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Hashmoney: exploring Twitter hashtag use as a secondary ticket market price determinant

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Abstract: The growth and prevalence of sport event ticket transactions on secondary ticket market platforms such as StubHub has led to the creation of a body of academic research studying this new phenomenon. Factors such as team performance and perceptions of fairness have been explored for their relationship with the price of secondary market tickets. This exploratory study introduces a new potential price determinant – social media activity – itself a popular online phenomenon that has inspired considerable academic research. This exploratory study of prices for eight National Football League games adds use of official team hashtags on Twitter to a multiple regression model, controlling for other price determinants established in previous research two models, one to predict prices for tickets sold on StubHub, the second to predict prices for tickets available on StubHub, demonstrate that increased Twitter hashtag use is a significant positive predictor of ticket prices on the secondary market.

Keywords: Twitter hashtags; National Football League; NFL; StubHub; sport tickets; social media.

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Ann Pegoraro is the Director of the Institute for Sport Marketing (ISM) and holds an appointment as an Associate Professor in School of Sports Administration, all at Laurentian University. She is an active researcher, who has presented at international conferences and published in refereed management journals in the areas of sport management, marketing, social media and communications. Her research primarily focuses on the intersection of sport and new media, particularly social media with her work published in the *International Journal of Sport Communication*, *Communication and Sport*, *American Behavioral Scientist*, *Journal of Sport Management*, *Online Information Review*, and the *Journal of Sponsorship*.

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1 Introduction

National Football League (NFL) fans in Seattle are well aware of the strength of their home town football team, the Seattle Seahawks. The 2014 Super Bowl champion Seahawks play in front of loud, sold-out crowds of 67,000 in their home stadium, CenturyLink Field (About CenturyLink, 2015). Anticipating playing host to the National Football Conference Championship game after finishing with the conference's best record during the regular season (NFL Standings – 2014, 2015), the Seahawks quickly sold out tickets to that tentative game, scheduled for Sunday, January 18 (Daniels and Pittman, 2014). In addition to indicating passion for the home team, the intense public focus on the game demonstrated the popularity and mainstream appeal of online ticket reseller StubHub, the largest of the so-called secondary market companies, which controls approximately 50% of the market for pre-sold event tickets (Peoples, 2014). Ten

days before the NFC Championship game would kick off in Seattle, more than 6,000 tickets were listed for sale on StubHub (StubHub, 2015), representing nearly 10% of the capacity of CenturyLink Field (About CenturyLink, 2015).

The borderless nature of online ticket resale transactions have made many previous anti-scalping laws, designed to prevent the sale of tickets at above the listed face value, impossible to enforce (Budnick, 2013; Drayer, 2011a). That legal loophole, along with the proliferation of online commerce, has led to a boom in the market for re-sold event tickets. This boom has been joined by the actual event hosts (Sagers, 2014; Stone, 2007). As consumers become more comfortable with the act of purchasing tickets on the resale market (Moore, 2010), a case has been made for the merging of primary and secondary ticket markets (Drayer, 2011b). It is believed that StubHub, which is owned by eBay, has annual sales that are larger than traditional primary ticket selling website Ticketmaster (Roberts, 2013). Cambridge, Massachusetts-based market research firm Forrester Research estimates the value of the secondary ticket market to be \$4.5 billion (George, 2013). Other estimates put that figure at more than three times that amount (Lacy, 2005; Stecklow, 2006). This evolving marketplace has been studied by researchers, who have established the legitimacy of ticket reselling for a NFL market (Drayer and Martin, 2010), have examined price determinants (Drayer and Shapiro, 2009), and have looked at consumer demand for tickets (Drayer et al., 2012; Kemper and Breuer, 2015) in the secondary market. While much of the scholarship about the secondary ticket market has been in the sporting realm, studies have investigated concert ticket resale as well (Bennett et al., 2015; Corey, 2014).

Given the size of the secondary ticket market in the overall economy, as well as the increasing reliance on resale by event organisers and ticket-buyers, it is logical to analyse the market to determine other factors that can affect the price of tickets. One such factor is social media, whose explosive growth has mirrored the spread and popularity of the secondary ticket market. Sport organisers understand the imperative to engage with potential customers on social media (Hipke and Hachtmann, 2014), and see the benefit of social media use bottom-line imperatives such as selling tickets (Boatwright, 2013), and fan identification (Hopkins, 2013). Secondary ticket resellers utilise social media platforms as part of their own marketing strategy (Mlot, 2013), sometimes to uneven results (Pachal, 2012). However, research examining the influence of social media on the secondary ticket market is non-existent. The decade since the introduction of Facebook and Twitter has seen social media broadly employed in sport as a fan engagement mechanism (Blaszka et al., 2012), and a marketing tool (Abeza and O'Reilly, 2014; Witkemper et al., 2012). It also affects how sports are consumed, live or through mass media (Hull and Lewis, 2014).

This study represents an exploratory effort to combine these two popular, online phenomena. Despite the abundance of studies about the secondary ticket market, and the even-larger collection of academic literature about social media, there appears to be no published research that seeks to join them. Since social media has become a cultural giant, organisations have sought to leverage that connectivity into financial gain, something that has proved elusive to demonstrate (Akar and Topcu, 2011; Shadkam and O'Hara, 2013), and evaluate (Groza et al., 2012; James et al., 2013). Within sport, Popp and McEvoy (2014) found that university athletic departments have so far been unable to leverage their investment in social media campaigns into financial return. Studies of efficiencies and sales figure maximisation in the secondary ticket market have included many variables that affect price – but have not included an evaluation of the relationship

between social media activity and prices on the secondary ticket market. This exploratory study seeks to analyse the extent of that relationship.

Understanding secondary market pricing and its many price-determinants is important to the industry, and to consumers. The academic literature that exists about the marketplace in previously transacted tickets could benefit from the addition of new research on price-determinants. Due to widespread social media usage, and the interest of sport managers to find ways to monetise the practice in sport, understanding the relationship between social media and ticket pricing in a real-time environment is essential, and will advance the literature in both areas. Therefore, the purpose of this exploratory study is to examine secondary market ticket prices, both in sold and available tickets, from select NFL games, and to tally activity on the social media website Twitter through the use of hashtags connected to those teams. Then an attempt will be made to determine the extent of the relationship between the two. Informed by the literature, and seeking to explore the possibility of merging the fields of secondary ticket market research and social media, this study asks the following research question:

RQ1 When controlling for other ticket price determinants, does team-related activity on the social media website Twitter influence prices for NFL games played by those teams on the secondary ticket market?

2 Review of literature

2.1 Pricing and the secondary ticket market

The factors that affect the price of sport event tickets have been studied from several directions in the previous 15 years, including efforts to determine optimal ticket pricing factors (Marburger, 1997), and an exploration of price-setting criteria for the NFL (Reese and Mittelstaedt, 2001). Rishe and Mondello (2003) looked at five years' of NFL ticket prices and a range of variables, such as teams' records or the stadium age, to see which had an effect on price, and extended that analysis (Rishe and Mondello, 2004) to the other three major sports. Levin and McDonald (2009) relied on an empirical approach, collecting attendance figures for smaller professional leagues and other market variables to determine the effect of competitive balance on attendance. Within Major League Baseball, variable pricing (Rascher et al., 2007), price discrimination (Rascher and Schwarz, 2012), and dispersion (Soebbing and Watanabe, 2014) have been examined for their effect on prices and attendance. Other factors that have been studied with respect to ticket pricing include stadium age (Humphreys and Soebbing, 2012) and the influence of image on a team's sales (Beccarini and Ferrand, 2006). Within stadiums, Shapiro et al. (2012) analysed factors affecting revenue from luxury suites, while Kelley et al. (2014) conducted a case study examination of the total investment of a typical fan of a National Hockey League team in tickets, merchandise, food, and drink. Organisations using dynamic ticket pricing (DTP), a system whereby the price of tickets fluctuate depending on various factors, realised additional sales revenue (Shapiro and Drayer, 2012). DTP has existed in the airline industry for years, resulting in numerous studies of the economics of airline ticketing (Kuusuwan, 2015; Saranga and Nagpal, 2016; Szopiński and Nowacki, 2015).

Within pricing research, there is an emerging body of literature about the secondary ticket market, particularly in connection with tickets to sporting events. Drayer and Shapiro (2009) first examined price determinants on the sport ticket resale market by looking at the price of NFL playoff tickets on online auction site EBay. They found factors such as home team metro area population and median income were positively correlated with higher ticket prices. A study of the perceptions of value by consumers included a secondary ticket market analysis, displaying wide disparity in the value assigned to tickets by buyers and sellers, and a significant effect on perceptions of value created by the price actually printed on the ticket, even if the ticket was not being sold for that price (Drayer and Shapiro, 2011). Kemper and Breuer (2015) analysed half a season worth of eBay sales for the top German soccer league the Bundesliga, finding that tickets on the secondary market are resold for nearly twice the original face value of the ticket. Drayer et al. (2012) collected prices from a secondary ticket seller for an entire NFL season, along with other variables such as size of the market, home and visiting team winning percentages, stadium capacity and distance between the teams. They found that the secondary market is a viable entity, with the potential to sell an additional 20,000 tickets per game, generating approximately \$260,000 in consumer surplus for each game. Additionally, Rishe (2014) examined secondary market prices in the NCAA Men's College Basketball Tournament and found that the NCAA is underpricing tickets in the primary market, leaving opportunities for resellers to profit from these inefficiencies. These studies confirm what Sweeting (2012) discovered when examining dynamic pricing in Major League Baseball. His research showed that dynamic pricing models accurately predict consumer behaviour with baseball tickets, a perishable good. He found dynamic pricing models demonstrate how sellers face consistent, declining demand curves as the event approaches, and how the original price of the ticket has no effect on the behaviour of the secondary market. Qualitative, case study interviews with traditional 'players' in the secondary ticket market – scalpers, ticket brokers and ticket reselling sites – further demonstrated the legitimacy of the secondary ticket market by showing how market principles played out in transactions (Drayer and Martin, 2010). Dwyer et al. (2013) found consumers expected to be more likely to find bargains when buying tickets closer to the event. Shapiro and Drayer's (2012) analysis of DTP by the San Francisco Giants also included an examination of price determinants on the secondary ticket market. In that analysis, home team performance and relative standing were positively correlated with higher secondary ticket market prices (Shapiro and Drayer, 2014).

There is also non-sport based inquiry into the secondary ticket market. An analysis of the ease with which non-box office (or secondary market) tickets can be found showed that for US concerts, promoters only benefitted from this activity when ticket demand was high (Bennett et al., 2015). Corey (2014) looked at ticket scalping laws in four different states and Europe, suggesting the disparity of regulation around this new marketplace could adversely affect travel for concerts. Across all ticketed events, Leslie and Sorensen (2014) examined the claim in economics that reselling tickets enhances the welfare of participants, benefitting both the buyer and seller. Their study found ticket reselling encourages negative outcomes such as rent-seeking behaviour, but allocates the product to consumers more efficiently.

The ticket reseller StubHub, which was utilised for the present study, was found to have a positive impact on price dispersion in Major League Baseball (Watanabe et al., 2013). Sanford and Scott (2014) attempted to determine the real value of the secondary

ticket market, by analysing prices from online ticket resellers compared to the price offered to season-ticketholders for Southeastern Conference (SEC) college football games. By constructing a synthetic season ticket, the researchers found SEC teams were pricing their season tickets sub-optimally. Studying the secondary ticket market in connection with the NCAA Basketball Tournament, Rishe et al. (2014) found that secondary market behaviour is significantly influenced by perceptions of event significance and the attractiveness of an event's draw, leading to higher prices being sought and received for tickets. Within this sphere of research into this relatively new marketplace, social media usage and trends has not been explored as a factor affecting ticket prices in sport.

2.2 Social media interactions and the modern marketplace

The popularity and spread of social media, and the affordances of this new technology, have had an impact on how every organisation conducts business. Increased worldwide use of the social media platforms represents 'an epochal reversal in the flow between people and news, entertainment, and information', forcing corporations to adapt (Crosbie, 2010). Academic studies have sought and suggested best practices about how to turn social media networks full of user-generated content into thriving marketplaces (Akar and Topcu, 2011; Shadkam and O'Hara, 2013). Proponents of social media commerce have been optimistic about their potential (O'Hern and Kahle, 2013) while others note the internal conflict within social networks – is it a communications tool or a sales device? – frequently results in suboptimal financial return for firms (Swani et al., 2013).

Within social media scholarship, the link between social media popularity and use and economic benefit has not been explored broadly. In introducing an analytical modelling of Twitter to examine consumer interest in Major League Baseball, Watanabe et al. (2016, p.207) suggest that "understanding how consumers interact with sport brands on digital platforms is of increasing importance to the sport industry". However, few academic researchers have sought to explore the relationship between the decision of a fan to follow a team on social media, and its on- and off-field performance (Moyer, Pokrywczynski, and Griffin, 2015; Perez, 2013). Studies such as these suggest social media can be used as a legitimate means to measure fan interest in an economic sense (Watanabe et al., 2015).

A review of sport and social media research pointed to a lack of theoretical grounding for research that has been published to date, along with an over-reliance on content analysis (Filo et al., 2015; Hardin, 2014). Therefore, it is worth considering academic literature beyond sport in an effort to better explain the rationale for a correlation between social media activity and ticket prices. An abundance of studies have examined the connection between social media practice and customer behaviour (Guesalaga, 2016; Kumar et al., 2016; Rodriguez et al., 2012). For this study, it is relevant to consider the perceived value of hashtags in creating an economic benefit for organisations. Scholarship about micro interactions created through social media engagement suggests a rationale for understanding why increased hashtag engagement could lead to increased sales. Examining five different types of Twitter users, Quercia et al. (2011) explored how the use of effective language by Twitter users can directly impact the influence their words have. Fischer and Reuber (2011) state that through Twitter interaction, entrepreneurs can generate more interaction from their potential marketplace stakeholders. Within Twitter, the hashtag is a tool that can further reach that intended

audience, because users can deploy them to self-identify into a community of interest, allowing more opportunity for engagement, and presumably, exposure for sales. The unique architecture of the hashtag warrants its own discussion in this study.

2.3 Twitter hashtags

Given its immense and growing popularity, there is a rapidly growing body of scholarship about social media, including extensive study of the microblogging platform Twitter, which was launched in 2006 and has more than 316 million active monthly users (DMR, 2015). The brevity, immediacy and interconnectedness of Twitter have made it a favoured site of athletes, sport fans, and sport journalists (Hambrick et al., 2010; Pegoraro, 2010; Sanderson, 2011).

Created at a conference in 2007 by a Twitter user named Chris Messina (*The Short and*, 2010), the ubiquity and use of the tweets beginning with a '#' has evolved into one of the most concise and popular ways to add editorial content to tweets. They now serve many functions, and are an integral part of Twitter's ability to link the conversations of strangers together (Murthy, 2013). They have spread to the point that one half of all mobile device users employ them in their social media posts (Zak, 2013). The way Twitter forms instant communities by making hashtags their own clickable link has resulted in their deployment to express collective identity (Sharma, 2013) or to organise politically (Khondker, 2011; Small, 2011). Events such as the Super Bowl rely on 'official' corporate hashtags for Twitter users to interact in a topic-specific domain. For the present study, eight of these official team hashtags, such as #Redskins, were tracked and tallied. Other hashtags emerge organically, as a result of celebrity happenings (Marshall, 2014), in response to breaking news (Kaye and Johnson, 2014) or as an activist statement or protest movement (Hull, 2014).

The academic study of hashtags has taken various forms. Tully and Ekdale (2014) examined hashtags and their link to civic activism in Kenya. There have been attempts to predict what ideas will gain currency through hashtags (Tsur and Rappoport, 2012), and characterise the dual role of hashtags as bookmark and community membership (Yang et al., 2012). An analysis of 31 million tweets sent by Singaporean Twitter users found that the best way to predict the popularity of emerging hashtags is to examine the usage patterns of existing Twitter users (Ma et al., 2013). Hashtag studies have also looked at the Occupy Wall Street movement (Gleason, 2013), the discourse of celebrity Twitter users (Page, 2012), and the disproportionate impact that motivated activists can have on Twitter through the use of hashtags (Bastos et al., 2013).

In the field of sport, hashtag research has covered many areas. An analysis of Tweets containing hashtags during baseball's College World Series found they help fans create team social identity (Smith and Smith, 2012). Users have been found to seek gratifications through hashtag use about their favourite teams (Gibbs et al., 2014). Widely tweeted events such as the World Series provide an opportunity for Twitter users to broadcast their fan allegiance through deployment of hashtags (Blaszka et al., 2012). Events with an international scope such as the Olympic Games provide opportunity through hashtags for nation-building and marketing (Pegoraro et al., 2014), as well as protest movements such as the #NBCFail, which offered scathing commentary about US host Olympic television broadcaster NBC (O'Hallarn and Shapiro, 2014). As evidence of the growth of hashtag scholarship, 2015 saw the publication of three studies about #NBCFail alone, analysing whether NBC failed audiences as a gatekeeper (Nee, 2015),

thematically analysing public discourse around NBC gymnastics coverage (Moore et al., 2015), and utilising the hashtag to better understand the Olympic movement as an emergent hypermedia event (Girginova, 2015).

In the past few years, researchers have attempted to gain further knowledge about what works in high-pressure efforts to turn social media efforts into financial gain. Proponents of social media's use as marketing and sales tools suggest it can help increase fan engagement (Tomko, 2011) and sell tickets (Steinbach, 2010). However, analyses of sport social media and sales demonstrate that claim has so far been difficult to demonstrate empirically (Popp and McEvoy, 2014). The non-curated construct of Twitter means that marketers need to be mindful of efforts by advocates to 'hijack' their marketing hashtags for completely different purposes (Fathi, 2009), or create counter-marketing hashtags to combat their stated business goals (Burton et al., 2013).

Studies that demonstrate the true bottom line impact of social media for sport organisations are somewhat limited. A study of the marketing of intramural sports found Facebook and Twitter to be far less effective at encouraging participants than traditional handouts (Ciuffo et al., 2014). Watkins (2014) found that social media, Twitter more than Facebook, had a positive impact on brand equity creation for fans of National Basketball Association teams. Abeza and O'Reilly (2014) discovered social media did little to create a relationship dialogue between national sport organisations in Canada and potential supporters. What is notable by their absence are studies of Twitter hashtags and sport that translate findings into the bottom line, especially considering an estimated half of all mobile-device Twitter users deploy them regularly in their tweets. This study would represent one of the first attempts in sport to ascribe financial value to the prevalence of hashtags, and at the same time, analyse this commonplace social media tool as a new predictor variable in the growing body of research about secondary ticket prices.

Because of the need to incorporate more critical theory in social media research (Filo et al., 2015; Hardin, 2014), particularly from outside sport, the suggestion that each micro interaction between Twitter users has the potential to create value (Fischer and Reuber, 2011; Quercia et al., 2011) could add weight to the findings of this study. The correlation between Twitter hashtag mentions and prices on the secondary ticket market could be established empirically within this study, and the current exploratory investigation could begin the lengthy process of understanding this relationship from a consumer behaviour standpoint.

3 Method

A multiple regression model was created to add the new potential price determinant – social media activity – to existing variables that have been shown to influence prices on the secondary ticket market in previous literature. Two statistical models were produced to introduce daily hashtag mentions as a new variable, which was combined with existing variables identified in Drayer and Shapiro's (2009) first pricing model. Prior literature on price determinants in the primary (Reese and Mittelstaedt, 2001; Rishe and Mondello, 2003, 2004) and secondary ticket markets (Drayer and Shapiro, 2011; Shapiro and Drayer, 2014; Dwyer et al., 2013) was also incorporated into the model, which initially included the collection and analysis of 22 potential factors influencing resale price.

Dependent variables measuring the median price of tickets sold on StubHub for the select games, as well as the median price of tickets available on the website, were used

for models. Previous literature on secondary ticket prices has relied on both tickets sold as a transacted value to be studied (Dwyer et al, 2013) and available tickets as an indicator of secondary ticket market interest and activity (Shapiro and Drayer, 2014). For the first model, the median price of tickets sold on StubHub in the selected stadium sections for the eight games was used as the dependent variable. For the second model, the median price of tickets available on StubHub in the selected sections for the eight games was used as the dependent variable.

3.1 Variables

A total of 22 predictor variables were included in the initial creation of the models. This differs from previous models generated for studies of secondary tickets in sport because of the inclusion of social media variables. Price determinants included: the game being tracked; the number of days before the game; the time of the game; whether the game was within the division; eight predictor variables for home and road team winning percentage, games behind the division lead, games behind the playoff wildcard position, and games behind teams occupying first-round playoff byes; quarterback (or QBR) rating for the previous start, both home and away teams; percentage of stadium capacity sold; whether the ticket was in a high, middle or low section of the stadium; the season ticket price available at the box office for the ticket; the single game price for the selected tickets at the team box office; and the number of tickets available on StubHub in each selected section of the stadium.

Three new social media variables were added to the model for this study – tweets with the official team '@' handle; tweets with the official team '#' hashtag; and impressions of the official team hashtag, a figure produced by commercial Twitter aggregator Hashtracking.

3.2 Sample and data collection

Choosing afternoon games on two consecutive Sundays, November 23 and 30, 2014, the researchers sought to explore the relationship between Twitter activity and secondary ticket market prices from teams representing all eight NFL divisions, as well as games played inside and outside the division, indoors and outdoors, and in warm and potentially cold-weather climates. According to division standings on October 1, 2014 the following games would feature home games for two teams representing each possible standing within a four-team division:

- a November 23, 2014
 - Tennessee Titans at Houston Texans, 1 p.m.
 - San Diego Chargers at Baltimore Ravens, 1 p.m.
 - Oakland Raiders at St. Louis Rams, 1 p.m.
 - Arizona Cardinals at Atlanta Falcons, 4:25 p.m.
- b November 30, 2014
 - Baltimore Ravens at Miami Dolphins, 1 p.m.
 - St. Louis Rams at Washington Redskins, 1 p.m.
 - Tampa Bay Buccaneers at Detroit Lions, 1 p.m.
 - Buffalo Bills at Denver Broncos, 4:15 p.m.

Besides reflecting a variety of team standings, the games were selected to allow a shorter period of data collection. The games were later-season dates so the effect of team performance and opponent performance, found previously to significantly predict secondary ticket prices, could be factored into the estimation. All of the games selected were also scheduled on Sundays, at either 1 or 4 p.m. to keep confounding variables about games at night or on Thursdays or Mondays out of the analysis, and to simplify the process for this exploratory study. Choosing teams performing at different levels relative to opponents also allowed for a broader pool of performance indicators to be included in the exploratory analysis.

Secondary ticket market prices were collected manually from online ticket reseller StubHub. For 30 days leading up to the games on November 23 and 30, median ticket prices for sold and available tickets in three distinct sections of each stadium were collected, methodology utilised by Shapiro and Drayer (2012, 2014) in their studies of DTP and the secondary ticket market. The data were collected between 11 a.m. and 1 p.m. each day, to control for the threat to internal validity of within-day spikes and drops in ticket prices caused by time of collection. A seat in a lower bowl sideline section comprised the 'high' ticket price for each stadium. A 'middle' ticket price was selected from upper deck sideline sections in each stadium. Upper deck end zone seats were classified as a 'low' ticket price in each stadium.

To reflect social media activity during the 30 days leading up to each of the games where secondary ticket prices were being collected, two online social media collection tools were used. Topsy, a Twitter aggregator, was used to tally the number of tweets each day that contained the official team 'handle' – such as @Ravens. Topsy has been used by researchers to assess the use of Twitter by medical professionals (Mishori et al., 2014) and to explore how environmental activists have utilised Twitter (Merry, 2013). Hashtracking is a commercially available program that collects data from Twitter by tracking hashtags. It has been used in previous studies to monitor Twitter discussions around movies (Deltell et al., 2013), and to study sustainability in higher education (Conway, 2012). Hashtracking allowed for the collection of more than 2 million hashtags during the 17 days of the Sochi Olympic Winter Games, which were analysed in connection with nation-building, protest, and marketing (Pegoraro et al., 2014). For this study, the eight 'official' team hashtags – the hashtags used by the Twitter account run by the team itself – were tracked for 30 days leading up to each game. Hashtracking also produced one other figure in its tweet aggregation: the impressions of the official team hashtag. This figure multiplies the number of hashtagged tweets by the number of followers from the account sending it.

3.3 Data analysis

Prior to regression analysis, preliminary analyses were conducted on both models. Previous studies of secondary ticket market prices have found issues of multicollinearity in the initial regression models (Shapiro and Drayer, 2014). When the initial models utilising tickets sold and tickets available were created for this study, utilising all 22 predictor variables, significant issues of multicollinearity existed. There were also some issues of skewness and kurtosis to address, as the nature of some of the variables was likely to yield non-normal distribution.

Because sizable multicollinearity was present, some independent variables were eliminated from the model. The presence of skewness and kurtosis also made logarithmic

transformation of some of the independent variables necessary. These issues of kurtosis were found in the social media variables, a fact that is intuitive. Spikes in social media activity frequently occur in connection with live events, in sports (Blaszka et al., 2012) and society at large (Houston et al., 2013). Therefore, a logarithmic transformation was performed on the social media variables, in an effort to reach normality of distribution by levelling off these Twitter hashtag usage spikes. A logarithmic transformation was also performed on the independent variable of tickets available on StubHub, as that figure, predictably, decreased at a non-normal rate as kickoff approached, resulting in a strong negative skew.

Additionally, there is a possibility endogeneity issues exist in the models due to the inclusion of two proxy variables for demand (percentage of capacity and tickets available on the secondary market). The underlying model in the secondary ticket market economy could be driving both price and demand for tickets. However, the authors felt due to the use of tickets available and/or stadium capacity in previous secondary market models (Drayer and Shapiro, 2014; Rishe, 2014; Rishe et al., 2014) it should be included in the current investigation. In order to assess the potential impact of endogeneity in our models, we examined the correlation between the estimate of the error term and the two possible endogenous variables. A correlation between the estimated error term and either of these variables would suggest endogeneity is an issue. However, the correlation was near zero, suggesting endogeneity is unlikely to be an issue in either model.

Finally, the hashtag impressions variable and @ mentions variables were eliminated from the analysis, leaving only one social media predictor variable – hashtag use. Since research of social media impact on ticket prices is new, a parsimonious regression with only one social media variable is preferable. Hashtag use was chosen because of the growing body of literature about their impact, both within and outside sport. The inclusion of a single social media variable in the secondary ticket market pricing model allows for official team hashtag use to be explored as its own price-predictor. So the final models used for the analysis, include different dependent variables, median ticket price sold and median ticket price available, and the same seven independent variables. The dependent variable in Model 1 was median tickets sold on StubHub. The dependent variable in Model 2 was median tickets available on StubHub. Previous pricing literature has utilised both tickets sold and tickets available in analysis of the secondary ticket market. Since the introduction of social media activity as a predictor is new, it is beneficial to include both models in this study.

4 Results

Table 1 displays descriptive data for all continuous variables included in the study, with means and standard deviations for the variables used in the regression models. For the outcome variables of median price of tickets sold, and median price of tickets available, the means were \$115.22 ($SD = 91.24$) and \$169.38 ($SD = 133.08$), respectively. Although standard deviations were high for both outcome variables, the high standard deviations can be explained by the wide assortment of quality of teams being tracked. Tickets for lower performing teams such as the Washington Redskins and St. Louis Rams were a considerably less-sought-after commodity than tickets for the first place Denver Broncos.

Table 1 Descriptive statistics for continuous variables

<i>Variable</i>	<i>Mean</i>	<i>Standard deviation</i>
Median tickets sold	115.22	91.24
Median tickets available	169.38	133.08
Home team win %	.512	.166
Percent of capacity	88.76	9.64
Season ticket price	86.58	37.60
Tickets available (log)	6.12	.972
Hashtag tweets (log)	7.71	.865

As shown in Table 2, both models examining price determinants for secondary market NFL tickets were found to be significant $F(8, 716) = 567.31, p < .001$, explaining 86.4% of the variance in price for sold tickets on StubHub, and $F(8, 716) = 323.19, p < .001$, explaining 78.3% of the variance in price for tickets available on StubHub. All secondary market determinants selected for the final analysis (days before the game, home team winning percentage, percentage of capacity sold, season ticket price, section of the stadium, tickets available and tweets containing a hashtag) were found to be significant predictors of secondary ticket market prices in Model 1 (tickets sold). Six of the seven independent variables in Model 2 (tickets available) were found to be significant, with only tickets available not significant. Also, the predictor variables influenced the price variables in the manner expected in both models. Days before the game and percentage of capacity of tickets sold positively influenced secondary ticket market prices in both models, suggesting that urgency and scarcity were driving demand. Home team winning percentage had a statistically significant influence on secondary ticket prices in both models, which is also intuitive, and consistent with prior literature (Drayer and Shapiro, 2012; Rishe, 2014). The regular price of a season ticket significantly influenced ticket price in both models, suggesting higher baseline prices setting a higher market for secondary tickets. Tickets available on StubHub significantly influenced sold ticket prices, suggesting that as fewer tickets are available, prices rise. The negative relationship was expected. However, ticket availability was not significant in the list price model. And the findings suggest sellers must adjust prices based on supply in order to sell their ticket. This is consistent with Drayer and Shapiro's (2012) findings that sellers tend to list prices on the high end and drop their prices as the game draws near. Seat location significantly influenced secondary ticket market prices, but in different directions for each model. This suggests interaction between some of the independent variables in predicting variance in the model. The variance inflation factor (VIF) for mid and premium seat locations was higher than other variables, suggesting potential multicollinearity. However, VIF was still in an acceptable range.

Most importantly, for this study, both models demonstrated a small, but statistically significant, relationship between official team Twitter hashtag activity and secondary ticket market prices for NFL games. Due to transformation of variables we cannot interpret the unstandardised coefficient in its reported form. Therefore, a baseline increase of 10% for the transformed independent variables was used to determine the expected change to the dependent variable $\beta_x * \log(1.10)$. After that calculation is made, for the model utilising tickets sold as a dependent variable, an increase of 10% in tweets containing official team hashtags results in a 36-cent increase in secondary ticket prices.

For the model utilising tickets available as the dependent variable, a 10% increase in hashtag use results in a \$1.40 increase in secondary ticket market prices. These positive relationships are relatively minor compared to other predictors of secondary ticket prices established from previous market studies. However, the statistically significant finding is valuable as the significant relationship shows potential value in understanding the relationship between hashtag usage and resale price.

Table 2 Regression results [dependent variables median. tickets sold (Model 1) and median tickets available (Model 2)]

<i>Model</i>	<i>Model 1</i>		<i>Model 2</i>	
	<i>Median price, tickets sold</i>		<i>Median price, tickets available</i>	
<i>F</i> -statistic	567.31		323.19	
R ²	.864		.783	
# of observations	716		716	
# of IVs	7		7	
<i>IV</i>	<i>Beta</i>	<i>t</i> -statistic	<i>Beta</i>	<i>t</i> -statistic
Constant	-441.45	-12.46*	-1181.65	-18.12*
Days before game	.489	2.99*	1.54	5.11*
Home team win %	60.68	5.88*	146.82	7.72*
Percent of capacity	5.27	22.67*	9.44	22.01*
Season ticket price	1.20	13.51*	2.81	17.20*
Seat location (mid/high)	-52.48	-6.73*	67.79	4.72*
	-52.27	-8.24*	38.60	3.30*
Tickets available	-1.15	-6.49*	-.388	-1.19
Hashtag tweets	.357	2.37*	1.40	5.03*

Note: * $p < .05$

Previous studies have demonstrated that team performance, opponent record, tickets available, stadium section, and the time before a sporting event to be significant predictors of price on the secondary ticket market. This exploratory research suggests social media activity can also influence secondary market prices, in a positive fashion. The more users tweet, the higher that prices can be expected to rise, after controlling for other factors that affect the price of secondary market tickets.

5 Discussion

This study attempted to add a new price-prediction variable, activity on social media, to the growing body of academic literature about the secondary ticket market and sport. Previous studies have established the legitimacy of the market and created a theoretical framework for studying it (Drayer and Martin, 2010; Drayer and Shapiro, 2009). It has been studied in connection to the underpinnings of consumer demand (Drayer et al., 2012), with regard to perceptions of value (Drayer and Shapiro, 2011), time (Dwyer et al., 2013), and with consideration of the perceived significance of the sporting event (Rishe et al., 2014). This study seeks to incorporate social media activity, a societal phenomenon that has accelerated for the past decade, to the price-prediction analysis.

Previous studies have determined that factors such as team performance, the time before a game, and the percentage of tickets sold in a stadium on the primary market are found to significantly predict secondary ticket market prices. The findings of this exploratory study are consistent with prior literature. Control variables utilised in the final price-prediction model behaved as expected, based on prior studies. Team record and attendance percentage of capacity are positively correlated with higher secondary market prices, whereas the number of tickets remaining for sale on StubHub negatively predicts prices, in other words, the fewer tickets are available, the higher the prices sought and received by secondary market resellers. The number of days before a game was found to be a positive price predictor. Prior literature (Shapiro and Drayer, 2012, 2014) suggests that prices peak a few weeks before an event, then drop sharply in the days immediately beforehand. The simple ordinal variable of days before a game may not be able to capture that market behaviour when incorporated as part of a multiple linear regression.

Twitter hashtags have been studied extensively, including in their connection to sport, through fan identification (Blaszka et al., 2012; Smith and Smith, 2012), the creation of fan gratifications (Gibbs et al., 2014), and as a protest vehicle (Clark, 2014; Hull, 2014; O'Hallarn and Shapiro, 2014). Few studies connecting Twitter and sport have attempted to assess the value of Twitter hashtags as a marketing and sales tool. Popp and McEvoy (2014) found university athletic department so far unable to demonstrate the financial impact of social media on their bottom line. Studies by Ciuffo et al. (2014), and Abeza and O'Reilly (2014) demonstrated that Twitter is less effective in sports marketing efforts than other forms of engagement, whereas Watkins (2014) found Twitter had a positive impact on brand equity for NBA fans. Notably, there do not appear to be studies that ascribe financial value in dollars to Twitter hashtag use. Proponents of social media and marketing suggest the interactions have real value for organisations. This study attempts to determine the extent to which secondary ticket market price behaviour is explained through the generation of Twitter hashtags.

The median price of tickets sold, and tickets available, were collected for 30 days leading up to eight 2014, late-season NFL games. That data were regressed against more than 20 price-prediction variables, which were collected through publically available databases, and via the commercial hashtag aggregator Hashtracking. Eliminating some variables for non-normality, multicollinearity and non-relevance to this study, two models were generated, with separate dependent variables of median price of tickets sold, and median price of tickets available, for the selected games on StubHub. Both models were found to significantly predict price variance, with the social media variable of use of official team hashtags correlating positively with prices on StubHub in a statistically significant fashion.

This finding is somewhat expected, as fan interest logically correlates with higher prices for sporting events. It is potentially of interest to secondary ticket market buyers and sellers, in their efforts to maximise profit (for sellers) and minimise outlay (for buyers). When the body of tweets is analysed together, in connection with prices to home games featuring that team, the collected pool of football and Twitter hashtag activity suggests more hashtags equals higher prices. Analysing social media activity, even anecdotally, can suggest to a seller or buyer that a drop or spike in ticket prices can be expected. The use of two models of secondary ticket market prices, one for tickets sold and one for tickets available, is consistent with prior literature, where both figures have been used as dependent variables. It is worth exploring the impact of social media use on both dependent variables, because the market for sold tickets can behave

somewhat differently than the market for available tickets. While both findings are relatively minor compared to previously established predictors such as home team record, they are statistically significant. The finding that median ticket prices increase by a greater degree among tickets available on StubHub, compared to tickets already sold, is reflective of behaviour of the secondary ticket market previously established. It factors more of a human element into the prices being sought by sellers, thereby reacting more strongly to ticket market predictors of all types.

More broadly, this research has implications in the small, but growing field of scholarship attempting to ascribe meaning to these interconnected social media interactions. With calls for better theoretical grounding of social media studies in academic literature (Filo et al., 2015; Hardin, 2014) this study affords an opportunity to explore the relationship between social media popularity and economic benefit, work that has been started (Moyer et al., 2015; Perez, 2013; Watanabe et al., 2015) but that needs greater articulation. Many studies in non-sport disciplines explore the connection between social media practice and customer behaviour (Guesalaga, 2016; Kumar et al., 2016; Rodriguez et al., 2012). Utilising frameworks in communication literature, such as the creation of micro interactions through social media engagement (Fischer and Reuber, 2011; Quercia et al., 2011) can begin the arduous process of unpacking meaning behind the positive correlations such as the ones seen in the two models in this study. This in turn can lead to more in-depth social media economic studies, adding layers of understanding to the potential power of this new technology.

5.1 Limitations and suggestions for further research

It is important to note that this is an exploratory study, with only a single social media variable included in a multiple regression analysis of 30 days of secondary ticket market prices for only eight NFL games. The number of variables eliminated before construction of the final price-prediction model, including the individual games for which price is being predicted, suggests that many factors can explain portions of the variance in prices on StubHub. As well, Twitter users include hashtags in their tweets for many reasons, from fan identification, to making an editorial statement; there is no way of assessing intent of the hashtag-sender, and therefore the increased activity on Twitter may not be connected with the intent to purchase tickets for a select game. An example of the multiple motivations of Twitter users for creating and tweeting hashtags is in the spike in tweets with #Ravens, the corporate hashtag of the Baltimore Ravens. A large spike in hashtags on Friday, November 28, 2014 was seen, but there was other Baltimore Ravens news that day aside from excitement about that Sunday's game against the San Diego Chargers. That was the day the NFL was forced by Former U.S. District Judge Barbara S. Jones, to reinstate running back Ray Rice, who had been suspended indefinitely for knocking his fiancée Janay (Katzowitz, 2014). Determination of the intent to use hashtags, and their translation into secondary ticket market price increases, is exceedingly difficult.

Since this is an exploratory study, the finding of significance of correlation between social media and secondary market tickets opens many avenues for further research. Different teams, different sports, and different measurement intervals can further explore the initial finding of significance. In addition, the study of hashtags in this relationship can be extended in different directions, because of the multiple uses of the Twitter function Hashtags can either be institutional and corporate in nature, such as the official

team hashtags used for this study. Hashtags are also created organically, as a form of editorial content, frequently in connection with events such as the Ray Rice suspension that become water cooler topics. The connection between a protest hashtag, like #NBCFail, could also indicate whether this online activity is having an effect on the bottom line for sport organisers. There are many different aspects to social media use that could be incorporated into future pricing studies, because of its ubiquity in society, and the perceived, yet so far not-empirically-demonstrated, financial return for businesses in using the online tools.

References

- Abeza, G. and O'Reilly, N. (2014) 'Social media platforms' use in building stakeholder relationships', *Journal of Applied Sport Management*, Vol. 6, No. 3, pp.103–126.
- About CenturyLink Field (2015) *The Seattle Seahawks* [online] <http://www.seahawks.com/gameday/centurylink-field/> (accessed 10 January 2015).
- Akar, E. and Topcu, B. (2011) 'An examination of the factors influencing consumers' attitudes toward social media marketing', *Journal of Internet Commerce*, Vol. 10, No. 1, pp.35–67.
- Bastos, M., Raimundo, R. and Travitzki, R. (2013) 'Gatekeeping Twitter: message diffusion in political hashtags', *Media Culture & Society*, Vol. 35, No. 2, pp.260–270.
- Beccarini, C. and Ferrand, A. (2006) 'Factors affecting soccer club season ticket holders' satisfaction: the influence of club image and fans' motives', *European Sport Management Quarterly*, Vol. 6, No. 1, pp.1–22.
- Bennett, V.M., Seamans, R. and Zhu, F. (2015) 'Cannibalization and option value effects of secondary markets: evidence from the US concert industry', *Strategic Management Journal*, Vol. 36, No. 11, pp.1599–1614.
- Blaszka, M., Burch, L., Frederick, E., Clavio, G. and Walsh, P. (2012) '#WorldSeries: an empirical examination of a Twitter hashtag during a major sporting event', *International Journal of Sport Communication*, Vol. 5, No. 4, pp.435–453.
- Boatwright, B. (2013) 'Interview with Chris Yandle, assistant athletic director of communications, University of Miami Athletics', *International Journal of Sport Communication*, Vol. 6, No. 4, pp.388–390.
- Budnick, D. (2013) 'How StubHub helped ticket scalping go legit', *The Hollywood Reporter*, 7 February [online] <http://www.hollywoodreporter.com/news/how-stubhub-helped-ticket-scalping-418030> (accessed 10 January 2015).
- Burton, S., Dadich, A. and Soboleva, A. (2013) 'Competing voices: marketing and counter-marketing alcohol on Twitter', *Journal of Nonprofit & Public Sector Marketing*, Vol. 25, No. 2, pp.186–209.
- Ciuffo, J., Johnson, J.E. and Tracy, D.R. (2014) 'Intramural sport marketing: an examination of effectiveness, participant motives, and demographic differences', *Recreational Sports Journal*, Vol. 38, No. 2, pp.75–187.
- Clark, R. (2014) '#NotBuyingIt: hashtag feminists expand the commercial media conversation', *Feminist Media Studies*, Vol. 14, No. 6, pp.1108–1110.
- Conway, M. (2012) 'Sustainable futures: what higher education has to offer', *Social Alternatives*, Vol. 31, No. 4, pp.33–40.
- Corey, S. (2014) 'Need tickets to an upcoming concert? The truth about ticket scalping laws', *Travel Law Quarterly*, Vol. 6, No. 4, pp.317–330.
- Crosbie, V. (2010) 'The epochal change that the rise of social media demarcates', *Digital Deliverance*, 1 November [online] <http://www.digitaldeliverance.com/2010/11/01/social-media/> (accessed 13 September 2016).

- Daniels, C. and Pittman, T. (2014) 'Seahawks playoff tickets sell out in minutes', *King 5 News*, December 30 [online] <http://www.king5.com/story/sports/nfl/seahawks/2014/12/30/seahawks-playoff-tickets/21035587/> (accessed 10 January 2015).
- Deltell, L., Osteso, J-M. and Claes, F. (2013) 'Twitter en las campañas comunicativas de películas cinematográficas', *El profesional de la información*, Vol. 22, No. 2, pp.128–134.
- DMR (2015) *By the Numbers: 150+ Amazing Twitter Statistics*, 29 July [online] <http://expandedramblings.com/index.php/march-2013-by-the-numbers-a-few-amazing-twitter-stats/> (accessed 13 September 2016).
- Drayer, J. (2011a) 'Examining the effectiveness of anti-scalping laws in a United States market', *Sport Management Review*, (Sport Law and Regulation), Vol. 14, No. 3, pp.226–236.
- Drayer, J. (2011b) 'Making a case for the integration of the primary and secondary ticket markets for professional team sports in the United States', *International Journal of Sports Marketing & Sponsorship*, Vol. 12, No. 3, pp.199–208.
- Drayer, J. and Martin, N.T. (2010) 'Establishing legitimacy in the secondary ticket market: a case study of an NFL market', *Sport Management Review (Elsevier Science)*, Vol. 13, No. 1, pp.39–49.
- Drayer, J. and Shapiro, S.L. (2009) 'Value determination in the secondary ticket market: a quantitative analysis of the NFL playoffs', *Sport Marketing Quarterly*, Vol. 18, No. 1, pp.5–13.
- Drayer, J. and Shapiro, S.L. (2011) 'An examination into the factors that influence consumers' perceptions of value', *Sport Management Review*, Vol. 14, pp.389–398.
- Drayer, J., Rascher, D.A. and McEvoy, C.D. (2012) 'An examination of underlying consumer demand and sport pricing using secondary market data', *Sport Management Review*, Vol. 15, No. 4, pp.448–460.
- Dwyer, B., Drayer, J. and Shapiro, S.L. (2013) 'Proceed to checkout? The impact of time in advanced ticket purchase decisions', *Sport Marketing Quarterly*, Vol. 22, No. 3, pp.166–180.
- Fathi, S. (2009) 'Avoiding hashtag hijacking and other Twitter fouls', *Public Relations Tactics*, Vol. 16, No. 11, pp.13–22.
- Filo, K., Lock, D. and Karg, A. (2015) 'Sport and social media research: a review', *Sport Management Review*, Vol. 18, No. 2, pp.166–181.
- Fischer, E. and Reuber, A.R. (2011) 'Social interaction via new social media: (how) can interactions on Twitter affect effectual thinking and behavior?', *Journal of Business Venturing*, Vol. 26, No. 1, pp.1–18.
- George, J. (2013) 'That's the ticket', *Philadelphia Business Journal*, December 20 [online] <http://www.bizjournals.com/philadelphia/print-edition/2013/12/20/thats-the-ticket.html?page=all> (accessed 10 January 2015).
- Gibbs, C., O'Reilly, N. and Brunette, M. (2014) 'Professional team sport and Twitter: gratifications sought and obtained by followers', *International Journal of Sport Communication*, Vol. 7, No. 2, pp.188–213.
- Gigaom (2010) *The Short and Illustrious History of Twitter #hashtags*, 23 April [online] <http://gigaom.com/2010/04/30/the-short-and-illustrious-history-of-twitter-hashtags/> (accessed 4 January 2015).
- Girginova, K. (2015) 'New media, creativity, and the Olympics: a case study into the use of #NBCFail during the Sochi Winter Games', *Communication & Sport*, Vol. 2, No. 5, pp.1–18.
- Gleason, B. (2013) '#Occupy Wall Street: exploring informal learning about a social movement on Twitter', *American Behavioral Scientist*, Vol. 57, No. 7, pp.966–982.
- Groza, M.D., Peterson, R.M., Sullivan, U.Y. and Krishnan, V. (2012) 'Social media and the sales force: the importance of intra-organizational cooperation and training on performance', *Marketing Management Journal*, Vol. 22, No. 2, pp.118–130.
- Guesalaga, R. (2016) 'The use of social media in sales: individual and organizational antecedents, and the role of customer engagement in social media', *Industrial Marketing Management*, Vol. 54, pp.71–79.

- Hambrick, M.E., Simmons, J.M., Greenhalgh, G.P. and Greenwell, T.C. (2010) 'Understanding professional athletes' use of Twitter: a content analysis of athlete tweets', *International Journal of Sport Communication*, Vol. 3, No. 4, pp.454–471.
- Hardin, M. (2014) 'Moving beyond description: putting Twitter in (theoretical) context', *Communication & Sport*, Vol. 2, No. 2, pp.113–116.
- Hipke, M. and Hachtmann, F. (2014) 'Game changer: a case study of social-media strategy in big ten athletic departments', *International Journal of Sport Communication*, Vol. 7, No. 4, pp.516–532.
- Hopkins, J.L. (2013) 'Engaging Australian rules football fans with social media: a case study', *International Journal of Sport Management & Marketing*, Vol. 13, Nos. 1/2, pp.104–121.
- Houston, J.B., Hawthorne, J., Spialek, M.L., Greenwood, M. and McKinney, M.S. (2013) 'Tweeting during presidential debates: effect on candidate evaluations and debate attitudes', *Argumentation & Advocacy*, Vol. 49, No. 4, pp.301–311.
- Hull, K. (2014) '#Fight4UNCWSwimandDive: a case study of how college athletes used Twitter to help save their teams', *International Journal of Sport Communication*, Vol. 7, No. 4, pp.533–552.
- Hull, K. and Lewis, N.P. (2014) 'Why Twitter displaces broadcast sports media: a model', *International Journal of Sport Communication*, Vol. 7, No. 1, pp.16–33.
- Humphreys, B.R. and Soebbing, B.P. (2012) 'A test of monopoly price dispersion under demand uncertainty', *Economics Letters*, Vol. 114, No. 3, pp.304–307.
- James, K., Albrecht, J., Litchfield, R. and Weishaar, C. (2013) 'A summative evaluation of a food safety social marketing campaign "4-Day Throw-Away" using traditional and social media', *Journal of Food Science Education*, Vol. 12, No. 3, pp.48–55.
- Katzowitz, J. (2014) 'Ray rice reinstated: here are the nine things to know', *CBS Sports*, 28 November [online] <http://www.cbssports.com/nfl/eye-on-football/24846904/ray-rice-reinstated-here-are-the-nine-things-to-know> (accessed 11 January 2015)
- Kaye, B.K. and Johnson, T.J. (2014) 'The shot heard around the world wide web: who heard what where about Osama bin Laden's death?', *Journal of Computer-Mediated Communication*, Vol. 19, No. 3, pp.643–662.
- Kelley, K., Harrolle, M.G. and Casper, J.M. (2014) 'Estimating consumer spending on tickets, merchandise, and food and beverage: a case study of an NHL team', *Journal of Sport Management*, Vol. 28, No. 3, pp.253–265.
- Kemper, C. and Breuer, C. (2015) 'What factors determine the fans' willingness to pay for Bundesliga tickets? An analysis of ticket sales in the secondary market using data from eBay.de', *Sport Marketing Quarterly*, Vol. 24, No. 3, pp.142–158.
- Khondker, H.H. (2011) 'Role of the new media in the Arab Spring', *Globalizations*, Vol. 8, No. 5, pp.675–679.
- Kumar, A., Bezawada, R., Rishika, R., Janakiraman, R. and Kannan, P.K. (2016) 'From social to sale: the effects of firm-generated content in social media on customer behavior', *Journal of Marketing*, Vol. 80, No. 1, pp.7–25.
- Kuosuwan, B. (2015) 'Market factors influencing the decision to patronage low cost carriers', *Procedia – Social and Behavioral Sciences*, 7th World Conference on Educational Sciences, Vol. 197, pp.2097–2102.
- Lacy, S. (2005) 'Ticket resellers aim to be top draws', *Bloomberg Businessweek*, 2 February [online] <http://www.businessweek.com/stories/2005-02-02/ticket-resellers-aim-to-be-top-draws> (accessed 10 January 2015)
- Leslie, P. and Sorensen, A. (2014) 'Resale and rent-seeking: An application to ticket markets', *Review of Economic Studies*, Vol. 81, No. 1, pp.266–300.
- Levin, M.A. and McDonald, R.E. (2009) 'The value of competition: competitive balance as a predictor of attendance in spectator sports', *International Journal of Sports Marketing & Sponsorship*, Vol. 11, No. 1, pp.7–24.

- Ma, Z., Sun, A. and Cong, G. (2013) 'On predicting the popularity of newly emerging hashtags in Twitter', *Journal of the American Society for Information Science & Technology*, Vol. 64, No. 7, pp.1399–1410.
- Marburger, D. (1997) 'Optimal ticket pricing for performance goods', *Managerial and Decision Economics*, Vol. 18, No. 5, pp.375–381.
- Marshall, P.D. (2014) *Celebrity and Power: Fame in Contemporary Culture*, University of Minnesota Press, Minneapolis, MN.
- Merry, M.K. (2013) 'Tweeting for a cause: microblogging and environmental advocacy', *Policy & Internet*, Vol. 5, No. 3, pp.304–327.
- Mishori, R., Singh, L.O., Levy, B. and Newport, C. (2014) 'Mapping physician Twitter networks: describing how they work as a first step in understanding connectivity, information flow, and message diffusion', *Journal of Medical Internet Research*, Vol. 16, No. 4, p.e107.
- Mlot, S. (2013) 'Q&A: StubHub founder mixes social media, video, celebs on Spreecast', *PC Magazine*, 13 May [online] <http://www.pcmag.com/article2/0,2817,2418191,00.asp> (accessed 10 January 2014)
- Moore, D. (2010) 'The times they are a changing: Secondary ticket market moves from taboo to mainstream', *Texas Review of Entertainment & Sports Law*, Vol. 11, No. 2, pp.295–307.
- Moore, J., Hesson, A. and Jones, K. (2015) '#NBC fail: thematic analysis of media and public discourse surrounding editing of Russia's Olympic gymnastics fall', *International Journal of Sport Communication*, Vol. 8, No. 2, pp.160–173.
- Moyer, C., Pokrywczynski, J. and Griffin, R.J. (2015) 'The relationship of fans' sports-team identification and Facebook usage to purchase of team products', *Journal of Sports Media*, Vol. 10, No. 1, p.31.
- Murthy, D. (2013) *Twitter: Social Communication in the Twitter Age*, Polity Press, Cambridge, UK.
- Nee, R.C. (2015) 'Gatekeeping the 2012 Olympic games: Did #NBCfail the social media audience?', *Journalism & Mass Communication Quarterly*, Vol. 92, No. 1, pp.77–98.
- NFL Standings – 2014. (2015) *ESPN.com* [online] <http://espn.go.com/nfl/standings> (accessed 10 January 2015)
- O'Hallarn, B. and Shapiro, S. (2014) '#NBCFail: a qualitative review of the shared experience as a social movement', *First Monday* [online] <http://firstmonday.org/ojs/index.php/fm/article/view/4760/3814> (accessed 4 January 2015).
- O'Hern, M.S. and Kahle, L.R. (2013) 'The empowered customer: user-generated content and the future of marketing', *Global Economics and Management Review*, Vol. 18, No. 1, pp.22–30.
- Pachal, P. (2012) 'StubHub Twitter account posts vulgar tweet, then deletes it', *Mashable*, 5 October [online] <http://mashable.com/2012/10/05/stubhub-tweet/> (accessed 10 January 2015).
- Page, R. (2012) 'The linguistics of self-branding and micro-celebrity in Twitter: the role of hashtags', *Discourse & Communication*, Vol. 6, No. 2, pp.181–201.
- Pegoraro, A. (2010) 'Look who's talking – athletes on Twitter: a case study', *International Journal of Sport Communication*, Vol. 3, No. 4, pp.501–514.
- Pegoraro, A., Frederick, E., Burch, L., Sanderson, J., Hambrick, M.E. and O'Hallarn, B. (2014) *Examining Social Media and the 2014 Sochi Olympic Games*, Presentation at the Sport Marketing Association Conference, Philadelphia, PA.
- Peoples, G. (2014) 'Ticketmaster vs. Stubhub: who's winning the resale battle?', *Billboard*, 20 October [online] <http://www.billboard.com/articles/business/6289185/ticketmaster-vs-stubhub-winning-resale-battle> (accessed 4 January 2015).
- Perez, L. (2013) 'What drives the number of new Twitter followers? An economic note and a case study of professional soccer teams', *Economic Bulletin*, Vol. 33, No. 3, pp.1941–1947.
- Popp, N. and McEvoy, C.D. (2014) *Do College Athletics Marketers Convert Social Media Growth into Revenue?*, Presentation at the Sport Marketing Association Conference, Philadelphia, PA.

- Quercia, D., Ellis, J., Capra, L. and Crowcroft, J. (2011) 'In the mood for being influential on Twitter', *Privacy, Security, Risk and Trust (PASSAT) and 2011 IEEE Third International Conference on Social Computing (SocialCom)*, October, pp.307–314.
- Rascher, D.A. and Schwarz, A.D. (2012) 'Illustrations of price discrimination in baseball', in Shmanske, S. and Kahane, L. (Eds.): *The Oxford Handbook of Sports Economics*, Vol. 2, Oxford University Press, Oxford, England.
- Rascher, D.A., McEvoy, C.D., Nagel, M.S. and Brown, M.T. (2007) 'Variable ticket pricing in Major League Baseball', *Journal of Sport Management*, Vol. 21, No. 3, pp.407–437.
- Reese, J.T. and Mittelstaedt, R.D. (2001) 'An exploratory study of the criteria used to establish NFL ticket prices', *Sport Marketing Quarterly*, Vol. 10, No. 4, pp.223–230.
- Rishe, P. (2014) 'Pricing insanity at March madness: exploring the causes of secondary price markups at the 2013 final four', *The International Journal of Sport and Society*, Vol. 4, No. 2, pp.67–73.
- Rishe, P.J. and Mondello, M.J. (2003) 'Ticket price determination in the National Football League: a quantitative approach', *Sport Marketing Quarterly*, Vol. 12, No. 2, pp.72–79.
- Rishe, P.J. and Mondello, M.J. (2004) 'Ticket price determination in professional sports: an empirical analysis of the NBA, NFL, NHL, and Major League Baseball', *Sport Marketing Quarterly*, Vol. 13, No. 2, pp.104–112.
- Rishe, P.J., Mondello, M. and Boyle, B. (2014) 'How event significance, team quality, and school proximity affect secondary market behavior at March madness', *Sport Marketing Quarterly*, Vol. 23, No. 4, pp.212–224.
- Roberts, D. (2013) 'Taking down Ticketmaster', *Forbes*, 26 November [online] <http://fortune.com/2013/11/26/taking-down-ticketmaster/> (accessed 10 January 2015).
- Rodriguez, M., Peterson, R.M. and Krishnan, V. (2012) 'Social media's influence on business-to-business sales performance', *Journal of Personal Selling & Sales Management*, Vol. 32, No. 3, pp.365–378.
- Sagers, C. (2014) 'Why fans can't win when it comes to buying concert, game tickets: Chris Sagers', *Cleveland.com*, 30 October [online] http://www.cleveland.com/opinion/index.ssf/2014/10/anti-competitive_practices_in.html (accessed January 10, 2015).
- Sanderson, J. (2011) *It's a Whole New Ballgame: How Social Media is Changing Sports*, Hampton Press, New York.
- Sanford, K. and Scott, F. (2014) 'What are SEC football tickets worth? Evidence from secondary market transactions', *Southern Economic Journal*, Vol. 81, No. 1, pp.23–55.
- Saranga, H. and Nagpal, R. (2016) 'Drivers of operational efficiency and its impact on market performance in the Indian Airline industry', *Journal of Air Transport Management*, Vol. 53, pp.165–176.
- Shadkam, M. and O'Hara, J. (2013) 'Social commerce dimensions: the potential leverage for marketers', *Journal of Internet Banking & Commerce*, Vol. 18, No. 1, pp.1–14.
- Shapiro, S.L. and Drayer, J. (2012) 'A new age of demand-based pricing: an examination of dynamic ticket pricing and secondary market prices in Major League Baseball', *Journal of Sport Management*, Vol. 26, No. 6, pp.532–546.
- Shapiro, S.L. and Drayer, J. (2014) 'An examination of dynamic ticket pricing and secondary market price determinants in Major League Baseball', *Sport Management Review*, Vol. 17, No. 2, pp.145–159.
- Shapiro, S.L., DeSchraver, T. and Rascher, D.A. (2012) 'Factors affecting the price of luxury suites in major North American sports facilities', *Journal of Sport Management*, Vol. 26, No. 3, pp.249–257.
- Sharma, S. (2013) 'Black Twitter? Racial hashtags, networks and contagion', *New Formations*, Vol. 78, No. 1, pp.46–64.
- Small, T. (2011) 'What the hashtag? A content analysis of Canadian politics on Twitter', *Information Communication & Society*, Vol. 14, No. 6, pp.872–895.

- Smith, L. and Smith, K.D. (2012) 'Identity in Twitter's hashtag culture: a sport-media-consumption case study', *International Journal of Sport Communication*, Vol. 5, No. 4, pp.539–557.
- Soebbing, B.P. and Watanabe, N.M. (2014) 'The effect of price dispersion on Major League Baseball team attendance', *Journal of Sport Management*, Vol. 28, No. 4, pp.433–446.
- Stecklow, S. (2006) 'StubHub's ticket to ride', *The Wall Street Journal*, 17 January [online] <http://www.wsj.com/articles/SB113745189357147923> (accessed 10 January 2015).
- Steinbach, P. (2010) 'Colleges use social media to sell sports tickets', *Athletic Business*, August [online] <http://www.athleticbusiness.com/College/colleges-use-social-media-to-sell-sports-tickets.html> (accessed 13 September 2016).
- Stone, B. (2007) 'Fighting the Web, sports teams seek to control ticket resales', *The New York Times*, 14 June [online] http://www.nytimes.com/2007/06/14/business/14tickets.html?_r=0 (accessed 10 January 2015).
- StubHub (2015) *Seattle Seahawks NFC Championship Tickets* [online] www.stubhub.com (accessed 8 January 2015).
- Swani, K., Milne, G.R., Cromer, C. and Brown, B.P. (2013) 'Fortune 500 companies' use of Twitter communications: a comparison between product and service tweets', *International Journal of Integrated Marketing Communications*, Vol. 5, No. 2, pp.47–56.
- Sweeting, A. (2012) 'Dynamic pricing behavior in perishable goods markets: evidence from secondary markets for Major League Baseball tickets', *Journal of Political Economy*, Vol. 120, No. 6, pp.1133–1172.
- Szopiński, T.S. and Nowacki, R. (2015) 'The influence of purchase date and flight duration over the dispersion of airline ticket prices', *Contemporary Economics*, Vol. 9, No. 3, pp.353–366.
- Tomko, M. (2011) 'College athletic departments use social media to increase fan engagement', *Medill Reports Chicago*, 19 October [online] <http://newsarchive.medill.northwestern.edu/chicago/news-190560.html> (accessed 13 September 2016).
- Tsur, O. and Rappoport, A. (2012) 'What's in a hashtag? Content based prediction of the spread of ideas in microblogging communities', *Presentation at the Fifth ACM International Conference on Web Search and Data Mining*, New York, February.
- Tully, M. and Ekdale, B. (2014) 'Sites of playful engagement: Twitter hashtags as spaces of leisure and development in Kenya', *Information Technologies & International Development*, Vol. 10, No. 3, pp.67–82.
- Watanabe, N., Yan, G. and Soebbing, B.P. (2015) 'Major League Baseball and Twitter usage: the economics of social media use', *Journal of Sport Management*, Vol. 29, No. 6, pp.619–632.
- Watanabe, N.M., Soebbing, B.P. and Wicker, P. (2013) 'Examining the impact of the StubHub agreement on price dispersion in Major League Baseball', *Sport Marketing Quarterly*, Vol. 22, No. 3, pp.129–137.
- Watanabe, N.M., Yan, G. and Soebbing, B.P. (2016) 'Consumer interest in Major League Baseball: an analytical modeling of Twitter', *Journal of Sport Management*, Vol. 30, No. 2, pp.207–220.
- Watkins, B. (2014) 'An integrated approach to sports branding: examining the influence of social media on brand outcomes', *International Journal of Integrated Marketing Communications*, Vol. 6, No. 2, pp.30–40.
- Witkemper, C., Choong, H.L. and Waldburger, A. (2012) 'Social media and sports marketing: examining the motivations and constraints of Twitter users', *Sport Marketing Quarterly*, Vol. 21, No. 3, pp.170–183.
- Yang, L., Sun, T., Zhang, M. and Mei, Q. (2012) 'We know what @ you #tag: does the dual role affect hashtag adoption?', *Presentation at the 21st International Conference on the World Wide Web*, New York, April.
- Zak, E. (2013) 'How Twitter's hashtag came to be', *The Wall Street Journal*, 3 October [online] <http://blogs.wsj.com/digits/2013/10/03/how-twitters-hashtag-came-to-be/> (accessed 13 September 2016).