set the record for single-season three pointers, we already

had an image ready to go and social effects ready to go, so that we could put that out everywhere. You have to be in the moment for that kind of stuff – it's no longer sufficient to just have a Tweet that goes out that says, "Hey Steph set the record." We now have everything in place where instantly the graphic goes up and instantly the highlight is shared on all the social channels, so that the next day you can relive it and capitalize on the moment. And again, when you have a winning team with players doing special things, it's funny, people think it makes our job easier, but actually it makes it more challenging – there's more and more to be capitalized on and more responsibility to be in the moment, and it's a lot more fun but at the same time busier.

RS: And is that different from before? You mentioned that now you have to have an image and text and a whole package ready to go, before it was just the text and that was enough?

KC: Maybe, or not even thinking that far ahead. Back in 2009, when Twitter was such an early, young platform, people were still trying to figure out what to do with it. When we first started way, way back, we didn't want to do too much. So we would think, "Ok let's just do one score update per quarter." And then it was, "Ok, well maybe we can do a couple things during games along with the score updates," as we found out people are following on Twitter if they weren't in front of their TV. Now, it's become between 50 to 100 times per game, because we've found that's what fans want, that's what, in terms of Twitter as a platform, that's what the platform calls for – if you're not in the moment in the last 10 seconds, almost six messages disappear. Facebook is different – it's going to surface the most popular and relevant content. That allows us to last a little longer and to capitalize on things like native video. Instagram – there's an incredible amount of engagement on that platform, it's getting younger, and it's very visual obviously, so there are different ways we strategize for each platform.

RS: You talked a little bit about having a successful team, and how that changes your roles – can you expand on this and how this changes how active you are on social media?

KC: I'd say, a lot. I mean, but even if you are a team that doesn't have a good record, you still want to be active. Even if fans are very negative, it's better than apathetic. The last thing you want is apathy with fans, you want your fans to be passionate and you want them to have a place where they feel like their voice will be heard, and social provides for that. That said, when you're winning, it allows you to do even more – it allows you to have more fun content, images that speak to team's success. When it's the opposite, some teams have taken the approach of having a little more fun with the platform and being a little more "off the cuff" and more of a joking manner. But, that's not necessarily the case with every team – some teams are very conservative and they don't have that likeness so they get quieter. I will say, you have to be able to take advantage of it – not really from a content standpoint, but really from a business standpoint. You know, sponsorships – they want to latch onto everything you do with tickets to sell constantly, and social, with Facebook ads becoming our most effective paid media channel because that's where the audience is. So, you have to be ready to take advantage of all of those things, especially when things are going well.

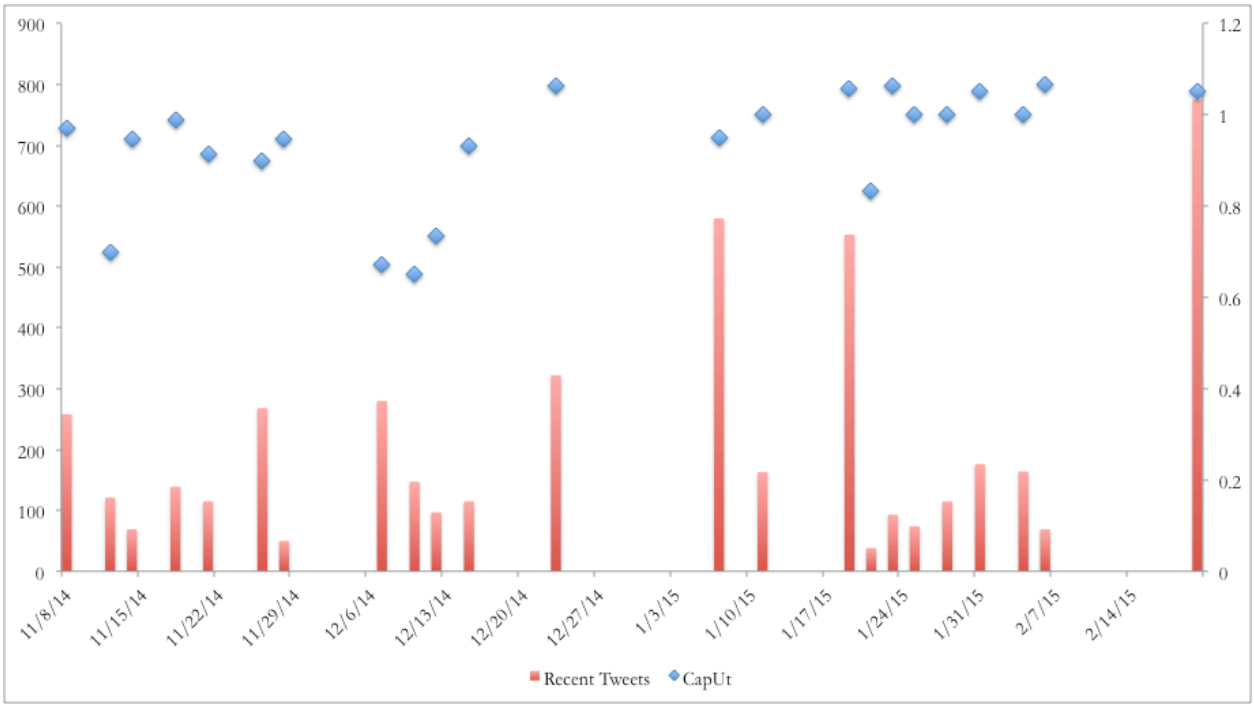
RS: Would you say that that sentiment is consistent across the league, in terms of having an emphasis on engaged fans whether they are positively or negatively passionate? How does it differ?

KC: It differs from market to market, it differs from team to team, across philosophies of ownership or president. A team like Atlanta, even though they are really, really successful on the court this year, they anticipated it, they decided last year, with their new president, that they had an apathetic fan base, and they needed to have a more fun voice. So, they consciously decided to that and they really

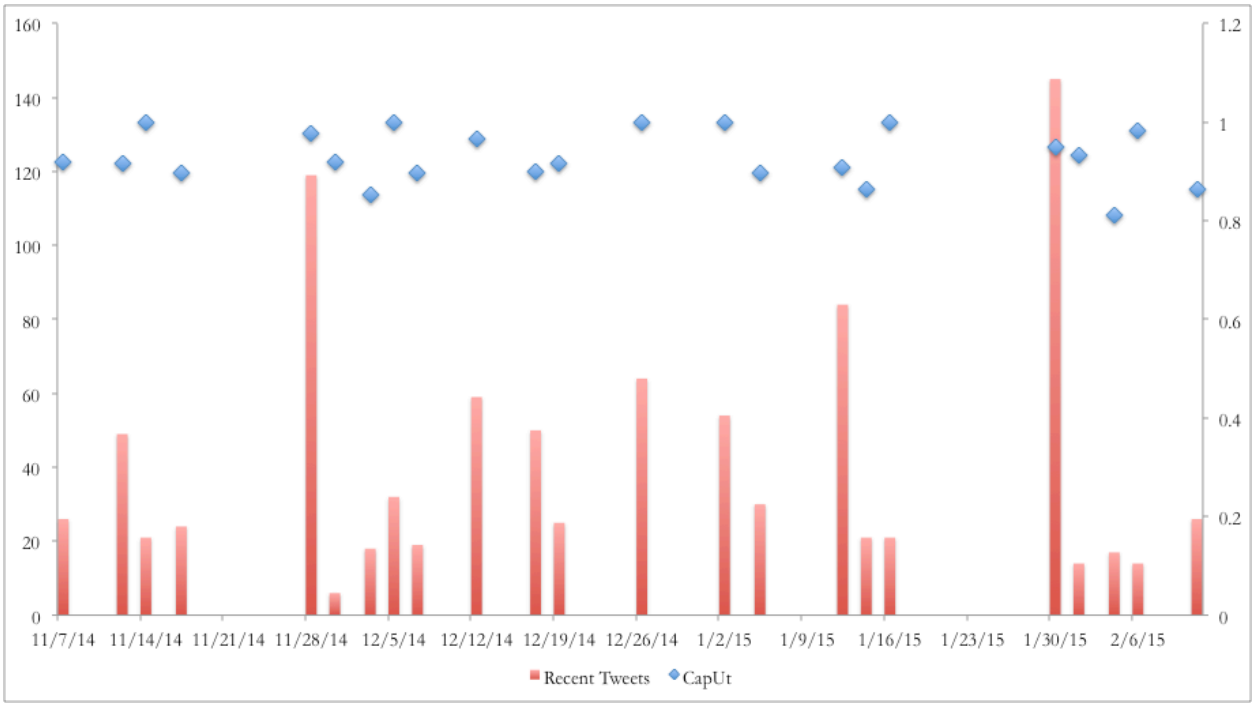
were targeting millenials – that's their marketing strategy, so they have a very different account than the Celtics, who are much more about tradition and an older fan base, and they aren't going to do "GIFs" and fun "memes", they're going to keep it pretty traditional. It differs all across the board, and someone in our position has to figure out a way to engage the fans while also protecting the brand.

Appendix B: Recent Tweets & Capacity Utilization Over Time Charts for all 30 NBA Teams

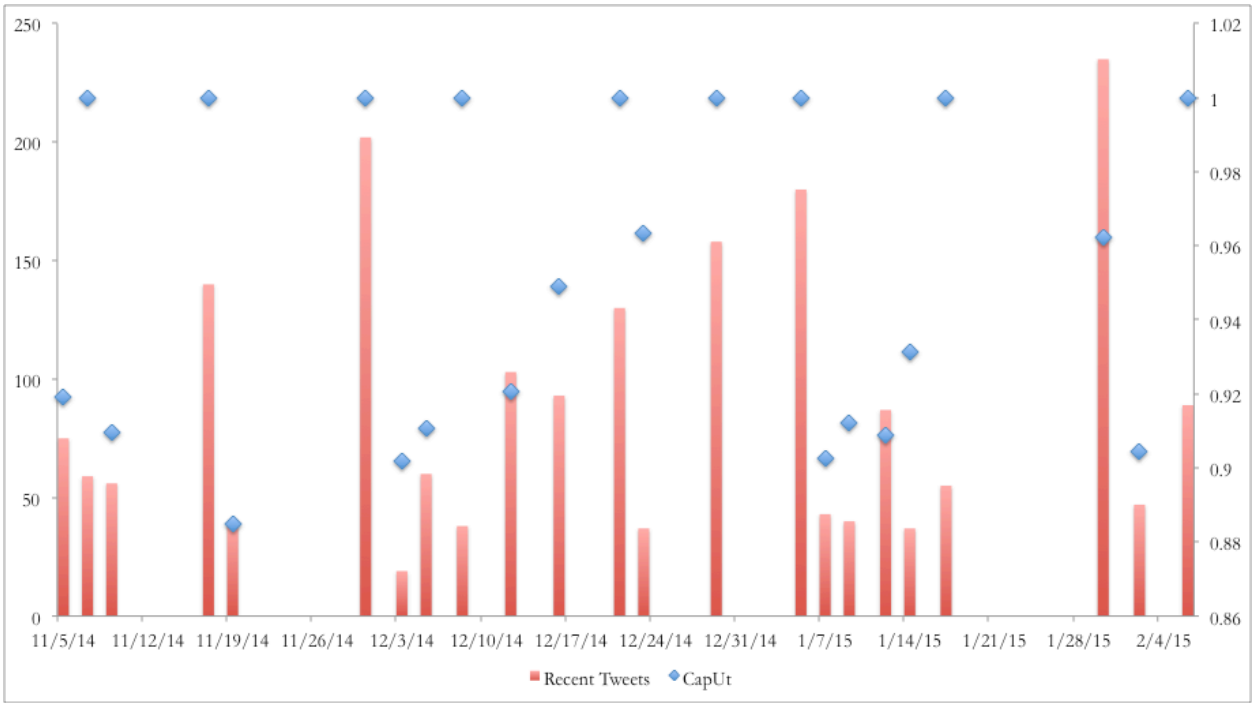
B.1. Atlanta Hawks



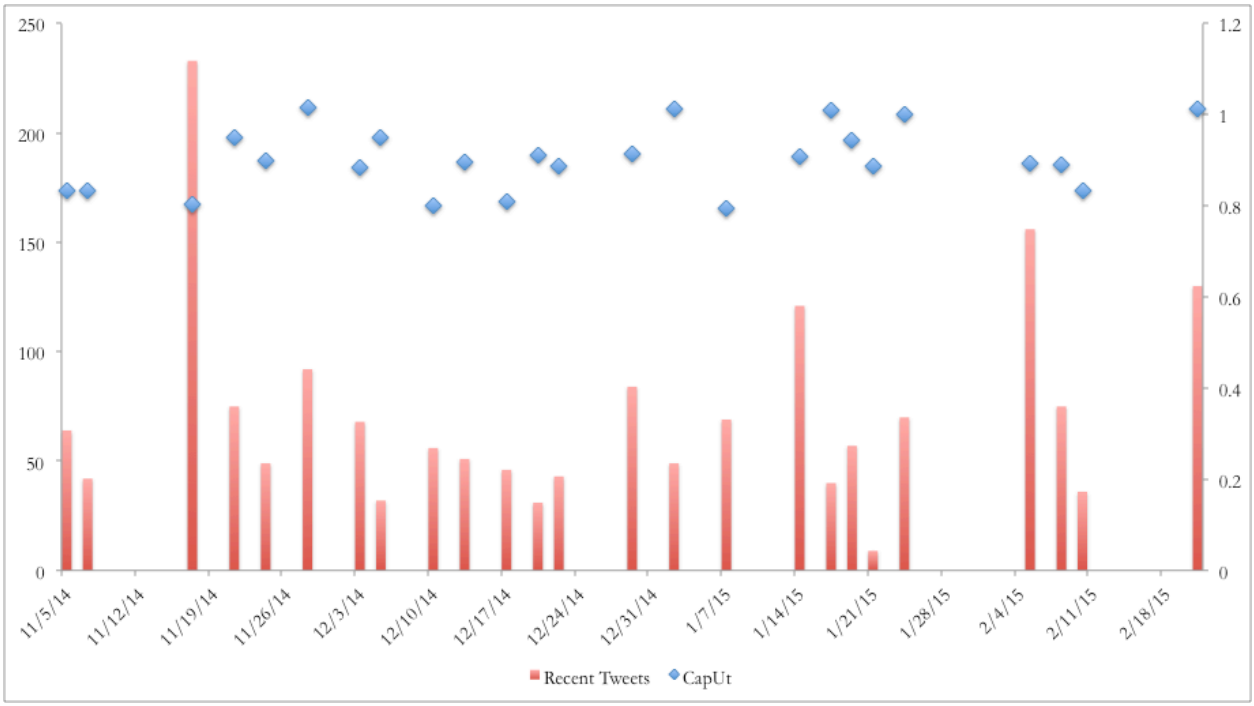
B.2. Boston Celtics



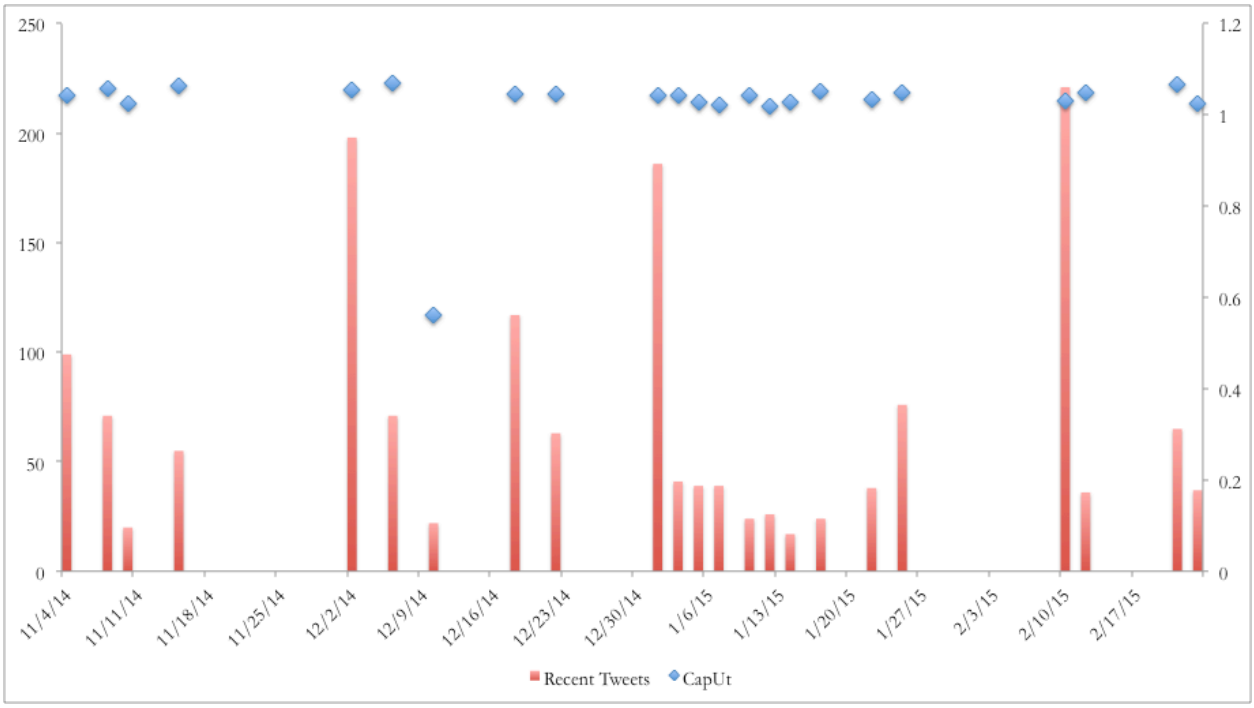
B.3. Brooklyn Nets



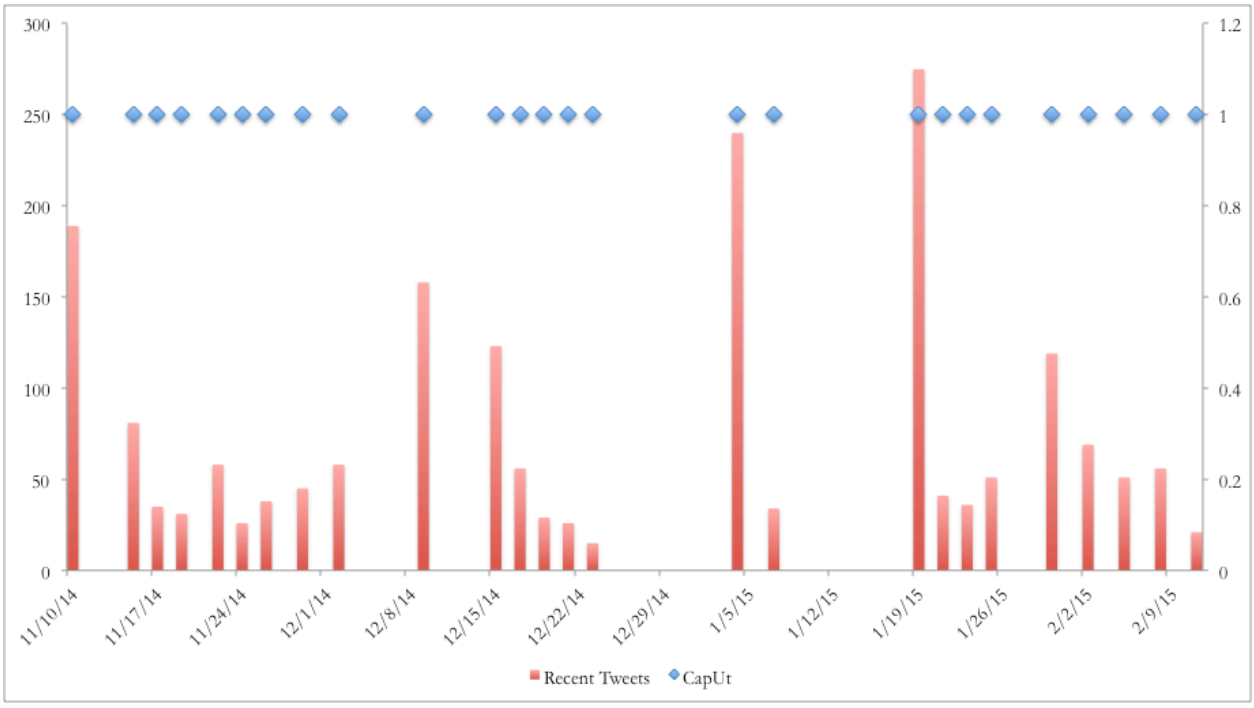
B.4. Charlotte Hornets



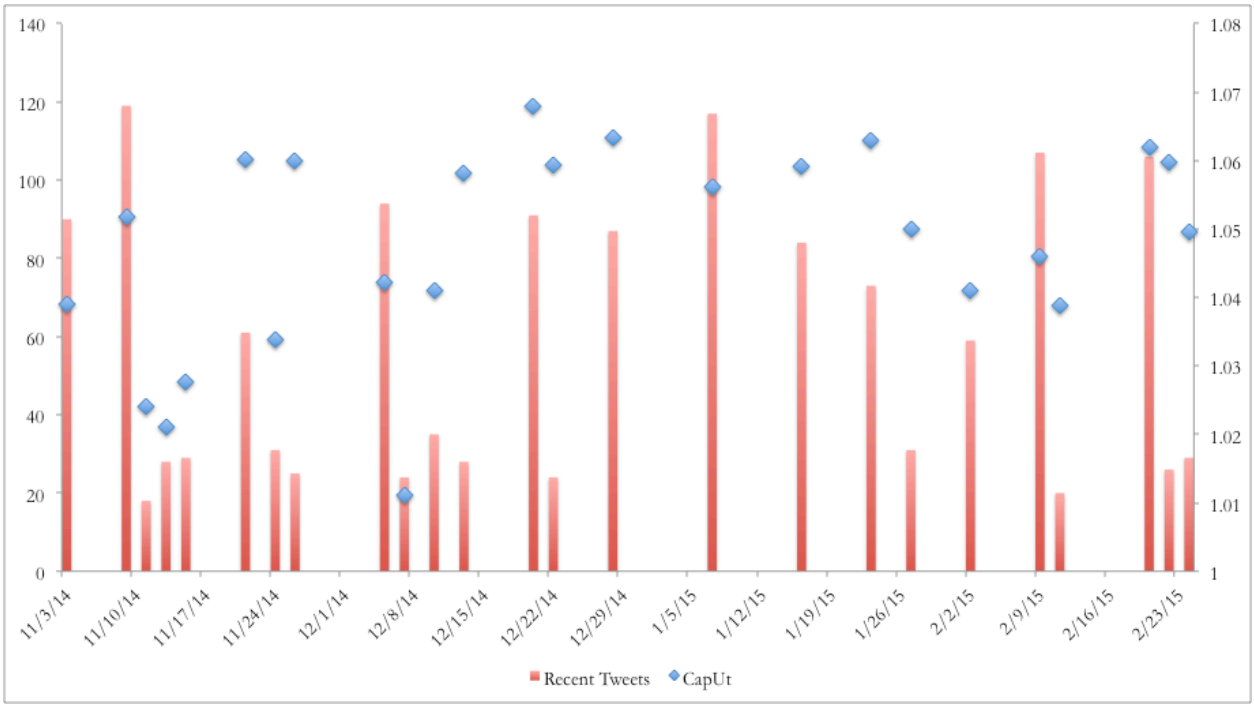
B.5. Chicago Bulls



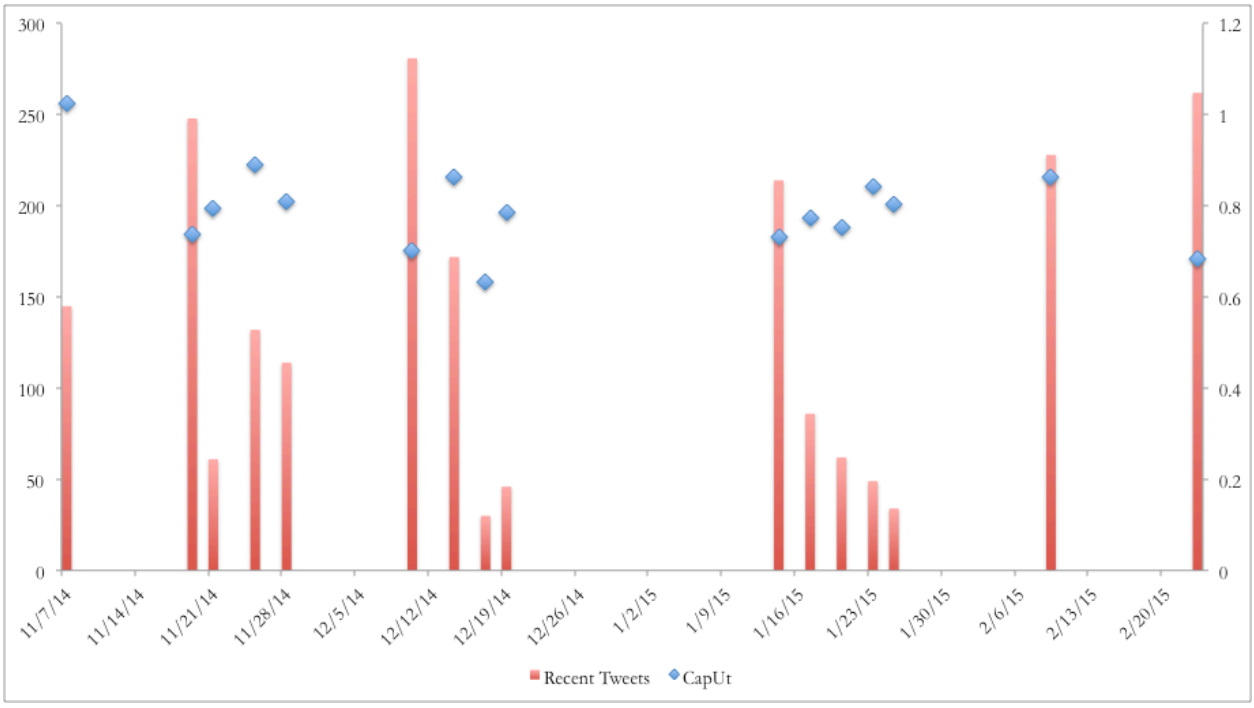
B.6. Cleveland Cavaliers



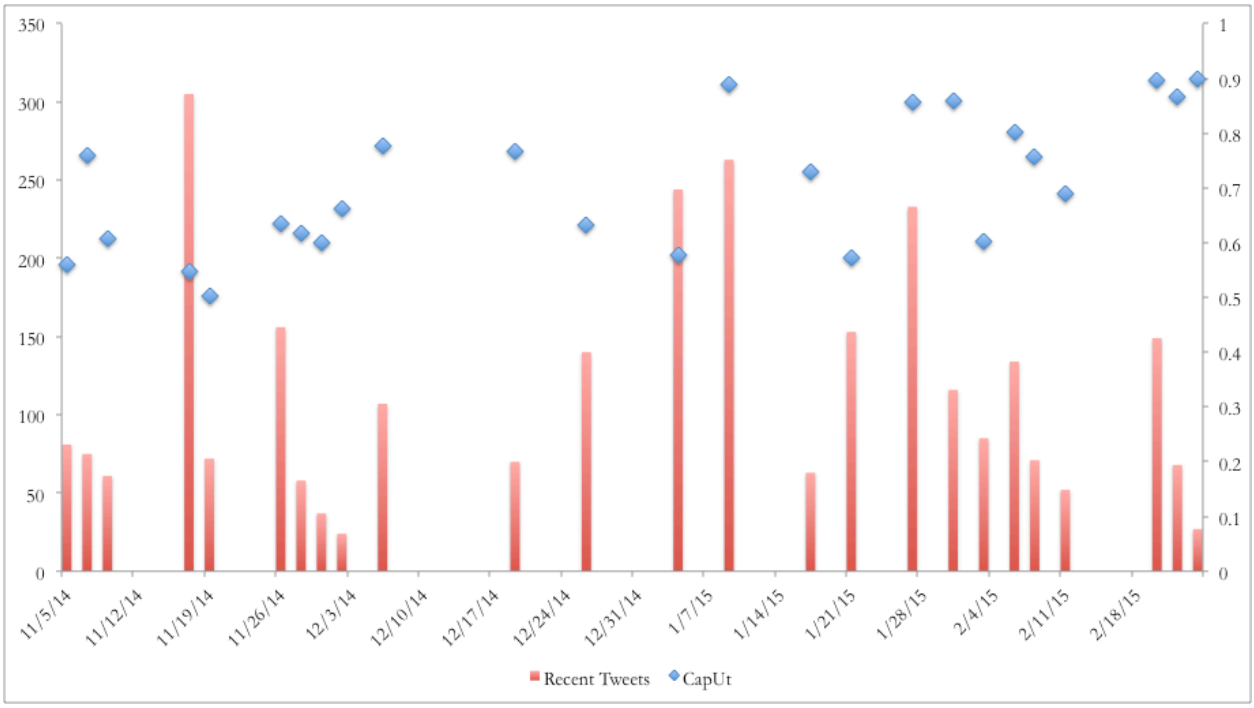
B.7. Dallas Mavericks



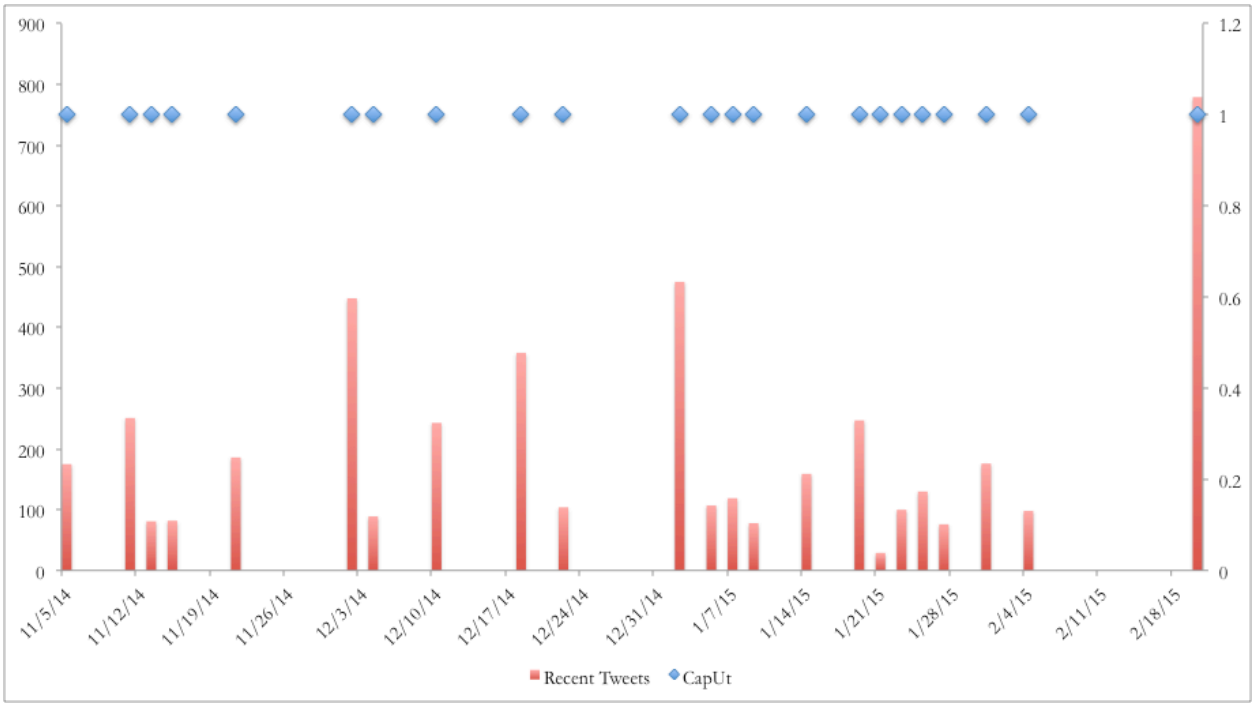
B.8. Denver Nuggets



B.9. Detroit Pistons

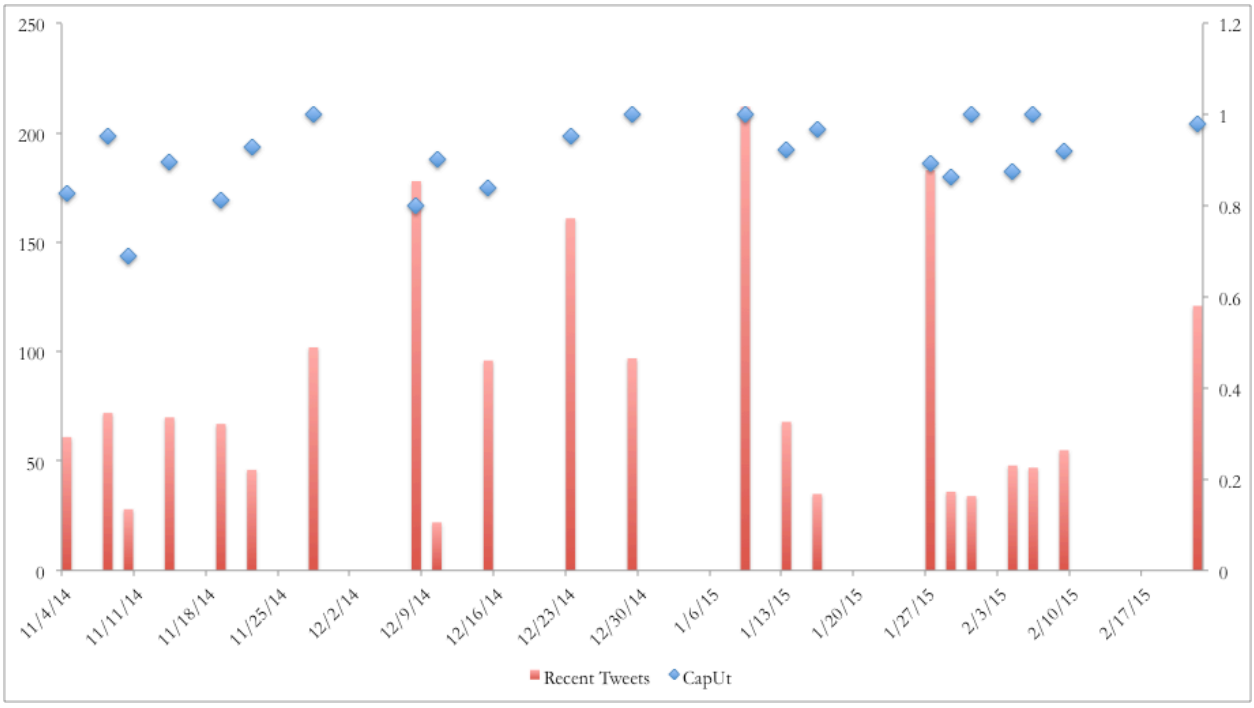


B.10. Golden State Warriors

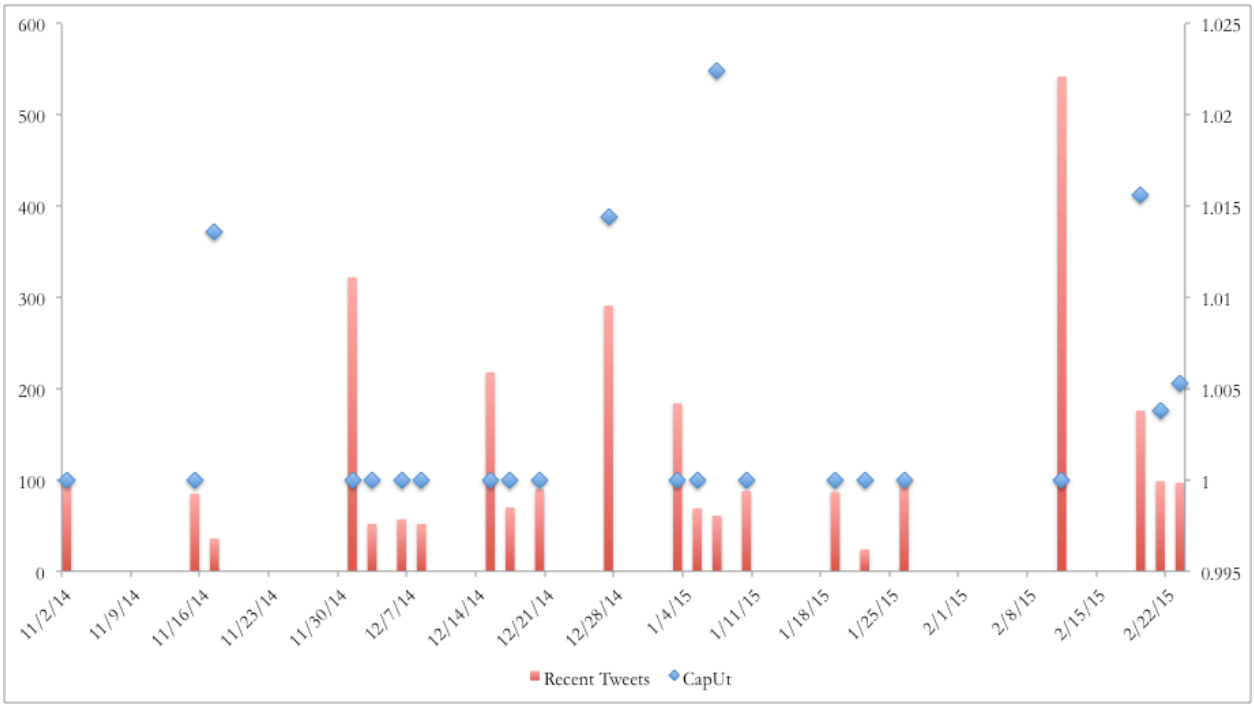


B.11. Houston Rockets

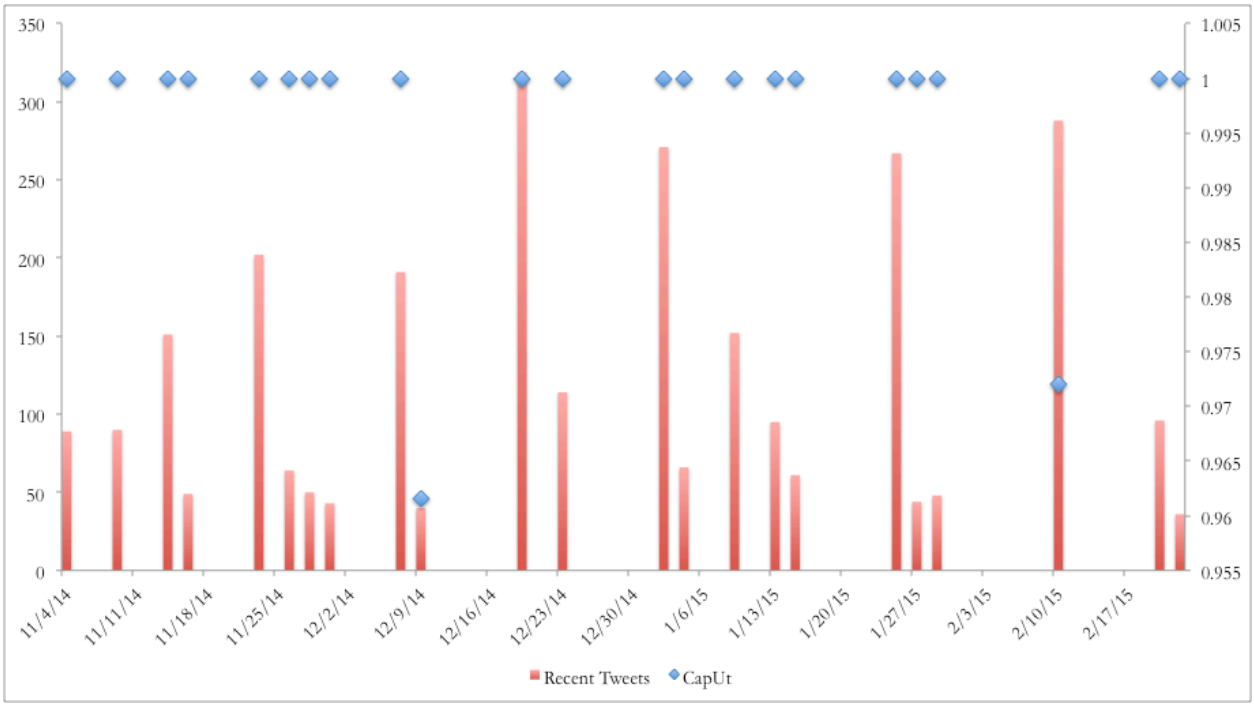
B.12. Indiana Pacers



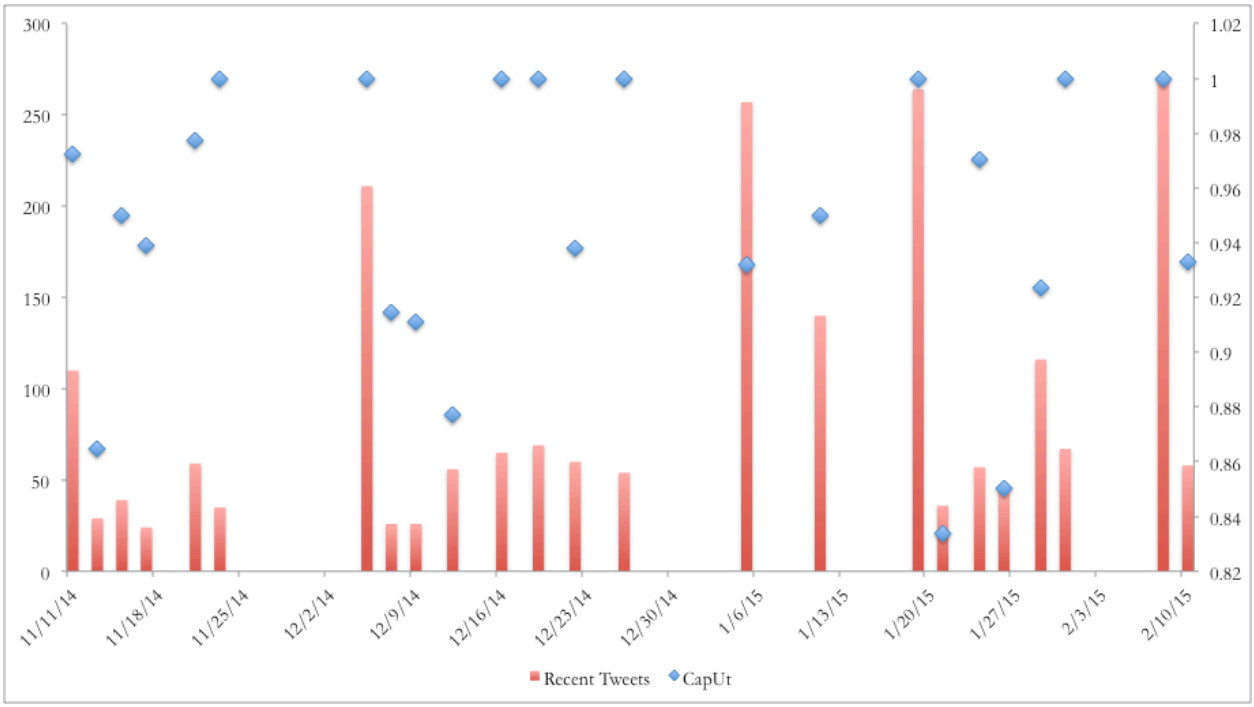
B.13. Los Angeles Clippers



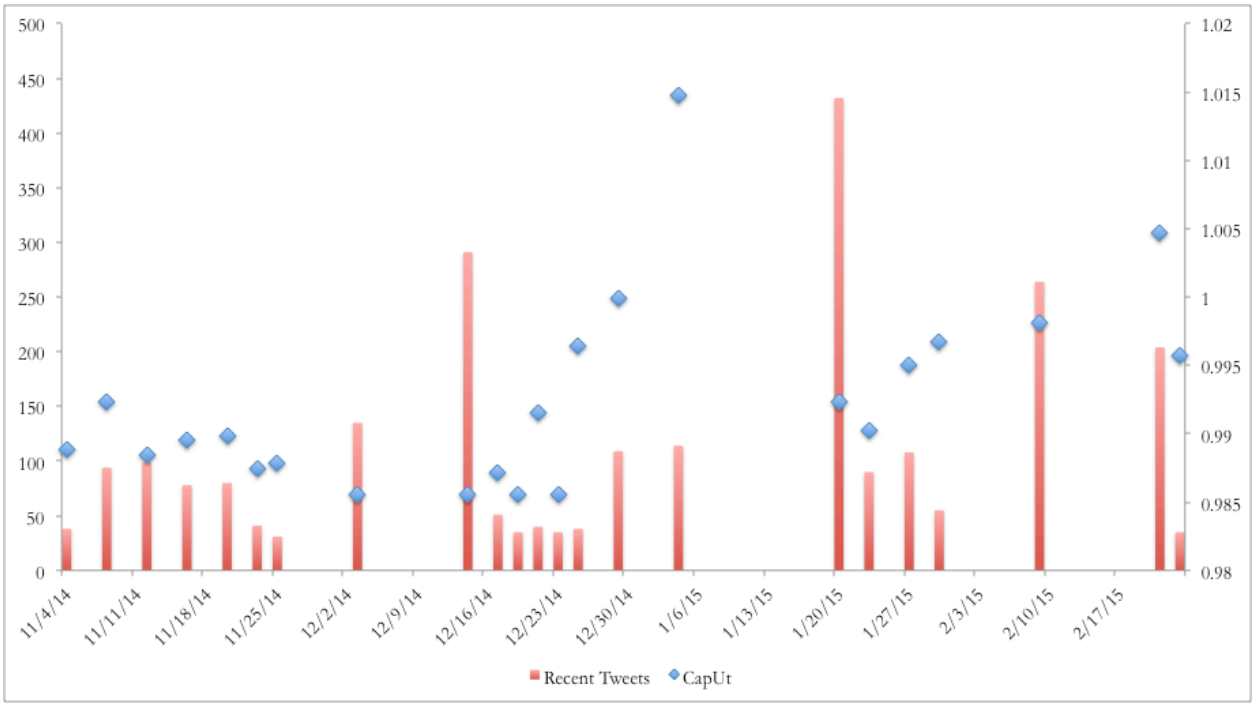
B.14. Los Angeles Lakers



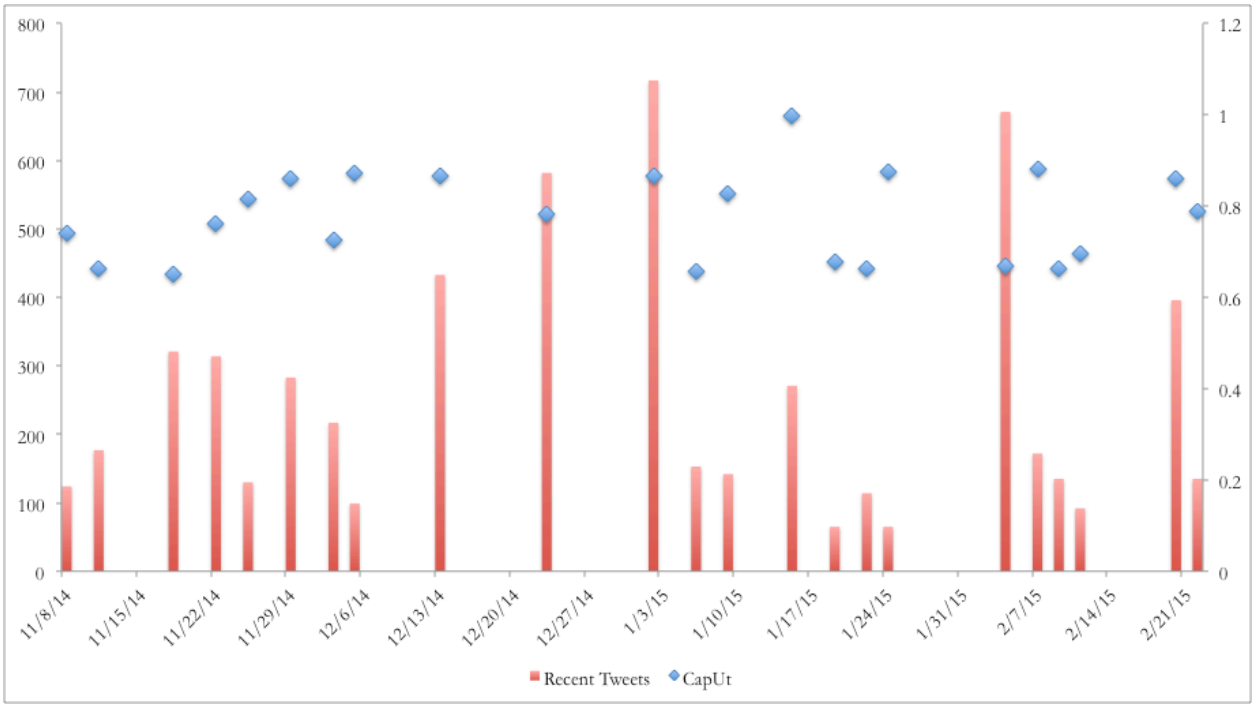
B.15. Memphis Grizzlies



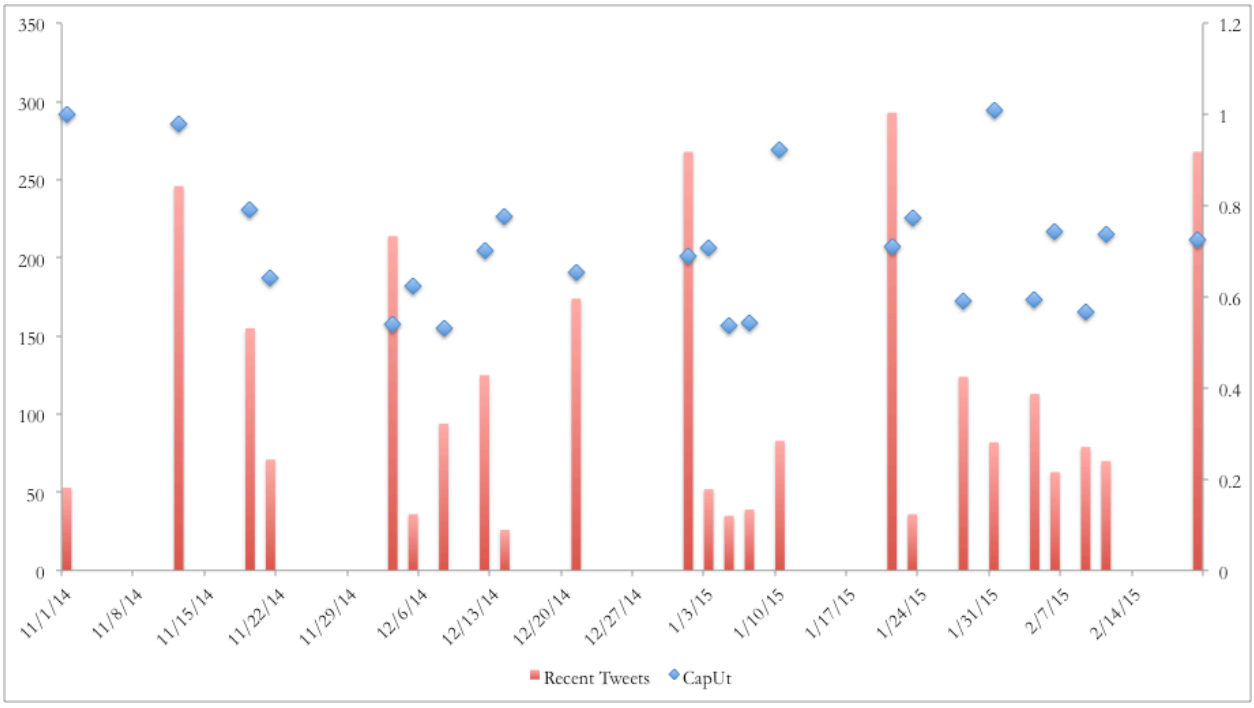
B.16. Miami Heat



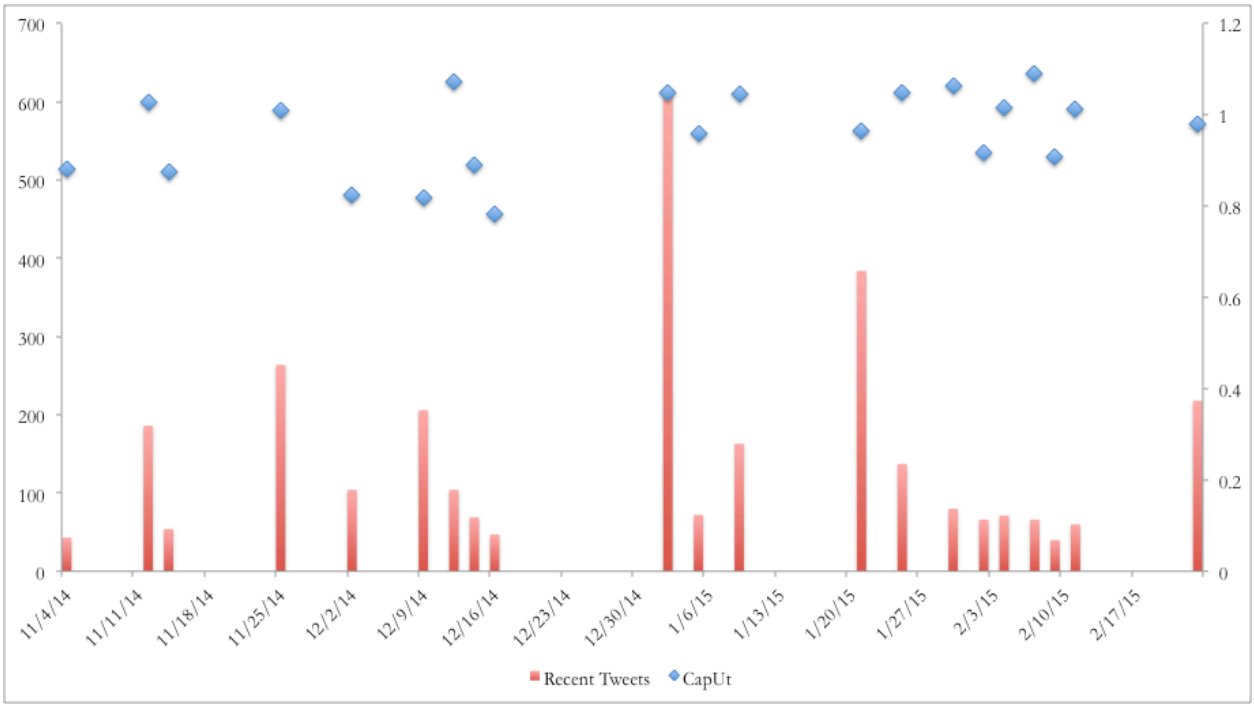
B.17. Milwaukee Bucks



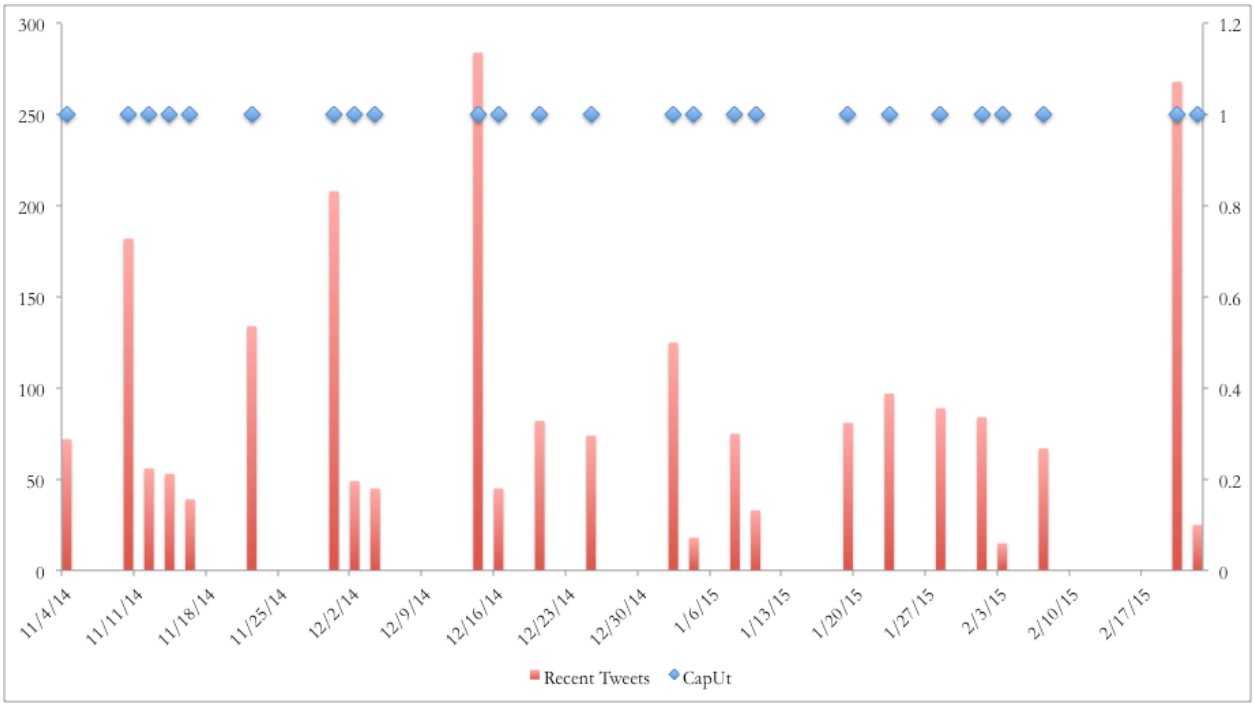
B.18. Minnesota Timberwolves



B.19. New Orleans Pelicans

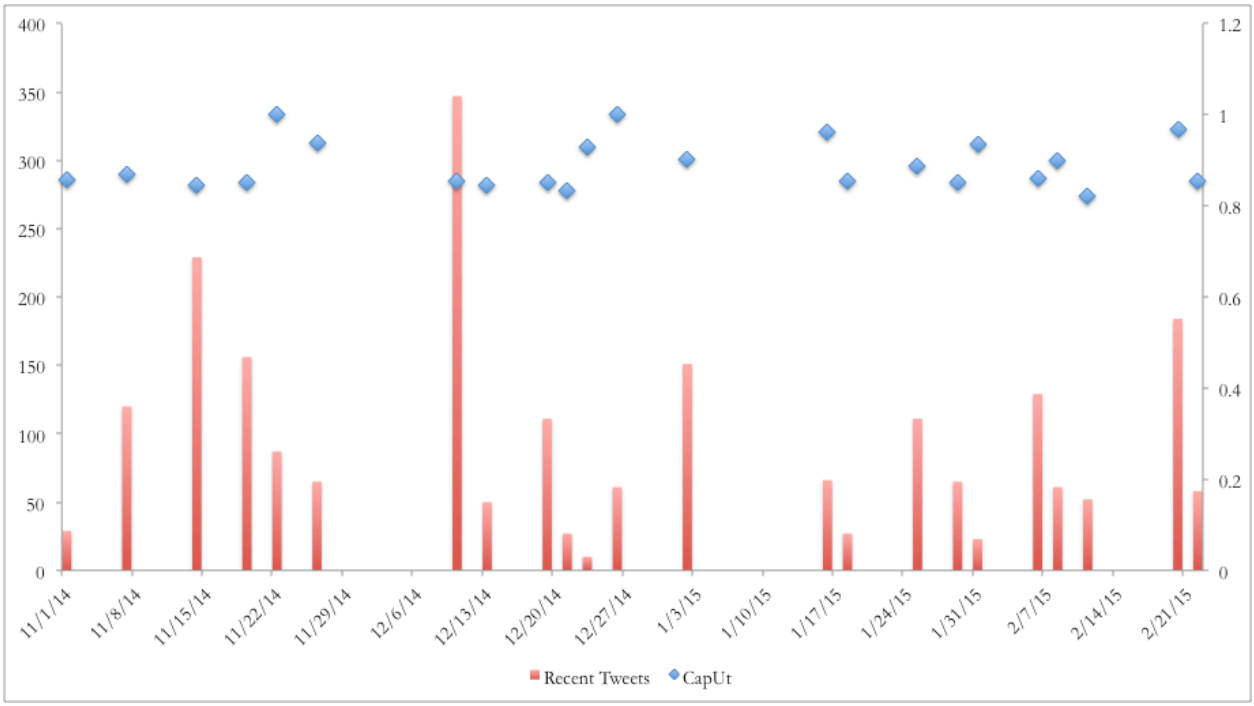


B.20. New York Knicks

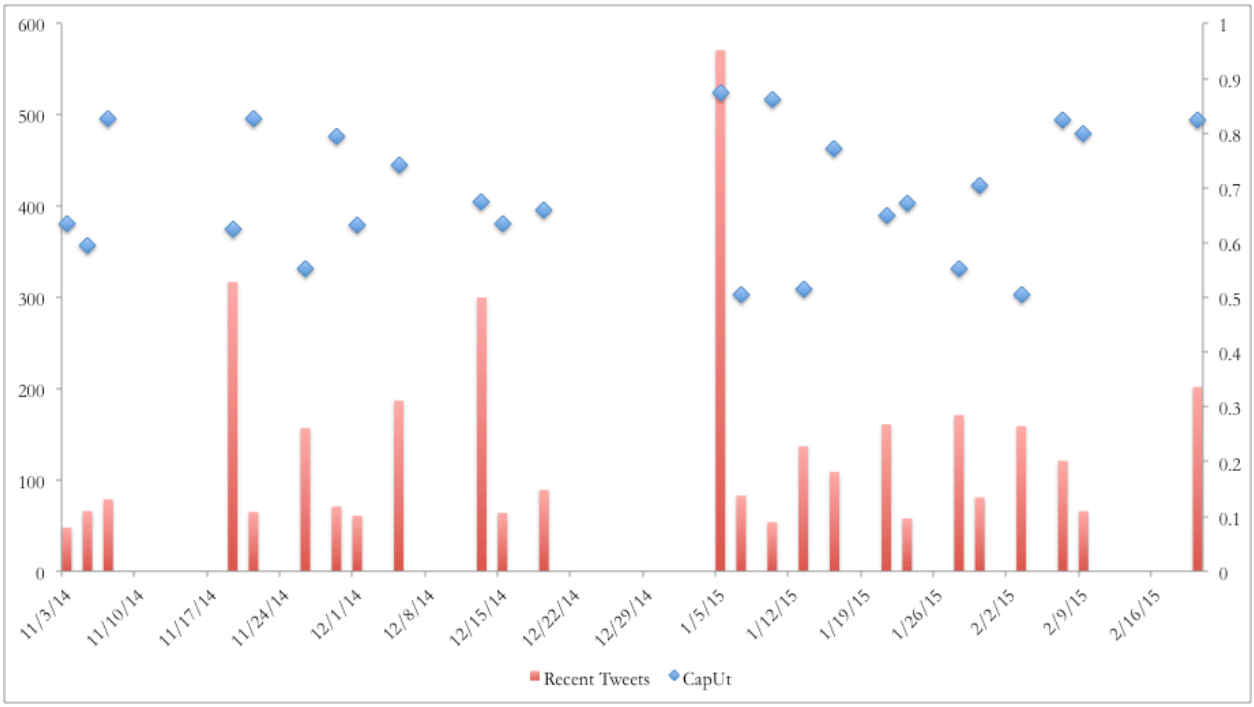


B.21. Oklahoma City Thunder

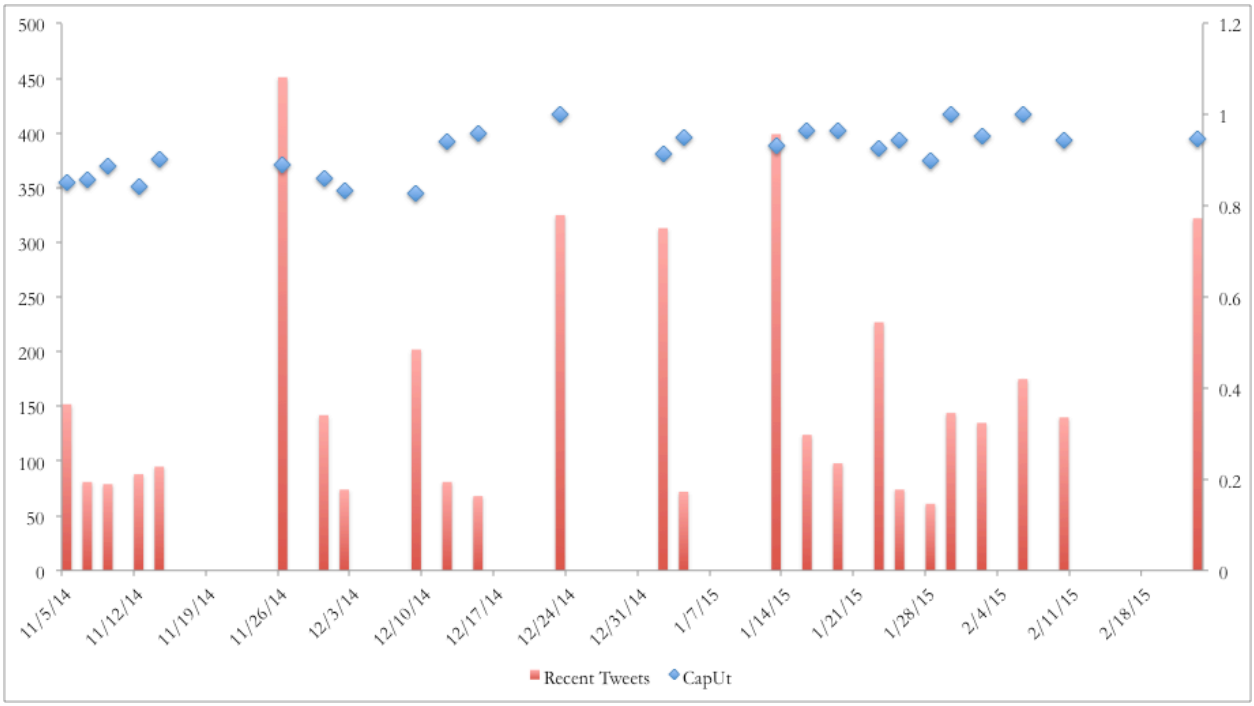
B.22. Orlando Magic



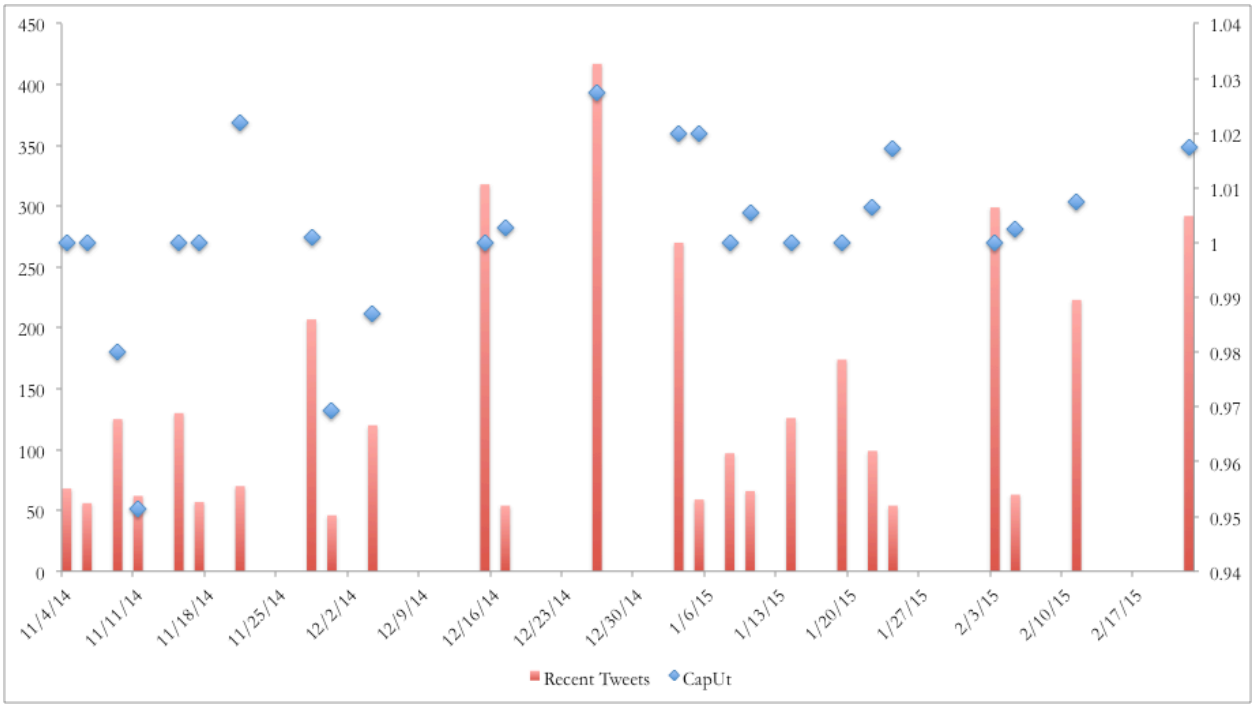
B.23. Philadelphia 76ers



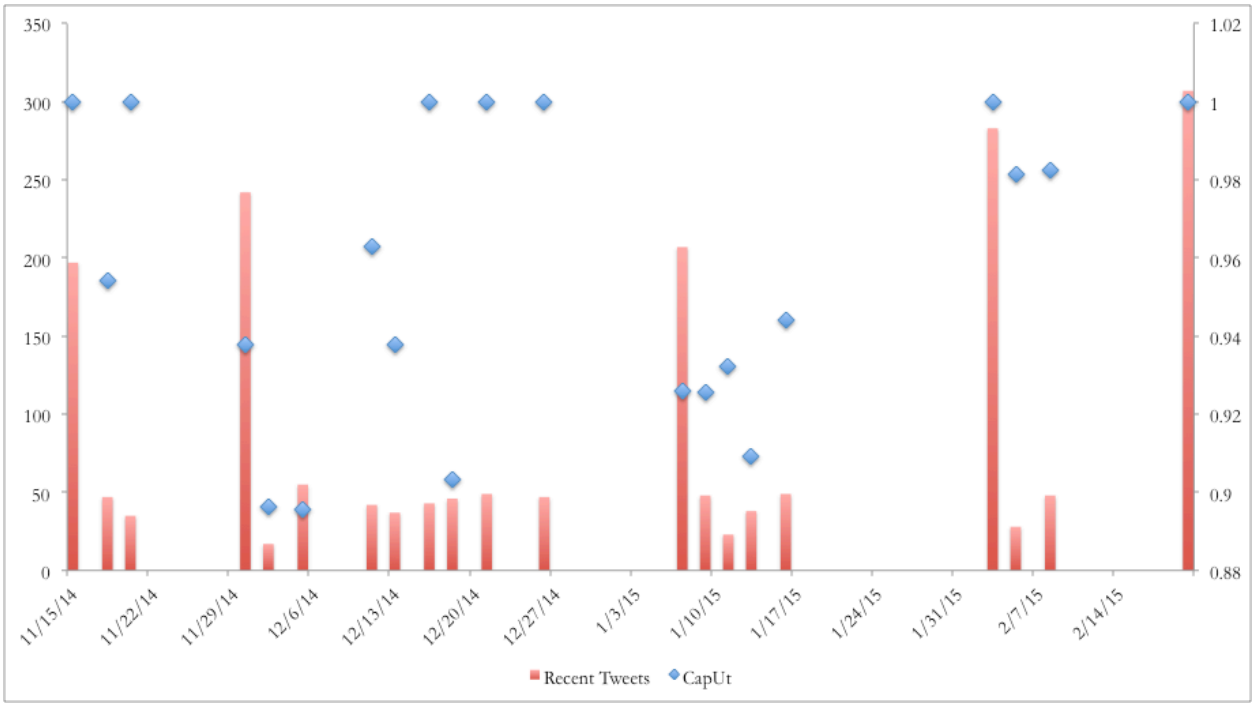
B.24. Phoenix Suns



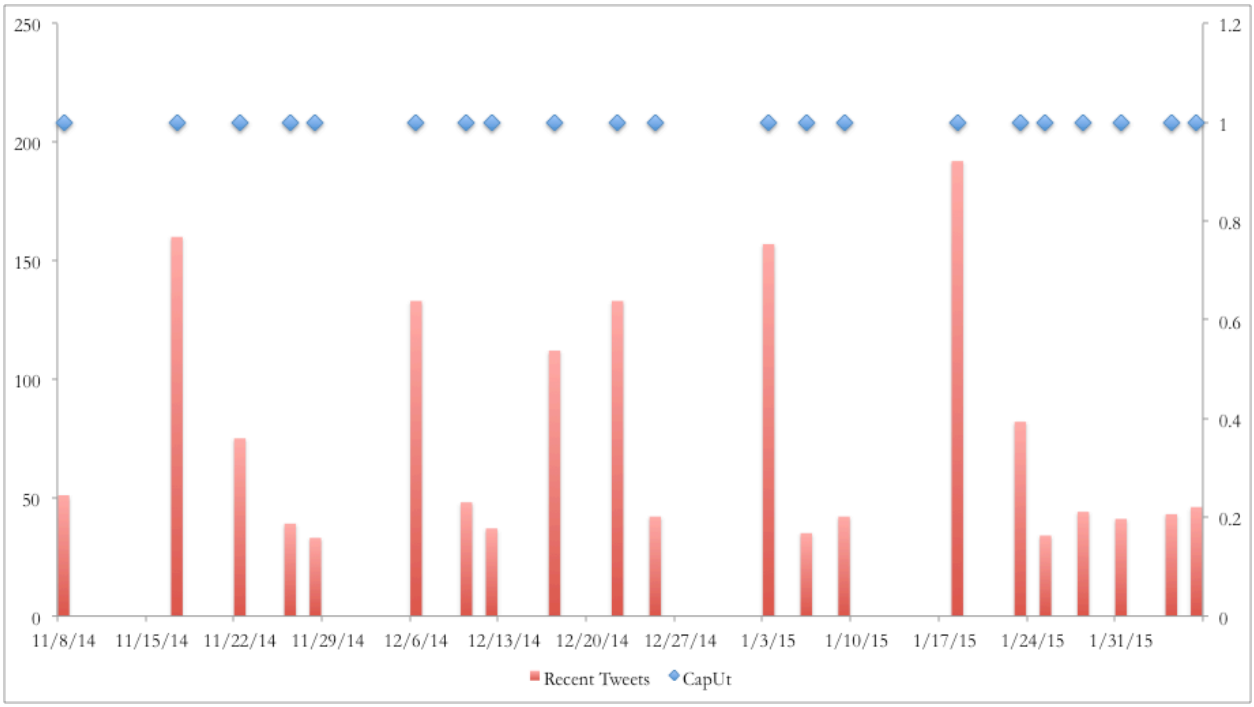
B.25. Portland Trail Blazers



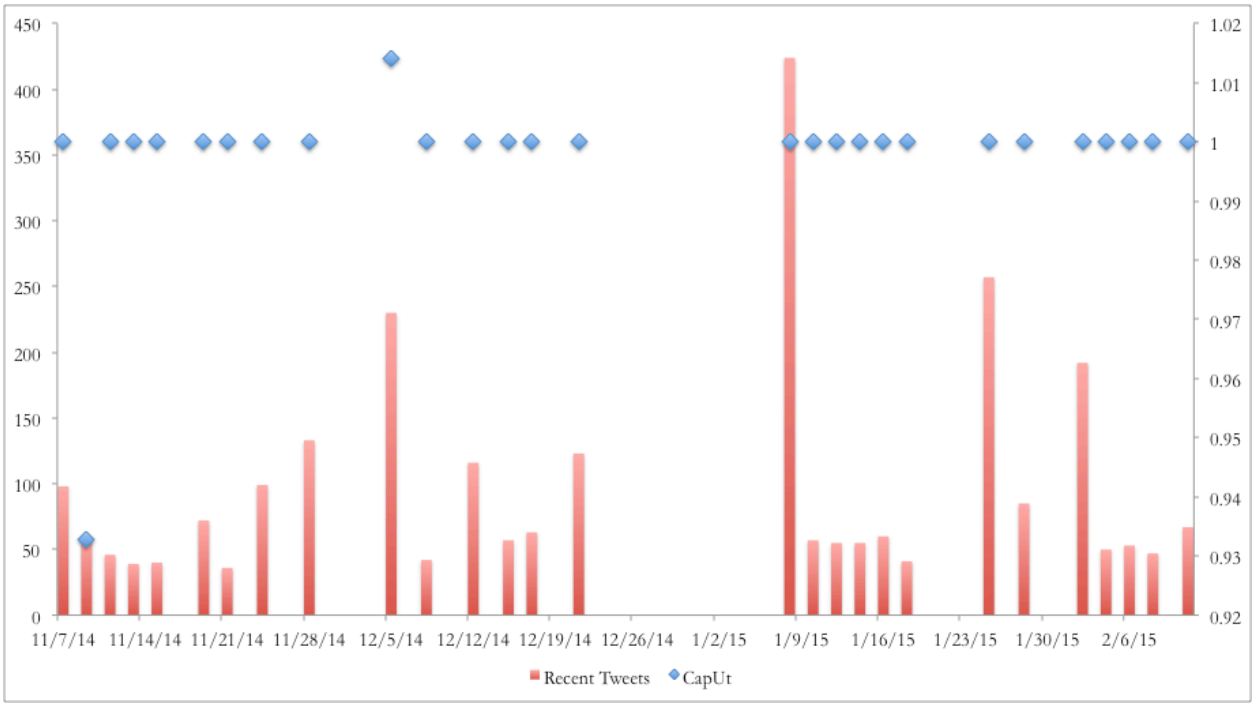
B.26. Sacramento Kings



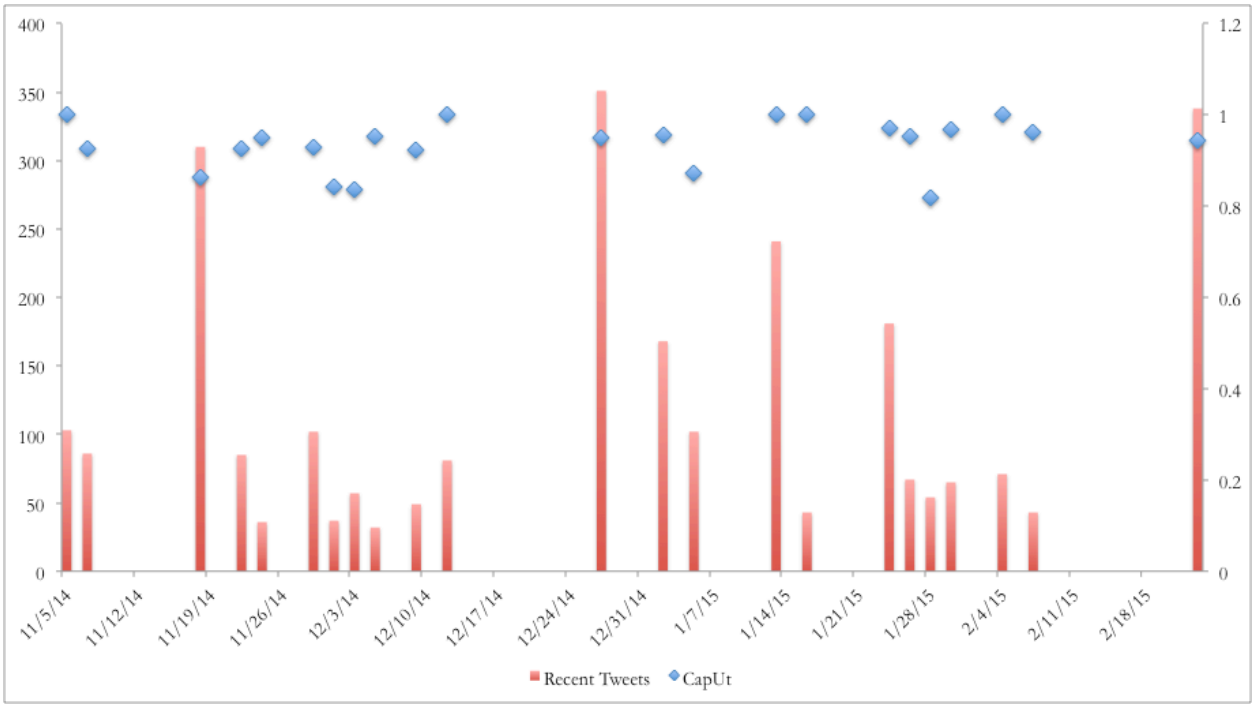
B.27. San Antonio Spurs



B.28. Toronto Raptors



B.29. Utah Jazz



B.30. Washington Wizards