Left at the Gate:
A Discrete Choice Model of Fan Attendance in the Canadian Football League

by

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ABSTRACT

LEFT AT THE GATE: A DISCRETE CHOICE MODEL OF FAN ATTENDANCE IN THE CANADIAN FOOTBALL LEAGUE

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The body of literature investigating spectator attendance in sports has developed using various forms of regression with secondary data, leading to a series of fairly consistent findings. The aggregate secondary data that has been used in these studies, which has been effective in developing this body of knowledge, is inherently limited in its ability to explain the most basic element of the attendance issue: how individual consumers choose whether or not to attend a game. The objective of this research is to provide these consumer-level insights, specifically for games in the Canadian Football League, by utilizing a discrete choice methodology. This study generates primary data from actual consumers, while incorporating many of the standard demand determinants. The results of this study show that while the quality of both participating teams are significant predictors of demand, their relative quality is not; contradicting the uncertainty of outcomes hypothesis.

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Part 1.1: Topic Overview

The secondary ticket market for sporting events, which includes all ticket transactions where the seller is reselling previously purchased tickets with no affiliation to the league or team associated with the event, has been extremely prosperous and has shown remarkable persistence (Happel and Jennings, 2002). Cole Gahagan, the Senior Vice President of Development and Strategy at Ticketmaster, suggested in 2011 at the Massachusetts Institute of Technology (MIT) Sloan Sports Analytics Conference that the nature of arbitrage in the sports industry has been unlike that in any other industry (Sloan Sports Conference, 2011). He argues that the nature of arbitrage in any market is short lived; a market inefficiency is noticed and then briefly capitalized upon before the market corrects itself and the inefficiency is removed. Gahagan states that this has not been the case in the secondary market for sports tickets, as the market inefficiency has existed profitably for as long as tickets have been sold. Consumers have consistently been willing to pay more than what the primary sellers have been charging.

While estimates often vary, it is common to see claims that the secondary ticket market is a US$10-15 billion industry annually (Drayer, Stotlar and Irwin, 2008). Some people in the sports industry, such as Sam Kennedy, the Executive Vice President, chief sales and marketing officer of the Boston Red Sox claim that understanding the secondary ticket market is the biggest issue facing teams in all sports (Sports Business Journal, 2008). Despite this being a well-known issue among all involved parties, a multi-billion dollar industry has emerged and persisted because of the inability, or possible lack of interest, in properly pricing a service in its initial market.

At the same time, there are teams in most sports that consistently struggle to bring attendance to respectable levels. The Toronto Argonauts of the Canadian Football League, for example, did not fill their home stadium to even half of its capacity at any point in their nine home games in the 2011 season. This occurs in a league where other teams, such as the Saskatchewan Roughriders, consistently compete in a stadium at full capacity.

While there are undoubtedly a number of mediating factors in these two very different situations, this discrepancy in combination with the prosperous nature of the secondary ticket market are evidence of an interesting disconnect. The sports industry consistently struggles at multiple levels to properly execute the most central aspect of any business: understanding the intersection of supply and demand. There are situations in which customers would be willing to pay much more than what the service is being sold for and situations where they are evidently only willing to pay less than what the service is being sold for. Indeed, the Chief Executive Officer of Ticketmaster, Nathan Hubbard, recently admitted just that, claiming that "as an industry, we have historically been awful at setting the price at the intersection of supply and demand." (ESPN, 2011).

The business of sports has been a popular area of interest for academics for a variety of reasons. The first is somewhat implied by the discussion above: there are certain critical aspects in the business of sports such as ticket pricing that seem to defy typical economic conventions. The area of sports is also of interest for its own sake, as many researchers might be sports enthusiasts outside of their academic work, providing a convenient opportunity to combine work and recreational interest. Beyond this, sports have also been commonly used as a laboratory for economic experiments for purely

practical reasons, as they feature certain issues such as externalities and monopolies that rarely exist in the greater economy (Baade and Tiehen, 1990).

The literature on attendance in sports is substantial. Originating with brief observations within the context of a larger discussion about the labour market in professional baseball by Simon Rottenberg in 1956, a large number of researchers have analyzed attendance in different sports at both the amateur and professional level. This has led to a variety of findings and theories that have proven to be fairly consistent over time and across sports. Game quality, for example, is consistently found to be one of the most important determinants of demand for sports. Fans prefer situations in which the home team is likely to win, but only to a certain point; games in which the home team are heavy favourites often produce lower than average attendance. Other factors, such as new stadiums and the presence of superstars on the home or opposing team have been positively linked to attendance.

While the research in sports attendance is undeniably vast, it has been considerably limited in approach. Attendance models derived from regression analysis are extremely commonplace, where the focus has been on discovering differences across sports, determining the weighted importance of known variables and occasionally introducing new variables while controlling for the standard attendance determinants. Many of these regression models have had considerable success, with R^2 values ranging from such values as .29 (Welki and Zlatoper, 1994) to .8 (Siegfried and Eisenberg, 1980; Coates and Humphreys, 2005).

In addition to the common use of regression, the nature of the data being analyzed is also invariably similar across studies. It is not viable to impose controls by holding

several variables constant while manipulating a desired variable of interest for a real sports team. Due to these feasibility concerns, researchers are left to use only secondary data that they must hope fits their area of interest; if the researcher is interested in the effect of new stadiums, for example, they must select a timeframe in which a new stadium was opened and analyze the attendance figures in comparison to adjacent years.

The secondary data obtained can be either for a single season or multiple seasons. In either situation, attendance at the game or season level can be modelled. Regardless of the nature of the dependent variable, aggregate data is taken from secondary sources after the season or seasons is completed and analyzed post hoc. Sports attendance has thus only been studied at the aggregate level because of the nature of the available data. Researchers have subsequently only investigated what drives broad attendance, not the underlying factors that prompt a consumer to attend a specific game. Consumer preferences at the individual level cannot be understood because this data does not exist. While the aggregate data might serve as a good proxy for consumer preferences in certain situations, such as analyzing why a particular game was sold to capacity, it fails to provide detail on a critical issue in attendance: why a consumer who did not attend a game chose to act in such a way. Biner (2009) cites the lack of consumer-level data as a concern in the attendance literature, arguing that the common current approach improperly assumes consumer homogeneity.

In general terms, the current state of knowledge of spectator attendance at sporting events has been derived using only a narrow scope of approaches and data types, despite the considerable age and interest in the subject matter. Specifically, studies have consistently used regression analysis to specify attendance models based on aggregate

secondary data. As a result, it is difficult to make inferences as to how individual consumers make their choices on whether or not to attend a sporting event and how they make tradeoffs among the several variables that have been shown to be important determinants of attendance consistently at the aggregate level in the literature.

Part 1.2: Research Objectives

The primary objective of this study is to provide new insights and perspective on an old problem. While the area of spectator attendance in sports has received considerable attention in the literature, the types of methods and data that have been employed to analyze it have been limited. This has led to an understanding of attendance at a broad level, with little knowledge of individual consumer preferences. The main research objective can be stated as follows:

1: To provide insights as to how individual consumers make decisions on whether or not to attend sporting events.

Objective 1 will yield potentially valuable results for practitioners by determining the game factors that consumers find most appealing. This has direct implications for the yield management practices of sports managers, as they can assess the utility that consumers gain from certain combinations of factors and price individual games accordingly.

The application of data generated from the individual-consumer level to the attendance problem would be a new development. This leads to a secondary research objective:

2: To establish a method that leads to a new stream of research in the attendance literature that can be followed to strengthen results across other sports and situations.

The proposed study will realistically only provide insights for the eight teams in the Canadian Football League. The method employed for this study could be followed in specific markets by an individual team for optimal accuracy, providing them with an approach to understanding their unique consumers. For the particularly entrepreneurial and innovative teams, they could even conduct similar studies with different categories or demographic cross-sections of consumers, providing them the opportunity for unique and optimal price packages to various consumers. The repeated employment of the discrete choice method in different sports and contexts over time can lead to a progressive understanding of the many determinants of attendance demand and how they are similar or different across these contexts. This process of developing a body of knowledge would be similar in nature to that which has occurred over the past several decades in the attendance literature using standard regression analysis and secondary data.

Part 1.3: Research Contribution

The primary contribution of this research, as implied through the research objectives, is the introduction of a new method into the vast but methodologically-limited body of attendance literature. This method, the discrete choice experiment, has the ability to augment the existing knowledge in the literature by introducing unique consumer-level

insights into some of the more established findings and providing further insights as to why consumers might choose not to attend a game.

The nature of this study also allows it to serve as what Nesbit and King (2010) refer to as a "robustness check" to the major findings in the attendance literature. As one of the only studies to employ consumer-level secondary data, Nesbit and King suggested that a major contribution of their work beyond its unique findings was to provide support to the results that had been found using the more standard methods of attendance analysis. It is possible that the patterns that emerge in aggregate data do not reflect the feelings or decision-making processes of individual consumers. Support from a study such as this will provide further support to the robustness of the more commonly reported findings.

These contributions are both derived from the consumer-generated data of the discrete choice method. The consumer-generated data is different from the more commonly employed aggregate data in a variety of ways. The discrete choice method generates primary data, while the aggregate data is collected from a variety of secondary sources. These secondary sources represent attendance figures generated from the real-world market itself and other sources for variables such as weather and income. The real-world attendance figures do have a variety of benefits. They reflect actual economic tradeoffs and market decisions, making them a specific but inclusive source of data. An individual might have chosen to attend a game based upon social influence or because they happened to be in the vicinity and witnessed the crowd entering the stadium, prompting them to make a last-minute decision to attend the game. Real-world attendance figures account for the these types of decisions, while the consumer-generated

primary data cannot account for such social factors. The downside of the aggregate data is that there is no way to knowingly differentiate between these types of consumers and the consumer who purchased a ticket in advance because of the specific aspects of the game being played. The aggregate data also cannot draw inferences as to why potential consumers who did not attend a game chose to act in such a way. The consumer-generated primary data has the potential to provide these insights.

The models generated by these distinct methods and data types are different. The regression models using secondary aggregate data that are often found in the literature are predictive models designed to explain the behaviour of the dependent variable, attendance, through a variety of independent variables. The discrete choice method estimates revealed preferences through a series of choices made by the respondents. Instead of attempting to predict demand for a specific game, the discrete choice method will estimate the respective utility of each of the independent variables. As such, these two methods along with the data types that they employ here are distinct, with each having their respective weaknesses and strengths. There is no specific theoretical reason to believe that the results gathered between the two will be different; it stands to reason that an individual would value a game where their home team is of high quality as opposed to low quality, much like the results depicted by the regression models using aggregate data. This study will seek to discern if this holds true and if the individual-level data compliments the aggregate data.

Part 1.4: Study Overview

This paper will begin with an overview of the literature, including the methods, data types, results and theory that have emerged since the topic's inception into the

academic literature in 1956. The review of the literature will be followed with an effort to link what has been found in the literature to the context in the current study. The sporting league of interest in this study, the Canadian Football League, has not been the focus of research efforts with the standard practices found in the literature. It would be presumptuous to assume that the findings that exist in other sports and leagues would translate perfectly to the Canadian Football League, so a pilot study was conducted using these standard methods and the results will be discussed. The nature and development of the discrete choice method for the primary study will be detailed, followed by the hypotheses and research results. The results will then be discussed with consideration of the theoretical and managerial implications. Finally, the limitations of the study will be reviewed and suggestions for future research will be made.

Section 2: Literature Review

A review of the relevant literature in sports and spectator attendance was undertaken to develop this study. The domain of sports is a common laboratory to test economic theory because of the unique traits that are often manifested in it such as monopoly and externality issues and there is also general popular interest in sports for their own sake. As such, there is an abundance of literature that addresses the various aspects of sports academically (Baade and Tiehen, 1990). The majority of the research relating to sports attendance specifically since its introduction into the academic literature over a half of a century ago exists in the economic literature in the form of attendance modelling. There has been a great effort put forth in understanding the demand that allows so many sports leagues to remain lucrative, with a particular emphasis on the aspect of demand that has historically been of primary importance in most sports: game day attendance (Jensen and DeSchriver, 2002; Knowles et al., 1992).

In general, theory has followed modelling results as the attendance literature has developed. While the majority of models and even theory are rooted in economics, more recent work has also been done in the area of the social sciences and psychology that attempt to explain some of the findings across different attendance models using the theoretical toolbox of each respective discipline. It is still common, however, for these studies to use aggregate data to support their theories that seek to explain individual behaviour.

This review will take an inclusive approach by identifying the contributions of psychological, social and economic research individually. This review includes research relating to all spectator sports as opposed to taking a narrow view on the results related to North American football specifically to provide a more holistic understanding of the

introduction and development of the state of academic knowledge in attendance. Further, findings have been remarkably consistent across sports and time and thus do not necessitate a need for a singular view of the specific sport of interest in this study.

Part 2.1: Introduction to the Literature

Nesbit and King (2010) claim that the issue of attendance was first addressed from an academic perspective by Simon Rottenberg (1956). Rottenberg only briefly discussed sports attendance as it related to the labour market in professional baseball, which was the focus of the paper. He suggested that a rich baseball club was one whose attendance was high, while a poor club was one who had low attendance. Rottenberg provided some brief observations in this article about attendance that were not empirically verified, but instead were based off of observation and some basic consumer statistics in 1929 and 1954. Attendance as a whole was suggested to be a function of the general level of income, the price of admission to the games relative to the price of other recreational substitutes and the goodness of those substitutes. Attendance for a specific team was theorized to be a positive function of the size of the population in the area in which the team has the monopoly rights to play, the size and access of the stadium in which the team plays and the average rank standing of the team during that season. Specific team attendance was also thought to be negatively related to the dispersion of the percentage of games won by teams in the league, such that closer league-wide competition led to higher overall attendance. While these observations were not empirically grounded at the time, they have proven to be largely true and continue to guide a great deal of the attendance research that has since been conducted (Nesbit and King, 2010; Coates and Humphreys, 2010).

Researchers have taken a variety of different angles in their approach to understanding sports attendance. There is a wide body of economic literature that seeks to understand attendance at the aggregate or macro level, while the research investigating reasons for attendance at the individual or micro level is less common but quite compelling. Wakefield and Sloan (1995) note that research in spectator attendance has tended to take a psychological, social or economic perspective, while often overlooking certain aspects of the sports encounter that would be of practical interest to sports administrators. The psychological and social literature could be regarded as an approach at the micro level while the majority of the economic research exists at the macro level.

Part 2.2: Psychological Research in Sports Attendance

Nesbit and King (2010) take the rarely used approach in the attendance literature of employing survey level data where the unit of observation is the individual. They assess motivational reasons for following and attending sporting events. While controlling for other variables such as age and team quality, the authors hypothesize that those individuals that participate in fantasy sports, where a group of participants claim "ownership" of athletes in a given sport and compete based upon the statistics that those players accumulate in actual games, become more heavily involved in the sport and attend more games. The results support this hypothesis, as those individuals that participated in fantasy football were found to be more likely to attend a single game and to have attended more games in general than those that did not. It would appear that a related but external motivation leads to a greater propensity to attend games.

There is also some evidence to suggest that once a spectator attends a single game that this behaviour is likely to persist. Spenner and colleagues (2010) suggest that

attendance at National Football League (NFL) games display the properties of habit-forming goods. They employ rational addiction theory, which suggests that people make choices according to their consistent utility maximization plan (Becker and Murphy, 1988). As a property of this theory, it is assumed that past and expected future attendance will be significant predictors of current attendance. In this study, future attendance is estimated by a variety of current variables such as team winning percentage and stadium age in coordination with a dynamic model of economic assumptions that attempt to represent a yearly interplay of successive responses to supply and demand. Estimated future attendance is subsequently regressed onto current attendance along with past attendance and other explanatory variables. The authors find that NFL fans do exhibit traits of rational addiction, as both past and estimated future attendance were significant predictors of current attendance. It should be noted that while the authors were attempting to explain attendance using addiction, an individual affliction, they used aggregate-level data to do so.

A study conducted by McDonald and Rascher (2000) uses adaptation level theory to explain how consumers respond to promotions in Major League Baseball (MLB) games. While there are multiple promotion types used in professional sports, it is suggested that the most common is price promotions where spectators might get two tickets for the price of one or a reduced rate for specific groups such as seniors or children. Adaptation level theory indicates that exposure to a past stimuli determines the adaptation level for that stimuli. In this specific scenario, it is posited that constant exposure to a reduced price through price promotion will lead to a reduced reference price among spectators. Theoretically, this reduced reference price should result in lower

attendance for regularly priced games as spectators begin to view these games as overpriced and not worth the investment above the reference price of what the game should be worth. Using over 50 control variables and a censored regression model, it is found that the average attendance will increase by 14% for a game where a promotion is present, but that there is also a dilution effect of 2% of total attendance for each additional promotion. The authors conclude that any losses due to a dilution or watering down effect are outweighed by the gains obtained from each promotion. One potential limitation that McDonald and Rascher articulate, however, is that the regression model could not account for a shift in demand. It is conceivable that promotions do not increase long term or total season attendance, but simply shift demand from a non-promotion game to a game that has a promotion. With particular relevance to the current study, once again the authors of this study estimated individual response processes using aggregate data and analysis. The theory was not tested using data obtained from the level of the single consumer.

Perhaps the most comprehensive analysis of the psychological aspects of spectator attendance is conducted by Van Leeuwen and colleagues (2002). They argue that, as in any other industry, customer satisfaction is a critical consideration in sports attendance and attempt to derive a framework that explains satisfaction in this unique consumption context. This is accomplished by first outlining what the authors suggest is the dominant customer satisfaction paradigm in the marketing literature: the Disconfirmation of Expectations Model (DEM). The DEM has four main elements: expectations, perceived performance, disconfirmation and the resulting satisfaction that occurs due to the interaction of the first three elements. Disconfirmation can be negative,

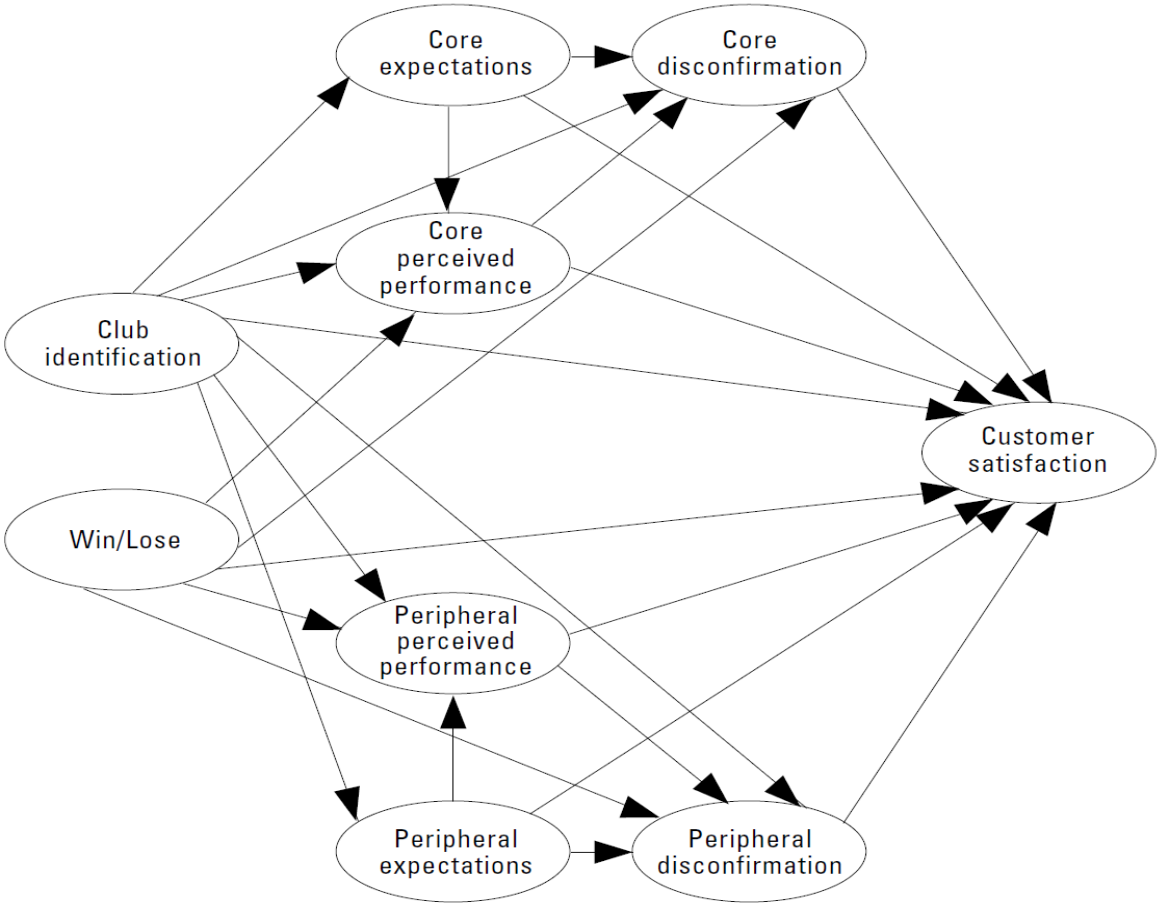
positive or zero depending on whether perceived performance fails to meet expectations, exceeds expectations or equals expectations, respectively.

While the DEM is generally accepted as a versatile satisfaction model in the marketing literature with applicability across multiple industries, it is suggested to be inadequate in modelling consumer satisfaction in the sports industry due to its uniqueness and complexity (Van Leeuwen et al., 2002). In particular, the two elements of the sports market that make it unique are club identification and the win/lose phenomenon (Mullin, 1985). Van Leeuwen and colleagues suggest that club identification is grounded in social identity theory, a theory of group membership, processes and intergroup relations where the individual's self-concept is constructed of two elements: the personal identity and the social identity. It is proposed that an individual can identify with a sports team as part of their social identity. This notion has been expressed elsewhere with the proposed relationship between an individual's level of identification with a given team and their sensitivity to price changes and performance outcome (Sutton et al., 1997). Other areas that have been empirically verified would also seem to apply in this context, such as the negative relationship between identification and the propensity for an individual to "cut off reflected failure" from the group (Snyder et al., 1983). This would suggest that an individual that identifies less with the team would choose to abandon their relationship with the team due to poor performance.

Van Leeuwen and colleagues (2002) argue that the win/lose phenomenon is the primary factor that separates the sports experience from the standard service. They point to one study that found a "halo effect" of winning, where the entire experience at a basketball game was judged more favourably with an improvement in home team

performance, including such seemingly independent factors such as the volume of the music being played (Lapidus and Schibrowsky, 1996). Other studies have found more obvious effects where the improved performance of the home team resulted in higher evaluation of team performance, individual player performance and game quality (Hirt et al., 1992). Van Leeuwen and colleagues use these and other studies to derive an enhanced sport-specific version of the Disconfirmation of Expectations Model, which they title the Sport Spectator Satisfaction Model (SSSM). The SSSM is best understood visually (as seen in Van Leeuwen et al., 2002):

Figure 1 - Sports Spectator Satisfaction Model



The impact that club identification and the win/lose phenomenon have on the three primary factors in the regular DEM (expectations, perceived performance and

disconfirmation) are separated into two categories: the core and peripheral performance. The distinction between the core and peripheral performance is often made in the service literature, and in this scenario apply to the actual sport event itself and the other aspects of the experience such as stadium quality and accessibility, respectively. As it turns out, the importance of satisfaction and the distinctions that Van Leeuwen et al. made are reflected in many of the variables that have been used to model attendance, as will be noted in the Prior Work in Attendance Modelling section.

Part 2.3: Social Research in Sports Attendance

While the SSSM proposed by Van Leeuwen et al. (2002) incorporates certain social elements such as identification, there has been some work that takes a strictly social perspective on an individual's attendance at a sporting event. Melnick (1993) proposes that attending a sport event is a mechanism for individuals to fulfill their need for sociability. In this context, sociability refers to the inherent need for involvement and belonging with other people for its own sake, without any ulterior motive or purpose in the relationship. Melnick argues urbanization has brought more strangers into an individual's everyday life and has made the possibility of true relationships with friends, neighbours and relatives increasingly difficult. A sporting event offers a "third world" beyond the home and workplace to associate with other people, where roles are pre-established and known. Spectators are also aware that they are crucial to the functioning of the event; a professional sport is unlikely to continue to exist without fan support and the fans themselves can contribute to the game by helping to instil a home field atmosphere. Melnick also notes that the event allows an individual to invert the "top-down" structure of their daily life. This provides the spectator the opportunity to become

the monitor as opposed to the monitored as is common in the workplace and to feel the resultant individuated identity and sense of empowerment that results.

Part 2.4: Economic Theory in Sports Attendance

The vast majority of work that seeks to understand and explain sports attendance exists in the economics literature. Before outlining the specific methods, variables and results that are common in attendance modelling, the theory that guides much of this work must first be understood.

Part 2.4.1: Supply and Demand

At its most basic level, attendance is the result of the interaction of the demand for attending games in person and the supply of seats in a sports facility (Coates and Humphreys, 2005). This is a somewhat simple statement, but is heavily weighted and results in many important points to consider.

When considering attendance, a basic distinction between direct and derived demand can be made (Borland and Macdonald, 2003). Direct demand is the viewership for a given sports contest, while derived demand is the ancillary revenues that occur because of the event itself such as sponsorship revenues, merchandise and concession sales. Even within direct demand, however, there are multiple revenue streams. There is the revenue for attendance that results in ticket revenues and there are other forms of demand that the team can indirectly benefit from such as television viewership. This is a critical distinction to make; while attendance is often used as a proxy for team revenue in the literature (Rascher, 1999), it is incomplete when viewed holistically. Nonetheless, the study of attendance is useful and worthwhile in its own right, as gate receipts have historically been a critical element in a team's economic viability (Price and Sen, 2003). Attendance in specific also has important implications for public policy. The construction

of new stadiums, often costing hundreds of millions of dollars, is typically funded in part and sometimes even in whole by the local governments and taxpayers in the area in which the team resides. It has become customary to view the construction of new stadiums as a public expense because it is argued that the local economy benefits from the existence of the stadium and team due to potential sales increases in areas such as hotel and food (Baade and Tiehen, 1990). This argument is predicated on the assumption that a new stadium will result in an incremental increase in attendance; otherwise there would be no benefit in funding its construction.

As it was noted above, the domain of sports is often used as a laboratory to test economic theory because of some of its unique elements that are atypical in the greater economy (Baade and Tiehen, 1990). One of these elements that is essential in understanding the supply side of the interaction is that a sports team typically enjoys a monopoly in its given market (Rottenberg, 1956). While it is typically beneficial for a business to be as theoretically close to a monopoly as possible, the type of monopoly exhibited by sports teams is unique (Neale, 1964). In what he calls the peculiar economics of professional sports, Neale suggests that a Louis-Schmelling paradox exists in sports, whereby a true monopoly is not desirable. While it is not ideal to have multiple teams concentrated in a very small geographic area, an individual sports team cannot create a product on its own; two teams are required to produce a game, which is the basic source of both direct and derived demand. Neale refers to this as the inverted joint product. A joint product typically refers to two products technologically being created from a single process, but the inverted joint product is a single product arising from two separate processes. It is from this line of reasoning that Neale deduces that while an

individual team might qualify as a monopoly under standard definitions being as how they do not have any direct geographical competitors, it is the overarching firm or league that should be considered the true monopoly.

Under monopolistic conditions, profit maximization theory indicates that the offering should be priced at the intersection of the marginal revenue and marginal cost curves (Krautmann and Berri, 2007). Another unique trait of sports economics, however, is that marginal cost is generally regarded to be equal to zero (Winfree et al., 2004; Jensen and DeSchriver, 2002). This is intuitive; a stadium has a given number of seats and it would cost virtually nothing for a team to admit one additional spectator, provided that they are not at capacity, because the spectator is not typically provided with anything beyond the rights to a seat. This distinction is made by Spenner and colleagues (2010), who note that marginal cost is essentially zero until capacity and infinite thereafter. Marginal cost is classified as infinite for practical purposes as capacity is, at least in the short run, fixed. Additional space and seating can be added in the long run, but for a single game this is not considered to be feasible.

With marginal cost equalling zero for all intents and purposes, a theoretical profit-maximizing owner of a sports franchise should price the offering at the point of unit elasticity (Kahane and Shmanske, 1997). Despite this, the literature consistently finds that this is not the case (see Krautmann and Berri, 2007 for a review). To the contrary, it is found that prices for a sports ticket are found to be in the inelastic portion of demand across multiple sports (Coates and Humphreys, 2007; Krautmann and Berri, 2007; Clapp and Hakes, 2005; Spenner et al., 2010; Winfree et al., 2004).

There are a variety of theories as to why this is the case. Salant (1992) proposes the "insurance hypothesis" and argues that teams price in the inelastic portion of demand to ensure strong season ticket sales in both successful and unsuccessful years. Spenner et al. (2010) suggest that owners price in the inelastic portion of demand as a long-run profit maximization theory because they believe that sports attendance is habit-forming. Their underlying belief is lower ticket prices now will build a larger fan base willing to pay higher prices in the future. Krautmann and Berri (2007) make note of the "sportsman hypothesis", which simply suggest that the owner of a team's primary goal is to maximize utility and not profits. Krautmann and Berri also suggest that there could be a "public choice explanation" for this phenomenon, such that team owners make arrangements with local politicians to keep prices low, maximizing attendance and the potential influx of business to the local economy, in return for ongoing considerations in matters such as the construction of new stadiums. There is also the much more simple argument that owners price tickets in the inelastic portion of demand to maximize attendance and increase auxiliary profits in areas such as concession sales and parking (Winfree et al., 2004).

While at the most basic level, attendance is thought to be the commonly discussed interaction of supply and demand, consideration of the other unique economic elements of sports complicates this issue. In addition, Krautmann and Berri (2007) articulate the very important point that ticket price is very difficult to model in academic research. A seat close to the field of play will be priced higher than a seat much further away and data on attendance in each price tier is not readily available. Barring cooperation from team management, researchers are left to use one of the common methods of estimating ticket

prices such as a weighted average where the price for each tier is included in calculating the average price in proportion to how many of those seats are in the stadium, choosing one of the many prices charged by the team in an effort to proxy the consumer's marginal expenditure for that given available seat or to divide total revenue by total attendance, data that is only intermittently available (Krautmann and Berri). Given these issues, it has been difficult to develop a true understanding of the consumer's side of the demand and supply relationship, in particular the price that they are willing to pay for admittance.

Part 2.4.2: The Honeymoon Effect

Coates and Humphreys (2005) note that both conventional wisdom and empiricism have suggested that new sport facilities provide a boost to attendance at sporting events. They argue that at least part of this increase in attendance is due to the desire of both fans and nonfans to see and experience the new stadium. This phenomenon, which they term the novelty effect, has been known elsewhere in the literature as the honeymoon effect (Coates and Humphreys). It would appear that this phenomenon, which had been empirically tested long before it was named, was coined as the honeymoon effect by Clapp and Hakes (2005) when they compared the novelty of a new stadium to a newlywed's honeymoon.

While the honeymoon effect has been found time and again, there have been varying degrees of strength, persistence and theories posited in attempt to explain the true dynamic of the relationship between the construction of a new stadium and attendance. Zimbalist (2003), for example, hypothesized an interaction between the duration of the gains in attendance and the quality of the home team, such that the attendance gains would only be sustained if team quality improved through reinvestment of the incremental revenue (Clapp and Hakes, 2005). Clapp and Hakes sought to test this

hypothesis using a cross product of stadium age and home team winning percentage as an independent variable in a regression model that used Major League Baseball attendance as the dependent variable, along with a variety of other independent variables that are common in the attendance literature. The regression coefficient of the stadium age and winning percentage cross product was not found to be a significant predictor of attendance, casting a measure of doubt on Zimbalist's original hypothesis. Clapp and Hakes explain this result by theorizing that fans are largely bipolar, meaning that fans are either there almost entirely for the product on the field or the stadium amenities. Once those fans that are interested only in the amenities have saturated their need, their patronization will cease. This notion is supported in their results, as it was found that the honeymoon effect lasts eight years with a decline over time. Another interesting result found by Clapp and Hakes that was not often tested elsewhere in the literature is the effect that a new stadium opening in the following year has on the current year's attendance. They found that most stadiums experienced a 14.4% decline in attendance in the last year before a new stadium opened.

As noted above, support for the honeymoon effect is fairly common, although not universal, in the literature. It is most commonly tested in a regression model as a dummy variable that takes on a value of 1 if the stadium is in a given age range, most commonly one to three years old, and 0 otherwise, although some studies employ a ratio variable where the numerical age itself was used. Jensen and DeSchriver (2002) find a small but significant effect for stadium age in Division II college football using a ratio variable, implying a negative regression coefficient. Depken (2001) finds a similar result for the National Football League, as does Spenner et al. (2010). Coates and Humphreys (2010)

use a dummy variable equalling 1 when a stadium is in its first year of operation and 0 otherwise, and find that a brand new stadium generates an increase in attendance of 20% in the National Football League. The regression coefficient was used as a percentage deviation in attendance as the natural logarithm of game attendance was used as the dependent variable. One of the few situations in which the honeymoon effect was found to be insignificant was in Baade and Tiehen's (1990) model of Major League Baseball attendance. They included a variable that was equal to 11 minus the age of the stadium or 0 if the stadium was older than ten years in their regression and the resulting coefficient was insignificant. Baade and Tiehen were looking to extend work originally conducted by Noll (1974), who had found a significant effect for stadium age using the same method. Baade and Tiehen theorized that the effect was possibly insignificant in their model because of the very long sample period of 18 years and because of the short-lived duration of the effect.

Part 2.4.3: The Superstar Externality

In a manner similar to the work conducted by Clapp and Hakes (2005), Hausman and Leonard (1994) articulated a name for a phenomenon that had long been accounted for in the attendance literature. The presence of star players was used as a determinant of demand in Noll's (1974) early work on attendance, where the number of star players on a given team in a given year was regressed on the total season attendance for that team. Hausman and Leonard point out the significant economic impact that a single star player can have on other teams in the league. This was coined the superstar externality since only one team in the league would pay a given star's salary, but all of the teams would share in the profits that his presence created. This effect was demonstrated for several players in the National Basketball Association (NBA) particularly in the area of

television revenues, but on attendance and paraphernalia sales as well. In the NBA's economic structure at the time, the teams shared television revenue and the pool of money from paraphernalia sales, while the vast majority of the gate receipts were kept by the home team. If a team with a popular star player was visiting another team, they would commonly enjoy much higher attendance revenue for that given game. Hausman and Leonard estimated that Michael Jordan alone generated $2.5 million in revenue for every other team in the league in the 1991-1992 season.

The nature of the effect, being a superstar externality or a simple superstar effect, is determined by the nature of the dependent variable. Stars on a visiting team cannot be a determining factor in aggregate attendance because they will typically only be present in a small fraction of the home team's games, while star players on the home team are for the most part consistent across the season and will thus not be a source of differentiation for game-to-game attendance. Berri et al., (2004) modify this approach slightly for the visiting team, by using the average attendance numbers drawn for the opposing stadiums that the team visits. The star power of a team, measured by the fan all-star votes received by the team's players, was a significant predictor of both average home and average road attendance, for home teams and visiting teams, respectively. Berri and colleagues, however, note that this effect is stronger for average visiting attendance, leading them to conclude that the other teams in the league benefit from a star player more than the player's employer in the NBA.

The superstar externality and effect, while explored thoroughly in sports such as baseball and basketball, is not often investigated in football. One notable exception to this scarcity in the literature is Spenner et al. (2010), who use the number of players on an

NFL team that are sent to the Pro Bowl, the annual all-star game for that league, in their fixed-effects two-stage least squares regression. This was found to be a significant factor in their model.

Part 2.4.4: Game Quality and the Uncertainty of Outcome Hypothesis

Baade and Tiehen (1990) suggest that the quality of the team that is put on the field of play is essential in attracting spectators, making it a critical factor in modelling attendance. This notion is supported throughout the literature, as it is extremely uncommon for an attendance model to not include a team quality independent variable. Further, team quality is consistently found to be significant at the 5% and often even 1% confidence levels (see for example Baade and Tiehen; Welki and Zlatoper, 1994; Coates and Humphreys, 2010). The table in Appendix A summarizes the presence or omission of independent variables in seven separate models of football attendance, where all seven have a measure of home team quality and four of seven also include a measure of visiting team quality. The direction of causality between team quality and attendance has been the source of a degree of speculation, but Davis (2008) found strong evidence, albeit only in baseball, that shocks in winning percentage increased attendance, but that the inverse, shocks in attendance improving winning percentage, was rarely true.

As Rascher (1999) notes, however, an understanding of the absolute quality of the home and away team is insufficient in truly understanding the assumed quality of the game. The relative quality of the teams must also be considered. This concept has been recognized since the emergence of sports attendance in the literature, as the initial work by Rottenberg (1956) did suggest that attendance was, among other things, a negative function of the dispersion of percentages of games won by the teams in the league. It is

assumed that a game in which a team that wins almost all of its games is facing a team that loses almost all of its games is unattractive from a fan's standpoint.

This has led to the development of the uncertainty of outcome hypothesis, which states generally that fan demand is positively related to outcome uncertainty, with the caveat that fans prefer success for their home team but also prefer less predictable outcomes over more predictable ones (Lee and Fort, 2008). This implies that there is some sense of ideal balance to be achieved between the home team winning in the completely uncertain condition with 50% probability and the approximately certain condition with nearly 100% probability (Rascher, 1999). This has led some researchers to attempt to pinpoint this ideal percentage. Rascher finds that the optimal win probability for a home team in Major League Baseball is between 60-70%, where the home team has roughly twice the chance of winning as the visiting team. Knowles and colleagues (1992) find a similar result in baseball with an optimal winning percentage of 60% for the home team. Both of these papers use pregame gambling odds to calculate the home team win probability that will maximize attendance. Many other studies use a measure of outcome uncertainty in their attendance models (Price and Sen, 2003; Welki and Zlatoper, 1999; Coates and Humphreys, 2010) but do not try to identify the optimal percentage, opting instead to use absolute uncertainty as a determinant of demand. Some of these other studies use the squared difference of season winning percentage between the home and visiting teams as their measure of uncertainty, but Peel and Thomas (1992) note that this method is often criticized because it attempts to model the behaviour of spectators with information that they did not have available to them at the time that they were making their decision to attend the game. Season winning percentages are not known until the

end of the season, when all of the games are completed. Peel and Thomas suggest that pregame gambling odds should serve as the best proxy for outcome uncertainty because they are known to the spectators beforehand and that the very nature of the gambling business itself is dependent upon the accuracy of game predictions.

There are other issues in testing the uncertainty of outcome hypothesis beyond the nature of the data. Peel and Thomas (1992) state that while outcome uncertainty is widely regarded as a key concept in the analysis of professional sports, there has been little agreement on how to best formulate and test the concept. They note specifically that individual game or match uncertainty can be contrasted with both seasonal and long-run uncertainty, identifying three different types of uncertainty that could impact attendance where it is common for researchers to simply use one. To clarify, individual game uncertainty is the aforementioned probability of one team winning against another in a single contest, seasonal uncertainty is closer to the notion originally articulated by Rottenberg (1956) where the distribution of wins among all of the teams in the league is considered with how likely it is for multiple teams to win the league championship, and long-run uncertainty is indicative of the long term dominance of one or a small group of teams over an extended number of seasons. These three types of uncertainty are identified by Lee and Fort (2008) as game uncertainty (GU), playoff uncertainty (PU) and consecutive season uncertainty (CSU), respectively.

Perhaps the most important work on outcome uncertainty was conducted by Rascher (1999), who formally postulated theory concerning relative and absolute game quality that has been supported and used by other authors. Rascher suggests that what Neale (1964) called the peculiar economics of professional sports is simply an example

of a limited positive production network externality. This implies that while a certain degree of dominance would likely be ideal to a team owner, too much would result in damages to league revenues and eventual dissolution of the league. Each team benefits, to a certain degree, from the quality of the other teams in the league. This concept was expressed with the inequality A>B>0>C where A is home team quality, B is visiting team quality and C is the closeness of the contest portion of demand, or game uncertainty. To clarify, each variable in this inequality is representative of the marginal propensity to attend a game given an increase in that variable. Thus, it is hypothesized that while both home and visiting team quality will positively impact attendance, the quality of the home team has a larger effect. An increase in the squared difference of quality between the two teams, as represented by C, will have a negative effect on attendance. This relationship was supported in Rascher's attendance model of Major League Baseball and has received support elsewhere as well (see for example Price and Sen, 2003).

Part 2.5: Prior Work in Attendance Modelling

Beginning with the work conducted by Roger Noll (1974), it has been common practice to use regression analysis to model spectator attendance in sports. The dependent variable in these studies has varied, but is often total season attendance, average game attendance, individual game attendance or attendance as a percentage of stadium capacity. Since attendance typically has a maximum capacity that cannot be easily exceeded, most researchers tend to use a Tobit or censored regression model that takes into account the censored nature of the dependent variable when developing their attendance models. Despite the tradition of employing a censored regression, researchers routinely run a separate regression using ordinary least squares and find little to no

differences between the models (see for example Welki and Zlatoper, 1994; Rascher, 1999; McDonald and Rascher, 2000).

Part 2.5.1: Determinants of Demand

In their review of the literature, Borland and Macdonald (2003) suggest that the nature and determinants of demand are arguably the most important issue in understanding sport markets. To organize the vast amount of research and broad range of these determinants, they classify them into five categories. These categories are the form of consumer preferences, economic determinants, quality of viewing, characteristics of the sporting contest and supply capacity. These are similar to the categories proposed in an earlier literature review conducted by Cairns et al. (1986), which were economic determinants, demographic determinants, game attractiveness and a residual category that included consumer preferences.

Under the Borland and Macdonald (2003) framework, consumer preferences include variables such as habit and the age of the team. The economic category includes important determinants such as price as well as the demographic characteristics of the market, for which Cairns et al. (1986) included a separate category. The quality of viewing category includes variables such as the timing of the contest and the characteristics of the contest category includes the quality of the teams and the uncertainty of outcome. Borland and Macdonald argue that the consumer preferences category, which is an important demand determinant in essentially all product and service categories, is especially complicated in the sporting context due to largely intangible factors such as habit and the bandwagon effect, which refers to the presence of additional fans or consumers improving the overall service experience.

The table attached in Appendix A summarizes the independent variables that have been used as determinants of demand for both college and professional football in seven different studies. While the typical results for superstars, new stadiums, game quality and closeness, also referred to as outcome uncertainty, have been discussed above, other trends also emerge.

Part 2.5.2: Consumer Preferences

While not many demand studies in football use the length of history or age of a franchise as an independent variable, two notable exceptions exist in Price and Sen (2003) and Depken (2001). Price and Sen find that their measure of consecutive years that a college football team has existed positively affects attendance, while Depken finds the age of an NFL franchise to be insignificant in predicting attendance.

It is a common finding that attendance decreases as the season progresses. Many studies use a progression variable where the number increases by one for each additional game played throughout the season. This is a logical outcome, as average attendance across the league is likely to decline as the season progresses and some teams are eliminated from playoff contention. Since the effect of season progression on attendance is likely to be opposite for teams in playoff contention as opposed to those that are out of contention, some studies have used an interaction variable that multiplies the progression statistic with a measure of team quality. In the work of both Price and Sen (2003) and Coates and Humphreys (2010), however, this variable was found to be insignificant.

Part 2.5.3: Economic Determinants of Demand

In their review of the literature, Borland and Macdonald (2003) note that the majority of evidence suggests that higher prices are negatively related to attendance, as the general theory of demand would suggest. This result, however, is not universal.

Jensen and DeSchriver (2002), for example, find a positive relationship between price and attendance for university football. They attempt to explain this intuitively odd result by arguing that it is an artefact of the cross-sectional sample that they employed, as different schools will likely have different demand curves and some might enjoy higher attendance regardless of price. Nonetheless, it is common for researchers to hypothesize a negative relationship between price and attendance.

Interestingly, the income of the population in the area in which the team operates has been found to have both a positive and negative impact on attendance across studies. Noll (1974) and Welki and Zlatoper (1994), for example, found that an increase in area income had a negative impact on football attendance which led them to conclude that football could be an inferior good. Rascher (1999) states that this is common across many sports. Despite this, some studies do find a positive relationship between income and attendance. A later study conducted by Welki and Zlatoper (1999), for example, that used largely the same methods and variables on a newer data set found a small positive effect of income on attendance in football. For these reasons, it is common for studies to use income as an independent variable, but claim that the hypothesized sign of the coefficient is indeterminate prior to calculation.

Part 2.5.4: Quality of Viewing

It is common for models that estimate individual game attendance for outdoor sports such as football and soccer to include at least one variable related to weather. Some studies include a day-high temperature variable while others use a deviation from seasonal temperatures variable. Price and Sen (2003) use the latter approach because, as they point out, Siegfried and Hinshaw (1979) suggest that "blood freezes at different temperatures" in different areas. While this variable had the hypothesized negative sign

in the Price and Sen study, it was not found to be significant. The presence of precipitation is also commonly used as an independent variable. Borland and Macdonald (2003) suggest an "Atlantic difference" in the effect of precipitation, as it is commonly found that precipitation seems to negatively affect attendance for sports such as baseball and football in North America, but not for sports like rugby and soccer in Europe. It is also worthwhile to note that the quality of viewing factors would appear to constitute what Van Leeuwen et al. (2002) refer to as the peripheral performance of the service experience.

Part 2.5.5: Characteristics of the Sporting Event

This category largely consists of team quality and outcome uncertainty variables, which were discussed while outlining the uncertainty of outcome hypothesis. In contrast to the quality of viewing factors, however, the characteristics of the sporting event category would seemingly constitute what Van Leeuwen and colleagues (2002) call the core performance of the service experience.

Part 2.5.6: Supply Capacity

While many models account for the effect of stadium capacity by incorporating it in the dependent variable by listing attendance as a percentage of capacity or by the choice of regression type, others include it as an independent variable. Price and Sen (2003) incorporate stadium capacity as an independent variable in one of their models and find it to be significant at the 0.01 level of confidence. Likewise, Depken (2001) incorporates stadium capacity in his attendance model for the NFL and finds it to be significant at the 0.05 level of confidence.

Part 2.6: A Summary of the Literature

There is a wealth of literature in the area of spectator attendance at sporting events, where it appears that the primary research methods and demand determinants have become entrenched. Due to the very nature of the subject matter, controlled academic experiments that yield primary data have not historically been considered to be feasible. The current state of knowledge in this area has correspondingly been built upon analysis of mostly aggregate data accumulated post hoc. Biner (2009) suggests that research in sports economics is typically done with limited data, where unobserved heterogeneity among consumers cannot be fully understood. Biner argues that the root of this problem is the lack of individual-level data in the field.

Nesbit and King (2010) are a notable exception to this limitation, but their analysis is focused primarily on understanding the effect of one factor, fantasy sport participation, on attendance. Nesbit and King acknowledged the rarity of consumer-level data by suggesting that a secondary contribution of their paper would be to serve as a "robustness check" to some of the widely accepted conclusions in the literature, since they included a variety of the other common variables such as income, home team star players and average ticket price. Their study, however, also uses secondary data obtained from a survey where the dependent variables are simply if the respondent had attended a game and how many games they attended. While it could be argued that the contributions of Nesbit and King's study are both unique and significant, there are inherent limitations to a data set that does not take the individual game into consideration. It cannot account for the uncertainty of outcome for a specific game or the superstars present on the visiting team. It is conceivable that a respondent in this study attended games only where both the home team and visiting team were both of high and nearly equal quality or where the

visiting team had a transcendent superstar. The dependent variable was not meant to capture such specifics, but this would be of primary concern to practitioners because games such as these are likely to always enjoy high demand. The practitioner should be most interested in understanding what factors could cause an increase in attendance when these desirable factors are not present.

As it was mentioned earlier, even those studies that take a more consumer-centric approach in understanding sports attendance use aggregate-level data to draw consumer-level conclusions. In addition to the motivation work of Nesbit and King (2010), Spenner et al. (2010) suggest that sports attendance is habit-forming. Habits are typically formed at the individual level, yet Spenner and colleagues employ aggregate data by regressing past and estimated future attendance on current attendance to provide support for their habit-forming theory. Similarly, McDonald and Rascher (2000) seek to determine how individuals respond to price promotions at baseball games. By using aggregate attendance data, they state that one of the main limitations of their study is the inability to detect whether demand simply shifted from a non-promotion game to one with a promotion or if overall attendance actually increased. This is a crucial subtlety that is difficult to specify without data on how individual consumers respond to promotions and if a price promotion is a deciding factor in whether they will choose to attend a game or not attend a game.

Nesbit and King (2010) also point out that studies of attendance demand are far more prominent in baseball than other sports. Hansen and Gauthier (1989) expressed a similar sentiment earlier, suggesting that demand studies particularly in less prominent North American sports such as indoor soccer and the Canadian Football League were

lacking. This issue seemingly has yet to be remedied, as the vast amount of current research continues to focus on the National Football League, the National Basketball Association and particularly Major League Baseball in North America. Differences in the importance of demand determinants have been found across other sports and it would be useful to determine what, if any, differences exist in the less prominent North American sports.

Section 3: Pilot Research

Since the attendance literature has yet to specifically address the Canadian Football League, a pilot study that utilizes standard methods and data types was conducted to assist in developing the discrete choice experiment and to generally assess the applicability of common research findings to the current context. The pilot study consists of a standard regression with many of the standard variables found throughout the literature for the 2011 CFL season.

Part 3.1: Dependent Variable

The dependent variable in the pilot study is the individual game attendance for each of the 72 games played in the 2011 CFL season, as obtained from the Canadian Football League's official website (CFL, 2011). Jensen and DeSchriver (2002) suggest that it can be considered appropriate for attendance regressions analyzing individual game data to use attendance as a percentage of stadium capacity as the dependent variable, but the pilot study will use unadjusted attendance numbers. This was chosen so that the large variance in stadium capacities across the CFL would not confound the results. In Hamilton, for example, 30 000 spectators would be equivalent to a sold out stadium while the same number of spectators in Edmonton would be less than half of the stadium's capacity (Ballparks, 2011).

Part 3.2: Independent Variables

A number of independent variables were included as determinants of demand. The majority of these independent variables, such as day of the week and temperature deviation, are of specific interest in developing the discrete choice model, while others, such as area population and income, will not be included in the discrete choice model because they do not vary across games. Nonetheless, Borland and Macdonald (2003)

argue that variables such as these should be included in all attendance regressions to avoid the potential for omitted variable bias.

The independent variables that will be included in the pilot regression can be classified according to Borland and Macdonald's (2003) categories. The economic factors category includes variables pertaining to the price of tickets and the demographic characteristics of the fan base. The census metropolitan area population and average income for each city were obtained from the most recent Canadian census, which was conducted in 2005 (Statistics Canada, 2011). Ticket price will not be included in the pilot regression due to the variations in ticket prices and number of pricing tiers across teams, as well as the lack of available information in regards to the number of seats available and sold in each tier. While price is undeniably an important determinant of demand, it is difficult to measure accurately in a regression and the results would not assist in developing the discrete choice experiment, which can focus on one specific seat location. There will, however, be a dummy variable equalling 1 if the game was classified as a "premium game" with a higher ticket price and 0 otherwise, as obtained from each team's individual website (CFL, 2011). With very few exceptions, these premium games occurred on Canada's Labour Day weekend.

Under Borland and Macdonald's (2003) framework, there are several important determinants that would be classified as characteristics of the sporting contest. Two of the variables that are almost universally employed in attendance models are measures of the quality of both the visiting and the home team. In this model, the week-to-week winning percentage will be used as the measure of absolute quality for each team. For the 16 observations in the first four weeks of the season, the winning percentage from the

previous season will be used because of the high variability in winning percentage at the beginning of the season and, for the purpose of a fan's decision to attend a game, perceptions of team quality based on the results in the current season would not yet be fully formed. This is somewhat similar to the approach taken by Price and Sen (2003), among others. In addition, categorical variables indicating the home and away team for each game will be included in the analysis.

The quality of the players in the game, known in general as the superstar effect, is also included as a measure of the contest's quality. The common measures of star quality in the sports attendance literature, such as all-star votes or number of players participating on the league's all-star team, are not easily transferable to the CFL due to its small number of teams and the types of player positions that are voted as all-stars. In the NBA, each of the 12 players that are voted as all-stars are typically highly recognizable, whereas in the CFL there are 27 players voted onto the all-star team in total including position players such as kickers and offensive linemen who are unlikely to be well known by fan bases across the league. Nonetheless, star power has consistently shown to have a positive influence on demand and should be included in the model. As such, the number of all-stars from the previous season that each visiting team employs, since the number of stars on a home team should not have an influence on fluctuating attendance in home games, will be included as an independent variable. As an additional measure of star power and the superstar externality, in particular, a dummy variable equalling 1 when a visiting team employs a former league Most Valuable Player and 0 otherwise will also be used.

As mentioned in the literature review, there is an important difference between relative team quality and absolute quality, as measured by winning percentage. While there is research that suggests that attendance is maximized when the home team has a 60% chance of winning, it is common for attendance models to assume for reasons of simplicity that it is maximized at 50%, such as when the absolute value of a point spread approaches 0. To advance knowledge in this area, two attendance models will be developed. The first will include the simple point spread, as obtained from Odds Shark (Odds Shark, 2011). The point spread is negative when the home team is favoured and positive when the home team is an underdog, which suggests that the coefficient should be negative as the spread increases positively.

To calculate the specific percentage chance of a home team winning for the second model, the method utilized by Rascher (1999) was used. This method uses the money line to calculate the winning percentage, which is argued as an accurate measure that reflects the general public's perception of the game and does not include a bookie's vigorish. Unfortunately, moneylines were not established for CFL games and had to be derived from the published point spreads using widely available conversion charts. The percentage chance of victory for the visiting and home team is calculated using simple algebra, with the result for the visiting team being subtracted from 1 to derive a second home team percentage. Under Rascher's method, the two home team percentages are then averaged and the process is complete. Since this model is interested in determining whether or not 60% is the optimal winning percentage for the home team, the average home team winning percentage is subtracted from 0.60. Finally, the absolute value of this

number is taken and employed as the independent variable. As the deviation from a 60% winning probability is increased, attendance should theoretically decline.

The quality of viewing category includes the time of day, day of week, presence of precipitation, temperature deviation and type of stadium. The time of day is coded as a dummy variable, equaling 1 when the game is played in the afternoon (before 5 p.m. local time) and 0 if played in the evening. The day of the week is a categorical variable, with a dummy value for games played on Friday, Saturday, Sunday and Monday, with games being played on Thursday as the base category. The regression coefficients for time of day and day of week have no a priori hypothesized sign. The presence of precipitation, as obtained from the Canadian National Climate Data and Information Archive (Environment Canada, 2012), is also coded as a dummy variable equalling 1 if precipitation occurred in the home team's city during the day of the game and 0 otherwise. The approach to analyzing the effect of temperature was adopted from Price and Sen (2003), with the daily high temperature for game day and seasonal average daily high obtained from Environment Canada's archives used to calculate temperature deviations from the seasonal standard. Precipitation and colder weather are generally found to have a negative effect on attendance in the literature. Finally, the type of stadium, indoor or outdoor, is dummy coded to equal 1 for an indoor stadium and 0 otherwise. The type of stadium typically does not have an influence on demand, although some exceptions do exist. It should be noted that the weather and presence of precipitation is included as a variable even for teams with indoor stadiums, as the weather might influence an individual's choice to travel to the stadium.

Finally, the fan preference category includes the honeymoon effect for new stadiums and season progression. The BC Lions played their first five home games of the season in a temporary location called Empire Field while their regular stadium, BC Place, underwent mass renovations. These renovations were met with a great deal of fan excitement and media attention, as BC Place was transformed from a relatively old stadium to one that is state of the art. The first five home games played at Empire Field will be dummy coded with a value of 0, while the final four home games played at BC Place will be coded with a value of 1. A season progression variable is often included in attendance models, where the number of games that each team has played is included as a variable. Since each team plays once per week in the CFL, the progression variable will equal 1 in week 1, 2 in week 2, and so on. It is generally found that attendance decreases as the season progresses.

Part 3.3: Results

One issue that is encountered when including the home and visiting team as categorical variables in the analysis is that these variables can be perfectly correlated with other independent variables that do not change from week to week. For example, the CMA population, average income and stadium type would correlate directly with the home team, while the number of visiting team all-stars and Most Valuable Players would correlate directly with the visiting team variable. Nonetheless, these variables were included in the analysis to represent as many of the variables that have been discussed in the literature as possible. The statistical program SPSS excluded the number of visiting all-stars and Most Valuable Players for this reason. It is rare for a regression modelling

football attendance in the literature to include a measure for star power, so further analysis was not conducted.

Since Borland and Macdonald (2003) specifically addressed the importance of including demographic characteristics such as average income in attendance models, more in depth analysis was undertaken for the variables that would correlate with the home team. Specifically, four unique regressions were run using SPSS for the home team categorical variables, population, average income and the type of stadium. These regressions will be run with the same combination of all other described variables, except for winning probability deviation, which will be subsequently included in a separate model. The results for these models are shown in Table 1. All models were found to be significant at the 1% level of significance, but while the R^2 values for the population, income and stadium regressions are fairly similar (0.624, 0.531 and 0.589, respectively), the R^2 for the regression that included the home team categorical variables was much higher at a value of 0.807. This would seem to be reasonable, as the home team variable could be considered an umbrella variable that would incorporate the effects of population, income, stadium and perhaps other unknown variables.

Many of the variables in the home team variable regression depict the theorized sign, such as new stadium, home team winning percentage, precipitation and temperature deviation. Three variables that seem to defy expectations in the home team model are home spread, week and visiting team winning percentage, although none are significant. The majority of variables have the same sign across all four models. The home team model would seem to fit the data best, so that will be the variable retained for comparison between Model 1, using home spread and Model 2, using winning probability deviation.

Table 1 - Model 1 Estimates for Home Team, Population (CMAPop), Income and Stadium

Model 1	R^2=.807		Model 1	R^2=.624		Model 1	R^2=.531		Model 1	R^2=.589	
Home Team	*Coefficient*	*Sig.*	**CMAPop**	*Coefficient*	*Sig.*	**Income**	*Coefficient*	*Sig.*	**Stadium**	*Coefficient*	*Sig.*
Constant	28719.973	0	Constant	25331.701	0	Constant	23996.788	0.002	Constant	25476.168	0
HomeSpread	63.186	0.755	HomeSpread	-7.689	0.969	HomeSpread	103.565	0.634	HomeSpread	106.446	0.6
Week	7.381	0.932	Week	18.845	0.863	Week	-89.118	0.449	Week	-63.55	0.565
TorontoA	-66.153	0.972	TorontoA	101.327	0.966	TorontoA	325.166	0.903	TorontoA	-219.86	0.929
WinnipegA	1010.84	0.626	WinnipegA	1259.612	0.633	WinnipegA	1672.767	0.575	WinnipegA	1396.251	0.613
MontrealA	2246.272	0.36	MontrealA	2690.622	0.378	MontrealA	3513.291	0.308	MontrealA	2770.565	0.386
HamiltonA	1052.005	0.606	HamiltonA	2444.419	0.338	HamiltonA	2239.171	0.435	HamiltonA	2264.036	0.396
BCA	1331.862	0.521	BCA	2605.558	0.296	BCA	375.584	0.178	BCA	2444.26	0.352
EdmontonA	2934.497	0.22	EdmontonA	2980.268	0.296	EdmontonA	4181.79	0.202	EdmontonA	3501.677	0.24
CalgaryA	916.526	0.69	CalgaryA	2135.291	0.453	CalgaryA	3341.833	0.297	CalgaryA	2410.434	0.418
TorontoH	-9935.714	0	NewStad	9502.449	0.002	NewStad	8260.702	0.016	NewStad	13520.442	0
WinnipegH	-860.381	0.707	V.Win%	-4293.794	0.353	V.Win%	-6727.826	0.208	V.Win%	-6426.092	0.185
MontrealH	-4707.787	0.063	H.Win%	6275.05	0.087	H.Win%	11191.494	0.004	H.Win%	4193.733	0.333
HamiltonH	-6660.645	0.001	Time	266.807	0.877	Time	916.266	0.633	Time	668.019	0.709
BCH	-4685.967	0.032	Premium	6512.979	0.006	Premium	9396.332	0.001	Premium	7,365	0.003
EdmontonH	3549.527	0.121	Friday	1527.051	0.456	Friday	3973.915	0.073	Friday	3492.139	0.09
CalgaryH	-374.475	0.871	Saturday	922.022	0.679	Saturday	4569.238	0.067	Saturday	2924.002	0.184
NewStad	11033.918	0	Sunday	-124.777	0.962	Sunday	1603.496	0.579	Sunday	14.531	0.996
V.Win%	-2628.936	0.512	Monday	-1477.964	0.678	Monday	-866.433	0.827	Monday	-1153.918	0.756
H.Win%	1283.439	0.765	Precipitation	-513.647	0.7	Precipitation	-1876.758	0.202	Precipitation	-1174.265	0.392
Time	902.321	0.52	TempDev	182.325	0.18	TempDev	114.421	0.444	TempDev	178.131	0.212
Premium	3508.396	0.08	CMAPop	-0.002	0.001	Income	-0.137	0.529	Stadium	-5466.409	0.009
Friday	1427.765	0.394									
Saturday	-107.421	0.956									
Sunday	-748.323	0.721									
Monday	-556.514	0.843									
Precipitation	-759.259	0.473									
TempDev	176.798	0.112									

The coefficients for Model 1 using the home team and home spread variables, appearing in Table 1 above, are also included in Table 2 for comparison with the Model 2 coefficients, using the home team and win probability deviation (WinProbDev).

Table 2 - Model 1 (Home Spread) and Model 2 (WinProbDev) Estimates

Model 1 - Home Team	R^2=.807		Model 2 - Home Team	R^2=.808	
	Coefficient	Significance		Coefficient	Significance
Constant	28719.97	0	Constant	28066.37	0
HomeSpread	63.186	0.755	WinProbDev	4060.136	0.559
Week	7.381	0.932	Week	-7.373	0.935
TorontoA	-66.153	0.972	TorontoA	-375.485	0.848
WinnipegA	1010.84	0.626	WinnipegA	1200.686	0.568
MontrealA	2246.272	0.36	MontrealA	2494.668	0.262
HamiltonA	1052.005	0.606	HamiltonA	1442.58	0.461
BCA	1331.862	0.521	BCA	1642.072	0.376
EdmontonA	2934.497	0.22	EdmontonA	3190.545	0.181
CalgaryA	916.526	0.69	CalgaryA	1216.903	0.567
TorontoH	-9935.71	0	TorontoH	-9850.37	0
WinnipegH	-860.381	0.707	WinnipegH	-472.596	0.837
MontrealH	-4707.78	0.063	MontrealH	-4700.19	0.05
HamiltonH	-6660.64	0.001	HamiltonH	-6331.78	0.002
BCH	-4685.96	0.032	BCH	-4343.72	0.056
EdmontonH	3549.527	0.121	EdmontonH	3901.588	0.101
CalgaryH	-374.475	0.871	CalgaryH	-114.655	0.961
NewStad	11033.91	0	NewStad	11180.04	0
V.Win%	-2628.93	0.512	V.Win%	-2708.12	0.476
H.Win%	1283.439	0.765	H.Win%	853.212	0.833
Time	902.321	0.52	Time	965.951	0.49
Premium	3508.396	0.08	Premium	3422.864	0.087
Friday	1427.765	0.394	Friday	1356.122	0.418
Saturday	-107.421	0.956	Saturday	-58.93	0.976
Sunday	-748.323	0.721	Sunday	-847.953	0.687
Monday	-556.514	0.843	Monday	-806.314	0.776
Precipitation	-759.259	0.473	Precipitation	-764.85	0.466
TempDev	176.798	0.112	TempDev	191.472	0.096

As it can be seen in Table 2, the R^2 values of 0.807 and 0.808 for Models 1 and 2, respectively, are virtually identical. Neither the home spread nor win probability deviation variables are found to be significant, while they also both have a positive sign, which is contrary to the results that commonly appear in the literature. The home spread value suggests that for every additional one point that the visiting team is favoured by, an additional 63 fans are likely to attend the game; a very small incremental increase. The win probability deviation, while not accounting for which team is favoured, also has a relatively small effect considering that the variable was expressed as a decimal with a maximum value of 1. The coefficients for the other variables are largely similar, so the subsequent analysis will focus on Model 1 because the use of point spreads is more common in the literature, while also requiring fewer assumptions and conversions in comparison to win probability deviation.

The values for visiting team winning percentage (V.Win%) also have a negative sign, but the coefficient is not significant and the effect would also be small as this variable was represented by a decimal as well. The negative sign does suggest that fans prefer to see visiting teams of poorer quality, which would be contrary to prior notions established in the literature. Three variables are significant at the 1% level of confidence: the home team categorical variables for the Toronto Argonauts and Hamilton Tiger-Cats (TorontoH and HamiltonH) and the new stadium variable. It would appear that Toronto and Hamilton have lower than average league attendance. It is interesting to note that while the new stadium coefficient is positive and significant, the home team categorical variable for the BC Lions (BCH), the team that moved to a new stadium during the 2011 season, has a negative coefficient that is significant at the 5% level of confidence. The

BC Lions seemed to have lower than average attendance until they moved into their new stadium, lending support to the honeymoon effect. The premium game variable is significant at the 10% level of confidence, implying that the teams have a general idea of the games in which they will enjoy large spikes in demand and can charge higher prices. As mentioned previously, these games primarily took place on Labour Day Weekend, a holiday weekend in Canada.

Section 4: Methodology

This study utilized a discrete choice method, where the respondent is instructed to select one out of two purchase scenarios or to indicate that they would not purchase either of the options. The possibility to select a no purchase option is an important distinction and provides an element that has not existed in the attendance literature up until this point. As Gilbride and colleagues (2008) note, real life consumers not only make purchase decisions between a variety of brands or options, but the decision to actually make the purchase itself as well. Consumers may decide to defer choice or opt for no choice because of the difficulty in making the decision or the outside tradeoffs required to make the decision (Gilbride et al.).

Part 4.1: Model Development

The use of regression analysis modelling historic data gathered from a variety of secondary sources has allowed researchers to measure the effect of a high number of variables, as can be seen in Appendix A. The collection of respondent-generated primary data requires a more focused approach to minimize respondent fatigue and to avoid information overload. A respondent faced with a game scenario that has a very high number of variables present might approach their choice task using heuristic processing, focusing on potentially only one variable while ignoring the rest to quickly complete the task. It would have been impractical to include all of the attendance variables that have been reviewed in the literature, requiring the study to focus on a select few. Six primary variables were chosen for inclusion in the study: the visiting team, the win/loss record of both the home and visiting team, a measure of game closeness and price for both a higher quality and lower quality seat. A seventh variable, home team, is included in the analysis but is fixed for each respondent based upon their choice of favourite team. For practical

reasons, it would make little sense to ask a respondent if they would purchase a ticket for a game taking place in Vancouver if the respondent lived in Montreal. Further, sports fans tend to choose one "favourite" team, often but not always based on geographical proximity, and would be most likely to attend a home game for that team. As such, each respondent was asked to indicate their favourite team and was then directed to a survey that includes only that team as the home team in the 14 choice scenarios presented to them.

While the home team presented in the 14 scenarios to each respondent is fixed based upon the stated selection of their favourite team, a visiting team must also be indicated; a respondent cannot be expected to make a reasonable choice on whether or not to attend a game without knowledge of which teams are participating in the game. For each home team, there are seven potential visiting teams so that a scenario would not be presented in which a home team was playing itself. In total, the visiting team variable had eight levels, one accounting for each of the teams in the Canadian Football League. Note that only seven teams appeared as the visiting team to each individual respondent, with the eighth being the fixed home team.

While the pilot study indicated that the two major game quality variables, team records and measure of closeness (as approximated by the point spread), were not significant, these measures are extremely prevalent in the literature. The quality of both the visiting and home teams as well as the anticipated closeness of the contest have been a focus for both model and theory development. This presented another potential source of respondent fatigue. The quality of the results might not only be tainted by a high number of variables presented in each choice set, but in the overall number of choice sets

as well. Presenting a wide range of records at different times in the Canadian Football League season would have required presenting respondents with an extremely high number of choice sets in order to reduce the standard error associated with each of the parameters and accurately construct a model. As such, a specific period in the season was selected with three levels of absolute team quality for both the home and visiting team. Specifically, respondents were informed that the scenarios would be presenting a potential game for week 16 of the season and each team would have played 14 games up to that point (a bye week where each team does not play is included). Having played a higher number of games reduces the luck and randomness that might be associated with a team's win/loss record. A respondent should be able to confidently conclude that a team that has won 75% of its 14 games is of fairly high quality, but would not be able to draw such strong conclusions if that same team had won 75% of its initial four games. The three chosen levels of team quality were 4 wins/10 losses, 7 wins/7 losses and 10 wins/4 losses for winning percentages of 29%, 50% and 71%, respectively. These were meant to represent a team of poor quality, moderate quality, and high quality, respectively.

As mentioned in the literature review, the tool most commonly used to approximate the anticipated quality or "closeness" of the game is the gambling point spread. This is an appropriate and accessible measure when modelling attendance using historic data. The primary benefit of estimating the closeness of the contest in one simple number would transfer to the current scenario of obtaining primary data, but there is the potential that many of the respondents have never wagered on a sporting contest before and might not understand point spreads. The difference between a contest with a point spread of +7 as opposed to -7 is great, but could be easily confused by one who is not

directly familiar with point spreads. To overcome this potential for error, the primary concept of the point spread was maintained but adapted into more common terms. In each scenario, the respondent would see one of the following three statements: "Visiting team favoured to win by 7 points", "Home team favoured to win by 7 points" or "Game considered to be even". These would represent situations in which the home team was strongly expected to lose, strongly expected to win, and games in which the game was considered to be too closely contested to determine a favourite, respectively.

The final and most important variable to include in the choice scenarios was price. As was also mentioned in the literature review, price has historically been a difficult variable to measure and understand in the attendance literature due to a variety of reasons including incomplete price information and the high variance in ticket prices based upon the different quality of seats in the stadium. A fan not only chooses whether or not to attend a game, but the quality of seat that they are willing to pay for as well. In an effort to represent this, an option for both a "higher quality" and "lower quality" seat were included in each choice scenario. The higher quality seat was stated to be towards the middle of the field while the lower quality seat was stated to be towards the corner of the field. This perception of seat quality based on location is widely accepted. The website for Reliant Stadium in Texas, for example, states that the seats on the yard lines (the side of the field) are preferred by most fans while the corners are the most "economical" seats (TickCo, 2012). A separate variable would be included in developing the choice sets for the high and low quality ticket prices. The corner and center sideline seats were also chosen because they were available in all eight of the team's home fields. Each respondent was shown a picture of their team's seating chart and told which section the

higher and lower priced seats would correspond to. The following image represents the seating chart that was shown to respondents who indicated that they were Toronto Argonauts fans, who were told that the higher priced ticket would correspond to a seat in the "Gold Section" (coloured yellow on the image), while the lower priced ticket would correspond to a seat in the "Bronze section" on the seating chart (CFL, 2011).

Figure 2 - Toronto Argonauts Seating Chart

To determine the prices that were to be used in the choice scenarios, an average of the eight team's ticket prices from the 2011 season (as obtained from each team's website) were used. Each team has a unique pricing structure with different combinations of prices for various groups of seats, known as pricing tiers. To obtain the average price for the low and high quality seats in the discrete choice model, the lowest and highest price from teams with four different price tiers was taken. To account for the higher price variance found in those teams that had five price tiers, an average from the lowest two tiers and highest two tiers was taken to determine that team's price for the lower and higher quality seat, respectively. The two averages calculated were $72 for the higher quality seat and $30 for the lower quality seat. Both variables had five levels, with two being above the average price and two being below the average price, each in increments of $5. Thus, the prices included for the higher quality seats were $62, $67, $72, $77 and $82. The prices included for the lower quality seats were $20, $25, $30, $35 and $40. A sample choice scenario with all of the information outlined above that was used in the survey can be seen in Appendix B. Note that this scenario represents one which would be seen by a respondent who indicated that the BC Lions were their favourite team.

It should be noted that certain variables, while undoubtedly important both practically and theoretically, were excluded from the analysis due to issues in their ability to be operationalized by the researchers and conceptualized by potential respondents. While a new stadium, for example, has been shown empirically to improve attendance figures and has been supported with theory, it would be difficult for a potential respondent to make a proper choice when they are told in one scenario that their favourite team's game will take place in a new stadium and in the very next scenario it will not. An

important part of the effect of new stadiums is the excitement generated from sources such as local news reports and team websites when the stadiums are opened, which would be difficult to replicate in this context and likely overburden the respondent with too much peripheral information.

Part 4.2: Procedure

Respondents accessed the survey, hosted by the widely used survey website www.surveymonkey.com, on their own schedule in a non-controlled environment. Upon accessing the website, they reviewed the consent form which included a synopsis of the study's purpose and informed them about the prize draw, which will be further detailed in the Sample section. After consenting to participate in the study, they answered two screening questions. In order to be eligible to participate, the respondent had to be 18 years of age or older and classify themselves as a fan of the Canadian Football League.

Before proceeding to the choice scenarios, the respondents answered a series of questions pertaining to their self-perceived knowledge and past experience with the Canadian Football League. After completing these, they were asked who their favourite team in the Canadian Football League is. Based upon their response to this question, they were routed to one of eight unique surveys; one for each of the eight Canadian Football League teams. Respondents were forwarded automatically to the survey relevant to their home team, which would feature that team as the home team in each of the 14 scenarios that were presented.

Aside from the home team being fixed based upon the respondent's stated favourite team, the content of the eight separate surveys was essentially identical. The only difference among the eight surveys was the seven different visiting teams that would

be included in the scenarios, as the home team could not conceivably play itself as the visiting team. The combinations of point spreads and team records were identical throughout, although four of the eight teams were counterbalanced and presented the scenarios in reverse order to offset potential respondent fatigue. After completing the 14 choice scenarios, respondents had a final opportunity to withdraw their data from the study and submitted their e-mail address to participate in the prize draw. Respondents were then debriefed and thanked for their time.

Part 4.3: Sample

The minimum acceptable sample size for a discrete choice experiment can be obtained from the following inequality:

$$N \geq (z^2 q)/(r p a^2)$$

Where z = 1.96 for a 95% level of confidence, r is the number of choice sets, p is the choice share (1 divided by the number of choices in a set), q is equal to 1-p and a is 0.10, a commonly used margin of error. The model used in this study with 14 choice sets and 3 options each has a minimum acceptable sample size of 56. Despite this relatively low number of respondents to derive meaningful results, a much larger number was desired to investigate home team asymmetries for the different variables. The desired number of respondents was 20 per team, totalling 160.

Part 4.4: Sample Generation and Characteristics

Respondents were recruited online from a variety of sources. Recruitment messages were posted on two online Canadian Football League message boards, "13th Man" and "Pro Sports Daily" (13th Man, 2012; Pro Sports Daily, 2012). Recruitment messages were also posted on each team's Facebook page. In addition, a snowball sampling method was used to increase the sample size by forwarding the survey to

various contacts and requesting that they forward the link to other fans of the Canadian Football League.

Potential respondents were required to be at least 18 years of age and to be fans of the Canadian Football League. Specific age and gender questions were not asked because they were not deemed to be directly relevant and to allow the respondent to feel as anonymous as possible. As compensation for the respondent's time, they were entered into a draw to win a pair of tickets to attend a Canadian Football League game for their stated favourite team. An individual draw was held for each team.

A total of 100 respondents completed the survey. After data cleaning, 83 respondents were available in the pool for analysis. The number of respondents for each of the home teams is as follows:

Table 3 - Respondents by Favourite Team

Team	# of Respondents
BC Lions	7
Calgary Stampeders	7
Edmonton Eskimos	1
Hamilton Tiger-Cats	27
Montreal Alouettes	7
Saskatchewan Roughriders	5
Toronto Argonauts	18
Winnipeg Blue Bombers	11
Total	83

Due to the low number of respondents who indicated that their favourite team was the Edmonton Eskimos, this pool of respondents was removed from the analysis. This left a total of 82 usable respondents from seven different fan bases.

Unfortunately, the sample size obtained from the majority of teams was inadequate in relation to analyzing cross-team asymmetries. For this reason, all

hypotheses relating to the "visiting team" variable were disregarded and no analysis was conducted. Certain teams are likely to have rivalries that would be evident only in the responses for a single home team. For example, the Edmonton Eskimos may see an increase in demand when the visiting team is the Calgary Stampeders because of the within-province rivalry, while this elevated importance would not exist if Calgary travels to Montreal. These relationships would be specific and unique to each individual team and cannot be measured with the small sample sizes obtained. As such, all responses were pooled to analyze the primary effects for the remaining variables: home team, home team quality, visiting team quality, point spread and price.

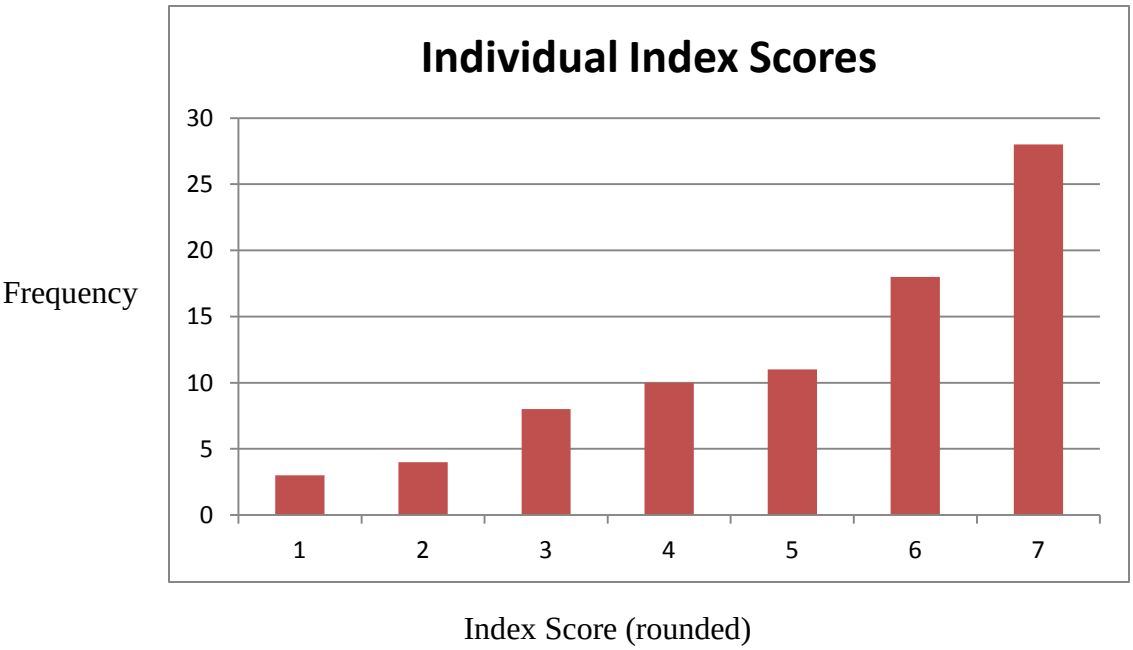
As stated above, respondents had to indicate that they were above 18 years of age and consider themselves to be fans of the Canadian Football League in order to complete the survey. Additional questions were included in the survey to assess the degree to which the respondents followed the Canadian Football League. First, a modified version of Scale # 161 from Marketing Scales Handbook Volume II (Bruner II and Hensel, 1996), originally established by Smith and Park (1992), was included to quantify the respondent's self-perceived knowledge of the Canadian Football League as well as their ability to make purchases in this product category. This scale included four questions which the respondent answered on a scale from 1 to 7 with 1 referring to "Strongly Disagree" and 7 referring to "Strongly Agree".

The four perceived knowledge questions were:

1. I feel very knowledgeable about the Canadian Football league.
2. If a friend asked me about the CFL, I could tell them a lot about it.
3. If I had to purchase a CFL ticket, I would need to gather very little information in order to make a wise decision.
4. I feel very confident about my ability to tell the difference in quality among different CFL teams.

The responses to these questions were summed and averaged for each respondent to create an individual index. The average index score for all participants was 5.2, indicating moderate agreement and thus moderate perceived knowledge and ability to purchase the product in question. The individual frequency for each index score, rounded to the nearest whole digit, is shown below:

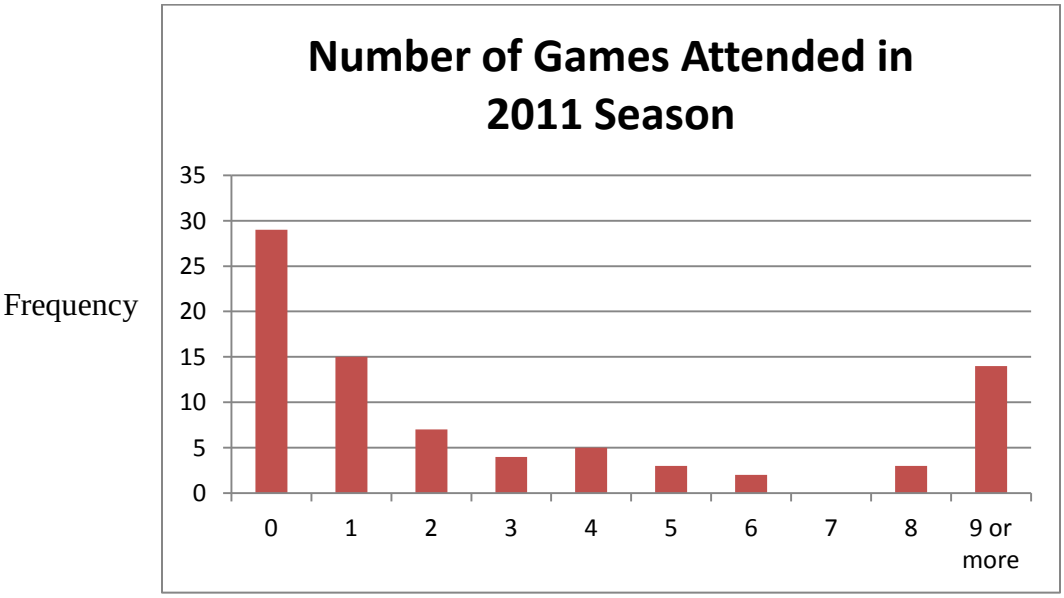
Figure 3 - Individual Index Scores



As an additional and more practical measure of assessing the degree to which the respondents were in the market for Canadian Football League tickets, they were asked how many games they had attended in the previous season. Respondents were allowed to

select any number ranging from 0 to 8, or to indicate that they attended "9 or more" games. Substituting a value of "9" for those respondents that attended "9 or more" games, the average respondent attended 2.9 games in the 2011 season. Unsurprisingly, this average has little meaning as the frequency chart shows a high degree of polarity:

Figure 4 - Number of Games Attended by Respondents in 2011



29 respondents did not attend a game in the 2011 season, while 14 attended 9 or more. Each team hosts nine regular season games throughout the season, so it can logically be assumed that those respondents that attended 9 or more games likely had season tickets, which can be purchased at the beginning of the year to obtain exclusive rights to a particular seat throughout all of the team's home games. This might not be the case for all attendees, as the close proximity to which certain teams play could theoretically allow an individual to attend multiple games in different cities. It is possible, for example, that a fan could attend five Toronto Argonauts home games and also attend four Hamilton Tiger-Cats home games. Nonetheless, over half of the total respondents attended either a

full season's worth of home games or none at all. In total, 65% of respondents attended at least one game during the previous season. While this study focused on the purchase of individual tickets to a single game, it should be noted that all of the teams in the Canadian Football League offer season ticket packages as well as discounted packages for multiple games, where a purchaser can obtain tickets for multiple games at a discounted rate without committing to the entire season.

Section 5: Hypotheses

The following hypotheses are based on the review of the literature and the pilot study.

Part 5.1: Variable Significance

The home team, point spread, price, home team quality and visiting team quality variables were included in the study because of their consistent inclusion and significance in the majority of studies in the literature. As such, it is hypothesized that each variable will be a significant determinant of demand in the generated choice model.

H1a: The home team variable will be a significant determinant of demand in the attendance model.

H1b: The point spread variable will be a significant determinant of demand in the attendance model.

H1c: Price will be a significant determinant of demand in the attendance model.

H1d: The quality of the home team will be a significant determinant of demand in the attendance model.

H1e: The quality of the visiting team will be a significant determinant of demand in the attendance model.

Part 5.2: Relative Importance and Home Team Quality

H2: Home team quality will have the highest calculated relative importance value among the independent variables.

The quality of the home team is nearly universally employed and found to be significant in attendance models across the literature. The importance of this variable should transfer from aggregate level data to the data collected at the individual level if, as Van Leeuwen et al. (2002) propose, club identification is a critical aspect of the sports

attendance experience. Individual consumers would seek to strengthen their social identity through identification with a successful team. If the team is not successful, they are likely to cut off reflected failure and choose not to attend the team's games (Snyder et al., 1983).

Part 5.3: Willingness to Pay

H3a: The willingness to pay for home team quality will be greater than the willingness to pay for visiting team quality.

H3b: The willingness to pay for visiting team quality will be greater than 0.

H3c: The willingness to pay for a higher point spread value will be less than 0.

This is an extension of Rascher's (1999) proposition of A>B>0>C, where A, B and C are the propensity to attend games with an increase in home team quality, visiting team quality and the squared difference between the home and visiting team's quality, respectively. It is hypothesized that while an increase in the quality (as measured by number of wins) of the visiting team will increase an individual consumer's willingness to pay for an individual game, this improvement in willingness to pay will be less than the incremental willingness to pay for an equivalent improvement in the home team's quality. While the willingness to pay for improvement in both the home and visiting team's quality will be positive, the measure of game closeness (estimated in the discrete choice model with the point spread) will result in a negative willingness to pay when increasing in value. Consumers will be willing to spend less on a game that is anticipated to be more one-sided than the average game. This should be the case for an increase in the absolute value of the point spread, as the literature suggests that attendance is highest when the game is relatively even.

Section 6: Research Findings

The full conditional logit estimates are reported in Appendix C. The rho-squared value for the full model including all variables is 0.096, indicating moderate model fit. To assess the accuracy of the model from a purely practical perspective, comparisons between the actual choice shares of the respondents and those generated by the model can be made. In the table, "Low Q" represents the shares for the lower quality seats, while "High Q" represents the shares for the higher quality seats. The highlighted columns represent the actual shares.

Table 4 - Actual Shares and Model Shares

	Low Q	Low Q	High Q	High Q	No Purchase	No Purchase
BC	50.70%	46.94%	43.36%	41.84%	5.94%	11.22%
Calgary	32.83%	44.90%	23.35%	33.67%	43.82%	21.43%
Hamilton	67.85%	65.33%	22.63%	23.21%	9.52%	11.46%
Montreal	42.93%	39.80%	55.87%	53.06%	1.20%	7.14%
Saskatchewan	100.00%	42.03%	0.00%	57.97%	0.00%	0.00%
Toronto	19.17%	39.29%	16.30%	34.82%	64.53%	25.89%
Winnipeg	38.12%	51.30%	61.87%	47.40%	0.01%	1.30%

The choice shares generated by the model are calculated at the $30 price level for the lower quality seats and $72 for the higher quality seats, as these are the average values originally calculated from the team's ticket prices and the average level of the price variable itself. As can be seen in Table 4, the choice shares generated by the model are generally similar to those generated directly from the respondents. This is particularly the case for the BC Lions, Hamilton Tiger-Cats and Montreal Alouettes. The Saskatchewan Roughriders are the only team that show model shares that are extremely deviant from the actual shares, but this is likely due to an anomaly in the responses from those individuals who selected Saskatchewan as their favourite team: not a single respondent selected the "No purchase" option for any of the scenarios presented to them. As

indicated above in Table 3, only five respondents were in this sample pool, the smallest among all teams. With each individual responding to 14 choice sets, a total of 70 choice sets were presented without a single respondent declining purchase on any of the games. In order to estimate the choice shares, an artificial option estimate of -20 had to be inserted for the no purchase option while the low quality option had to be removed and defined as the base category. Interestingly, the Saskatchewan Roughriders enjoy the strongest attendance numbers in the league, having sold out all but one of their nine home games during the 2011 season, as per the attendance figures obtained from CFL.ca and used in the pilot study. The only game that did not sell out was the final game of the season. Saskatchewan might simply be home to an extremely loyal fan base where the demand far outweighs the supply.

Part 6.1: Findings - Variable Significance

The results pertaining to Hypothesis 1 can be seen in the following abridged version of the full model estimate table in Appendix C. Four out of the five variables are significant at the .05 level of significance, with three also being significant at the .01 level of significance.

Table 5 - Variable Significance

	Options	Home Team	Spread	Price	Home Record	Away Record
LIKLHD	-1062.4	-998.14	-994.79	-986.67	-966.64	-960.52
DF	2	13	17	19	23	27
Chi-square		128.70	6.71	16.23	40.06	12.25
Prob(Chi-sq)		0.00	0.15	0.00	0.00	0.02
rho-square		0.0606	0.0637	0.0714	0.0902	0.0960

H1a: The home team variable will be a significant determinant of demand in the attendance model.

With a test statistic of 128.70, the home team variable is significant at the .01 level of significance.

H1b: The point spread variable will be a significant determinant of demand in the attendance model.

With a test statistic of 6.71, the point spread variable is not a significant determinant of demand in the choice model.

H1c: Price will be a significant determinant of demand in the attendance model.

With a test statistic of 16.23, price is significant at the .01 level of significance.

H1d: The quality of the home team will be a significant determinant of demand in the attendance model.

With a test statistic of 40.06, the quality of the home team is significant at the .01 level of significance.

H1e: The quality of the visiting team will be a significant determinant of demand in the attendance model.

With a test statistic of 12.25, the quality of the visiting team is significant at the .05 level of confidence.

Part 6.2: Findings - Relative Importance and Home Team Quality

H2: Home team quality will have the highest calculated relative importance value among the independent variables.

The discrete choice model allows for the calculation of the relative importance that the respondents placed upon each of the independent variables. This value is determined by calculating the range of the utility values of the different levels of each variable in the complete model (under the "Arec" column in Appendix C) and then dividing each range by the sum of all of the range values for each variable. Note that only the price estimates are included in Appendix C. To obtain the utility values for each individual price level, the price coefficient is multiplied by the dollar value of each level of the variable. As per the construction of the model, the high quality and low quality ticket prices are two separate variables.

Table 6 - Relative Importance Calculations

Variable	Range	Relative Importance
Home Team	4.4134	42.00%
Spread	1.896411	18.05%
Home Record	1.116036	10.62%
Away Record	1.763295	16.78%
High Q Price	0.472796	4.50%
Low Q Price	0.845184	8.04%
Total	10.50712	100.00%

It was hypothesized that the quality of the home team would have the highest calculated value of relative importance because of the influence that the association with one's favourite home team can have on social identity. As can be seen in Table 6, Hypothesis 2 was not supported. Further, it had the lowest relative importance value outside of the price variables. The home team variable has a relative importance value that is more than double any of the other variables, indicating the great importance and difference among fans of the various home teams.

An interesting disconnect can be found for the relative importance of the point spread variable with a value of 18%, second in magnitude only to the home team variable. While this was found to be the variable with the second highest relative importance, it was not found to be a significant predictor of choice in the actual model. This could be explained by the two very different meanings of these values. The significance of a variable in the model indicates whether the variable is a reliable predictor of the respondent's choices. The relative importance value, on the other hand, essentially only factors in the maximum and minimum values of the utilities and infers that the relative importance value is higher if two levels of the variable have a strong

positive or negative impact on utility. It could be that one level of the point spread variable had a strong negative impact upon utility, but the variable as a whole had little explanatory power.

Part 6.3: Findings - Willingness to Pay

H3: Willingness to pay and game quality.

The discrete choice estimates also allow for the calculation of willingness to pay. To calculate willingness to pay for a certain variable, the price coefficient is required. Since there are two different price variables, one each for the high and low quality seat, two price coefficients are created. The price coefficient for the low quality seat can be seen in the full model ("Arec") in Appendix C, in the "Price" row. This value is 0.042. The price coefficient for the high quality seat is calculated by summing the utility estimate for the low quality seat, 0.042, and the estimate for the high quality seat found in the same column and one row below, which is -0.019. Adding these values together delivers a price coefficient of 0.024.

It is immediately noticeable that both price coefficients are small but positive, a counterintuitive finding. As stated in the literature review, the economic aspects of ticket pricing have historically confounded researchers. Different studies, often undertaken in the same sport, have found conflicting results. The income of the local population has been found to influence ticket consumption, for example, but certain studies have found that tickets are inferior goods, increasing in sales where income is lower, while others have found that they are normal goods, increasing in sales where income is higher.

A positive relationship between price increases and attendance is especially rare, but was reported by Jensen and DeSchriver (2002) in their attendance model for college

football. Even in this rare instance, however, Jensen and DeSchriver acknowledged the irrationality behind this findings and attempted to explain it as an artefact of their sample. They used a cross-sectional sample of different colleges and argued that different colleges might have different demand curves, with some enjoying high attendance regardless of price. It should be noted that these elements are present in the current study, which used a cross-sectional sample of fans from seven of the eight fan bases in the Canadian Football League. Further, there is ample evidence to suggest that at least some of these teams face very different demand curves. Two teams in particular have been discussed in this paper as polar opposites in terms of their demand structure: the Saskatchewan Roughriders who sell out nearly every game and the Toronto Argonauts who did not reach half of their stadium's capacity at any point during the 2011 season. These demand curves were reflected in the current study, as the Toronto Argonauts had the lowest utility values among the home teams (-1.35 for the high quality seat and -1.34 for the low quality seat), The Saskatchewan Roughriders had a strongly positive utility value for their high quality seat at 0.65. The utility value for their low quality seat was negative, but this is likely due to the conversion of the low quality seat to the base level of this variable which was necessitated by the fact that none of the fans of the Roughriders declined purchase on any of the choice scenarios presented to them.

It is thus possible that the positive price coefficients found in this study were caused by the same factors that Jensen and DeSchriver (2002) identified. The presence of positive price coefficients diminish the meaning that can be placed upon the following results because they imply the very counterintuitive positive relationship between an

increase in price and demand. Nonetheless, willingness to pay can still be calculated by dividing each variable by the corresponding price coefficients.

Part 6.3.1: Home Team and Visiting Team Quality

H3a: The willingness to pay for home team quality will be greater than the willingness to pay for visiting team quality.

Each willingness to pay value for a single level of an independent variable must be calculated in reference to another level of that same variable. For the team quality variables, the willingness to pay for the best possible record in the study, 10 wins and 4 losses, will be calculated in comparison to the worst possible record, 4 wins and 10 losses. The following table presents the willingness to pay for home team record.

Table 7 - Home Team Willingness to Pay Calculations

	Record	Utility	Price Coefficient	WTP	Relative WTP
High Quality	10-4	0.198	0.0236	8.375713	$33.63
	4-10	-0.597	0.0236	-25.254	
Low Quality	10-4	-0.457	0.0423	-10.8142	-$9.35
	4-10	-0.062	0.0423	-1.46714	

In the high quality seats, the respondents were willing to spend an additional $33.63 if their team had a record of 10-4 as opposed to 4-10, equivalent to an increase in winning percentage of 42%. In the lower quality seats, respondents would pay less for an equal improvement in their home team's winning percentage. This also defies standard logic. The willingness to pay values for away team quality can be seen in the table below.

Table 8 - Away Team Willingness to Pay Calculations

	Record	Utility	Price Coefficient	WTP	Relative WTP
High Quality	10-4	0.499	0.0236	21.10849	$61.55
	4-10	-0.956	0.0236	-40.4403	
Low Quality	10-4	0.665	0.0423	15.73621	$41.72
	4-10	-1.098	0.0423	-25.9825	

The results for away team quality are more logical. Respondents would be willing to pay $61.55 more for a 42% increase in winning percentage in the higher quality section, and $41.72 for an equal improvement in the lower quality section.

In reference to Hypothesis 3a, the results for home team and visiting team must be compared.

Table 9 - Willingness to Pay for Home and Away Team Quality

	WTP, Home Team Q	WTP, Away Team Q	Difference
High Quality	$33.63	$61.55	-$27.92
Low Quality	-$9.35	$41.72	-$51.07

It was hypothesized that the willingness to pay for home team quality would be greater than the willingness to pay for away team quality. If this were true, subtracting the willingness to pay for away team quality from the willingness to pay for home team quality should result in a positive difference. As can be seen in Table 9, this is not the case. Hypothesis 3a is not supported for either price tier.

Part 6.3.2: Positive Visiting Team Quality

H3b: The willingness to pay for visiting team quality will be greater than 0.

As can be seen in Table 8, the willingness to pay values for an increase in away team quality are positive in both price tiers. Hypothesis 3b is supported.

Part 6.3.3: Negative Point Spread Value

H3c: The willingness to pay for a higher point spread value will be less than 0.

It was hypothesized that an increase in the absolute value of the point spread, which is an increase in the deviation from a theoretically even contest, would have a negative willingness to pay value.

Table 10 - Willingness to Pay for Point Spread

	Point Spread	Utility	Price Coefficient	WTP	Relative WTP
High Quality	Even	-0.639	0.0236	-27.0307	
	Home Favoured by 7	-0.251	0.0236	-10.6177	$16.41
	Away Favoured by 7	0.889	0.0236	37.6061	$64.64
Low Quality	Even	0.463	0.0423	10.95619	
	Home Favoured by 7	0.544	0.0423	12.87293	$1.92
	Away Favoured by 7	-1.007	0.0423	-23.8291	-$34.79

Given the hypothesis, there are two scenarios in each price tier that would constitute an increase in the absolute value of the point spread and should theoretically have a negative willingness to pay value. In one scenario, the home team is favoured by 7 points and in the other, the visiting team is favoured by 7 points. The willingness to pay for each of these scenarios, which were calculated for both price tiers, are in reference to a game that is considered even, which would be a point spread of 0. The calculations detailed in Table 10 do not support Hypothesis 3c, as three of the four willingness to pay values are positive. There does not appear to be an obvious explainable pattern among these results. The respondents showed the highest willingness to pay for a high quality seat when the away team was favoured to win by 7 points over the home team.

It should be noted that the single willingness to pay value that does support Hypothesis 3c is one of the two where the effect should theoretically be the strongest. According to the uncertainty of outcome hypothesis, home team fans prefer to attend games that are relatively even but with the home team being a slight favourite. It was noted in the literature review that the optimal percentage chance for a home team to win has been found to be approximately 60% in multiple studies conducted with baseball as the sport of focus. If these results were to be applied to the current context, that would imply a point spread value between even and the home team being favoured by 7 points. Home team fans should be especially averse to games in which the visiting team is favoured by 7 points. This is reflected in the willingness to pay value for the low quality seat in this study. The high quality seat, however, has the highest calculated value of willingness to pay when the visiting team is favoured by 7 points.

Section 7: Discussion and Conclusions

Part 7.1: Theoretical Implications

This study has introduced the discrete choice method into the sports attendance literature. While this body of literature is extensive and has seen significant development in theory, the discrete choice method allows for a variety of new insights to be gleaned that regression analysis does not allow for. It can determine which game features appeal to different groups of potential attendees and how much they would be willing to pay for such features, using a price variable that is more easily manipulated than in a regression using historical data. The very nature of the data collected in a discrete choice experiment also provides insights as to why a potential attendee would choose not to attend a game as opposed to associating only positive variables with higher attendance.

A particularly interesting contrast to a finding that has been fairly consistent throughout the literature is the insignificance of the point spread variable in the model. The uncertainty of outcomes hypothesis suggests that attendance is maximized when the home team is a slight favourite to win the game or when it is considered to be even. As an extension of this concept, it is theorized that attendance typically struggles when the visiting team is favoured to win the game. The model estimated in this study suggested that the home team being a seven-point favourite as opposed to a seven-point underdog did not have significant predictive value on the choice of respondents. There are a variety of possible explanations for this beyond the potential that it was a simple statistical oddity. To begin, it is possible that the idea of a point spread simply did not translate well to the designed study because "theoretical" teams were used, regardless of the fact that the respondents were asked to only consider the information being presented to them in the current scenario. It might have been difficult for a fan to believe that the BC Lions,

last season's league champions, would be an underdog to the Saskatchewan Roughriders, last season's worst team. It is also possible that a seven-point margin on either end was deemed to be minor by the respondents since it represents only one touchdown or score. This is despite the fact that point spreads established for gambling purposes are rarely much larger in absolute size than seven points. While this fact was considered when designing the survey, a replication study could be enhanced by a pretest to determine what the average respondent would indicate as a significant margin of predicted victory.

Finally, another possibility would be that some combination of the unique elements of the Canadian Football League diminish the importance of point spreads. The Canadian Football League has never been the subject of a longitudinal attendance study. Further, the single-season pilot study conducted in this paper also did not find the point spread to be a significant predictor of attendance. It is possible that the very small number of teams, intense rivalries or small number of games reduce the importance of the uncertainty of outcome hypothesis. In practical terms, if a baseball fan is presented with 81 home games throughout the course of a single season, they have the opportunity to be more selective in choosing to attend one where the game is likely to be close. In the Canadian Football League, with only nine home games, a fan might simply choose to attend any game that is available.

This study was highly supportive of one of the most important and consistent findings in the greater attendance literature: the importance of team quality. The quality of the home and visiting teams were significant in the model with an increase in quality, as measured by an improved winning percentage, generally yielding higher utility for both seat types. While the results relating to the uncertainty of outcome hypothesis as

measured through the point spread were contradictive to those typically found in the literature, a variety of possible alternative explanations are possible and were explored above. In a manner similar to the results found by Nesbit and King (2010), the consistency of findings between this study and the greater literature lend support to the robustness of the results that have been found using regression analysis with secondary data. While the results found herein cannot be considered conclusive in relation to over 50 years of research, the translation of the importance of game quality should allow for the body of findings in the literature to serve as the basis for development of future discrete choice models in this area.

Part 7.2: Managerial Implications

The focus of this study was to introduce an individual consumer-oriented method into the study of attendance using established theory and variables. Due to the nature of the variables that were selected, the direct influence on practitioners is negligible. A team marketer or ticket salesman cannot control his or her team's record at any given point in the season. Indeed, if it was possible for a sports marketer to do so the winning percentage of all teams in a given league would approach 100%. This is due not only to the popularity of successful teams but the competitiveness on the part of team management.

While there is inarguably a lack of immediate implications to sports marketers in this study, the information that the method has the potential to uncover could be critical. The profitability of the secondary ticket market in sports, an estimated US$10-15 billion annually (Drayer, Stotlar and Irwin, 2008), is extracted from the consumer surplus that is generated by poorly set prices in the initial market. It is unlikely that the primary market

could correct itself fully due to the dynamic and extremely complex nature of sports ticket sales, but $10-15 billion dollars a year is an extraordinary amount of revenue to forego. Until recently, the secondary market has evolved from individual ticket scalpers to a complex distribution network comprised of firms whose existence is based solely on reselling event tickets while the primary sellers have shown little deviation from their standard practices. It is only now that primary sellers are looking to revolutionize their approach through new, data-based means. In August of 2012, Ticketmaster Chief Executive Officer Nathan Hubbard stated:

> "Teams have used sophisticated data to evaluate players. Now it's time for teams to use sophisticated data to evaluate fans instead of just going with the gut. It's time for teams to get data and do what Proctor & Gamble and GE does with that data: find the best product for the consumer at the right price in the best distribution channel possible." (Rovell, 2012)

This is the beginning of the market shifting to a more data-driven and analytical approach to pricing its product.

Teams themselves would have better access to sales data and pricing than researchers, especially with current efforts to integrate the secondary market into the primary selling team's webpage, as is being explored by the National Football League and the National Basketball Association (Rovell, 2012). This would offer consumers the opportunity to purchase tickets directly from the team or from resellers on the team's webpage, allowing for a new degree of control and improved profits through a resale fee. This would allow teams to observe the prices that tickets are sold for on the secondary market in comparison to their own prices.

Despite the seemingly large pool of data that the above discussion would indicate that each team would have access to, this data is still extremely limited in its explanatory power for two primary reasons. First, the percentage of the secondary market to be

captured on a team's website is likely to be minimal. There are countless other established channels through which to resell tickets, many of which would not charge the user fee that team websites impose. Further, ticket brokers who purchase season ticket packages with the sole intent to redistribute them are unlikely to do so through a team's official webpage. Nathan Hubbard also states:

> "There are two types of season-ticket holders. There are real season ticket holders who use tickets for personal (use) and business and sell some of the seats when they can't go, and there's a second category filled with brokers who aren't fans but serve as a distribution channel for the teams. What teams want to find out is if they're charging the real fan the best price and if they're paying that distribution channel of brokers too much to do their job." (Rovell, 2012)

It is unlikely that ticket brokers would want to share that information, making it more likely that a team's official resale channel will only capture those tickets being resold by the group which Hubbard refers to as the "real season ticket holders".

The second inherent limitation of a team's dataset is that it is limited to the sales and prices that have actually occurred. The simple collection of data, the problem which has plagued academic researchers in the attendance literature, would also limit the sports marketer. It is not feasible to impose control groups or manipulate multiple variables for a given game to derive the effect of each variable. Each individual game is its own specific product with its own context and cannot be replicated. Research using discrete choice analysis could expand the data pool by allowing researchers or the teams themselves to manipulate multiple variables in a fixed context. Further, if the research is undertaken by the team themselves, actual game scenarios could be presented to actual fans. It would also be possible to identify different market segments if certain clusters of consumers tended to respond to the scenarios in a similar fashion. As an example, a team could

conduct a survey with its fans in the days preceding a game with full knowledge of the game's point spread, the team's records and even the weather forecast. With this data, the teams could analyze which section fans from a certain demographic or geographic cluster would choose to sit in and the price they would be willing to pay for that section.

Part 7.3: Limitations

Since this study is the first of its kind, its scope was necessarily limited to begin the development of a foundation of knowledge. The scope was limited not only in terms of the number of variables included in the choice scenarios in comparison to those included in the majority of regression analyses in the literature, but in its ability to be extrapolated beyond the stated choice context. The choice scenarios presented to respondents involved a specific time period in a specific league. Further replications and extensions would be required before the results contained herein could be dutifully applied to other sports and scenarios. The nature and purpose of this paper sacrificed external validity for the development of a new method that over time can lead to far greater and deeper insights into the consumer market for sporting tickets than is currently enjoyed.

This study faced other limitations that were largely due to the availability and size of an appropriate sample. One of the limitations that was mentioned in the body of this paper was the difficulty in reaching the fans of the different markets of the Canadian Football League. While an acceptable number of respondents was achieved in order to analyze the large-scale variables such as point spread and team quality, having only 82 respondents limited the amount of potentially fruitful peripheral analysis that could have been conducted. The analysis that was conducted showed that none of the respondents

who indicated that the Saskatchewan Roughriders was their favourite team declined purchase to any of the choice scenarios that they were presented with, a situation unique to this respondent pool. It is possible that other home team-asymmetries exist. At the very least, it is likely that such asymmetries exist for visiting teams; in-province rivalries are typically revered by local fans and would likely enjoy higher attendance for those specific pairs of teams. It is also possible, however, that other variables such as point spread might be subject to such asymmetries. The discussion above would suggest that a Saskatchewan fan is likely to attend any game, regardless of the scenario. The Toronto Argonauts fans in this sample, on the other hand, declined purchase for 26% of the scenarios that they were presented with. Would Argonauts fans be more likely to attend a game in which their team was favoured?

Another limitation found within the nature of the sample pool was alluded to when discussing the number of games that each respondent attended in the previous season. Single game tickets, the focus of this survey and the majority of the attendance literature in general, are only one option a fan has when it comes to attending a game. They could also purchase full or partial season ticket packages. Fans who purchase a full season ticket package would likely share little in common with those fans who occasionally purchase a single game ticket once or twice throughout the year. These two groups could differ greatly in how much value they would place upon a single ticket. Again, the limited sample size obtained did not allow for analysis of these types of asymmetries.

Part 7.4: Future Research

Many of the limitations discussed above could potentially be resolved if future researchers had the opportunity to work directly with a specific team to gather data. If this were to be done during the course of a season, actual game scenarios and team records could be presented in the scenarios. The teams would also likely have the requisite database to separate season ticket holders from those individuals who have only purchased single game tickets. This study focused on game scenarios for an entire league during a one-week period. A study conducted in coordination with a single team could be more focused and potentially cover a longer period of time.

It should also be noted that this study, like the vast majority of the attendance literature, does not assess the influence of television, which is becoming an increasingly enjoyable option to consume a sporting event due to the growing affordability of large screen high-definition televisions. Gate receipts through ticket sales have historically been the predominant source of revenue for sport franchises, but recent television contracts are becoming increasingly lucrative. The Los Angeles Lakers of the National Basketball Association, for instance, recently signed a reported 20-year cable deal for US$3 billion (Ozanian, 2011). It is likely that as some of the importance of attendance revenue shifts towards television revenue, the academic literature will begin to analyze the two holistically. While the model would have to be adapted, this is another area that discrete choice analysis has the potential to augment results that would be found from aggregate data, perhaps by separating the "No Purchase" option into two separate non-attending options: "I would choose not to watch this game" and "I would choose to watch this game on television".

Part 7.5: Conclusions

The results of this study are split. In some instances, they support current logic and theory while in others they appear completely illogical. Aside from the point spread variable, all of the variables included in the model were found to be significant determinants of demand. The various forms of analysis conducted indicate that the point spread variable behaved in a very odd manner. It was not deemed to be a significant determinant of demand but had the second highest relative importance value among the variables. It was also calculated that the highest willingness to pay value in relation to point spread existed when the visiting team was favoured by 7 points for the high quality seats. The current body of literature would suggest that the willingness to pay in this instance should be negative, as fans do not typically want to attend a game in which their home team is expected to lose. When all of this is considered, it appears the variable might have been misinterpreted by respondents. There is a chance that the concept of a team being "favoured" to win a game by a certain margin was unfamiliar to many of the respondents or that the stated margins were not large enough. While the results found in this study were not ideal, the importance of game closeness is well established in the literature and the uncertainty of outcomes hypothesis suggests that fans prefer to attend games where the point spread approaches 0. A future study should pretest for the comprehension of point spreads and to determine the magnitude they would have to be in order to be considered significant by respondents.

One of the most important aspects of the attendance literature that discrete choice analysis has the potential to contribute towards is the understanding of price. The variance in pricing tiers and the attendance within each tier in each stadium does not lend itself to strong academic study without the deep involvement of a sports team or league.

The ability to manipulate price levels for a specific seating section and to analyze how fans would respond to each change provides an important improvement upon standard regression analysis with aggregate data.

Unfortunately, the results pertaining to price in this study will not assist in the clarification of the various pricing issues currently in the literature. The price coefficients found for both the high and low quality tiers were small but positive, suggesting that an increase in price would be met with an increase in attendance. The unlikely results pertaining to pricing in this study should not deter future researchers from employing a similar approach in future studies. The potential for important contributions in this poorly understood area are too great to discount based upon a single set of odd findings.

It is also possible that the scope of this study, while purposely narrow in many respects, was still too broad in certain areas. Two different seating options were presented for a single game. Perhaps the results would have been more meaningful if a single seating section was focused on for a single game or across a period of time in a single season. The participants were also shown an actual seat chart that represented the stadium seats for their chosen favourite team. It is possible that the parameters of these seat charts are not specific enough. There is a chance that certain fans might value proximity to the field more than their position relative to the field.

This study was the first of its kind and as such, the procedure and approach were not previously established nor perfect. Nonetheless, there were certain findings that indicate that the method has merit and is deserving of future exploration. A model was developed that fit the data adequately and closely approximated the actual choice shares of the respondents. The majority of the most important determinants of demand in the

literature, such as home and visiting team quality, were found to be significant in this model. The literature would indicate that the willingness to pay for an increase in home team quality should be greater than an equivalent increase in away team quality. While that specific relationship was not found here, three of the four willingness to pay values for increases in both home and away team quality were strongly positive and the fourth, the willingness to pay for an increase in home team quality in the lower quality seat section, was only slightly negative. Many of the results found in this study are encouraging when considered alongside the current state of knowledge and applied common sense. The current state of academic knowledge in the attendance literature, in terms of findings and theory, have taken over 60 years to fully develop. If applied to other leagues and teams, replications and extensions of this study have the potential to both refine the method itself and provide insights to the areas the standard regression analyses have yet to fully explain.

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Appendix A – Regression Variable Summary

Independent Variable	Coates and Humphreys	Depken	Jensen and DeSchriver	Price and Sen
City/Team Name			Y	
Concession Price				
Conference	Y			Y
Day of Week	Y			Y
Games Behind div. Leader				
Home Team Quality	Y	Y	Y	Past 11 games
Income per Capita		Y		
Length of History		Y		Y
Long Term Success	Last Season	Last Season	Last Season	Bowl Appearances
Measure of Closeness	Multiple			(H-V)^2
Number of Local Teams (other sport)				Y (NFL)
Number of Local Teams (same sport)			Y	Y
Opening Day				
Population		Y	Y	Y (student)
Precipitation			Y	Y
Precipitation x Temperature				Y
Premium Game				Y
Promotions			Y	
Rivalry				Y
Scoring in Previous Games				
Season Progression	w/Record Control		w/Record Control/Time per.	w/Record Control
Short Term Win Streak	Y			
Stadium Age	Y	Y	Y	

Independent Variable	Coates and Humphreys	Depken	Jensen and DeSchriver	Price and Sen
Stadium Capacity		Y		Separate Model
Stadium In/Outdoors	Y			Y
Superstars				
Television Broadcast				Y
Temperature Deviations				Y
Temperature High	Sun belt games			
Ticket Price		Y	Y	as % of income
Visiting Team Quality	Y			Past 11 games

Independent Variable	Spenner et al	Welki and Zlatoper (1994)	Welki and Zlatoper (1999)
City/Team Name	Y		Y
Concession Price		Parking	
Conference		Y	Y
Day of Week		Y	Y
Games Behind div. Leader			
Home Team Quality	Y	Y	Y
Income per Capita	Y	Y	Y
Length of History			
Long Term Success			
Measure of Closeness			Spread and Spread^2
Number of Local Teams (other sport)	Y		
Number of Local Teams (same sport)			
Opening Day			
Population			

Independent Variable	Spenner et al	Welki and Zlatoper (1994)	Welki and Zlatoper (1999)
Precipitation		Y	Y
Precipitation x Temperature			Y
Premium Game			
Promotions	Y		
Rivalry			
Scoring in Previous Games			
Season Progression		Y	Y
Short Term Win Streak			
Stadium Age	Y		
Stadium Capacity	Y		
Stadium In/Outdoors		Y	Y
Superstars	Y		
Television Broadcast		Y	Y
Temperature Deviations			
Temperature High		Y	
Ticket Price	Y	Y	Y
Visiting Team Quality		Y	Y

Appendix B - Discrete Choice Scenario Sample

Orange Section	Yellow Section
$67	$35
 @ 	
10 wins, 4 losses	10 wins, 4 losses
Visiting team favoured to win by 7 points.	

Appendix C - Full Model Estimates with Legend

	Options	HomeTeam	Spread	Price	Hrec	Arec
Opt1	1.052	1.612	1.616	1.953	0.513281	0.123728
Opt2	1.381	1.746	1.764	0.409	0.511832	0.716035
HTOpt1		-0.229	-0.229	-0.230	-0.2266	-0.22522
HTOpt2		-0.233	-0.232	-0.232	-0.22851	-0.22699
HTOpt12		-1.126	-1.127	-1.127	-1.15588	-1.15917
HTOpt22		-0.956	-0.956	-0.957	-0.9701	-0.97667
HTOpt14		-0.889	-0.889	-0.889	-0.92219	-0.91317
HTOpt24		0.015	0.019	0.030	0.015993	0.026812
HTOpt15		0.501	0.502	0.501	0.530771	0.531169
HTOpt25		0.098	0.097	0.092	0.108427	0.109799
HTOpt16		0.616	0.619	0.626	0.654564	0.653365
HTOpt26						-0.65337
HTOpt17		-1.304	-1.305	-1.305	-1.34107	-1.34856
HTOpt27		-1.309	-1.311	-1.316	-1.33242	-1.34443
HTOpt18						2.46157
HTOpt28						3.06484
SpOpt11			-0.139	-0.133	0.4074	-0.25057
SpOpt21			0.014	-0.016	-0.048	0.544474
SpOpt12			-0.177	-0.148	0.129045	-0.63884
SpOpt22			0.221	-0.019	-0.14289	0.462536
SpOpt13						0.889401
SpOpt23						-1.00701
Hrec11					-0.70966	-0.59685
Hrec12					-0.25452	-0.06216
Hrec21					-0.36606	0.398526
Hrec22					-0.38091	0.519186
Hrec31						0.198329
Hrec32						-0.45702
Arec11						-0.95583
Arec12						-1.09832
Arec21						0.456567
Arec22						0.433343
Arec31						0.49926
Arec32						0.664975
Price				0.046	0.043427	0.042259
Price1				-0.050	-0.02759	-0.01862
LIKLHD	-1062.4	-998.14619	-994.79	-986.67	-966.644	-960.521
DF	2	13	17	19	23	27
Chi-square		128.70	6.71	16.23	40.06	12.25
Prob(Chi-sq)		0.00	0.15	0.00	0.00	0.02
rho-square		0.0606	0.0637	0.0714	0.0902	0.0960

Legend	
Opt1	High Quality Seat
Opt2	Low Quality Seat
HTOpt1	BC Lions, High Quality Seat
HTOpt2	BC Lions, Low Quality Seat
HTOpt12	Calgary Stampeders, High Quality Seat
HTOpt22	Calgary Stampeders, Low Quality Seat
HTOpt14	Hamilton Tiger-Cats, High Quality Seat
HTOpt24	Hamilton Tiger-Cats, Low Quality Seat
HTOpt15	Montreal Alouettes, High Quality Seat
HTOpt25	Montreal Alouettes, Low Quality Seat
HTOpt16	Saskatchewan Roughriders, High Quality Seat
HTOpt26	Saskatchewan Roughriders, Low Quality Seat
HTOpt17	Toronto Argonauts, High Quality Seat
HTOpt27	Toronto Argonauts, Low Quality Seat
HTOpt18	Winnipeg Blue Bombers, High Quality Seat
HTOpt28	Winnipeg Blue Bombers, Low Quality Seat
SpOpt11	Home Team Favoured by 7 - High Quality Seat
SpOpt21	Home Team Favoured by 7 - Low Quality Seat
SpOpt12	Game Considered Even - High Quality Seat
SpOpt22	Game Considered Even - Low Quality Seat
SpOpt13	Away Team Favoured by 7 - High Quality Seat
SpOpt23	Away Team Favoured by 7 - Low Quality Seat
Hrec11	Home Team Record: 4-10, High Quality Seat
Hrec12	Home Team Record: 4-10, Low Quality Seat
Hrec21	Home Team Record: 7-7, High Quality Seat
Hrec22	Home Team Record: 7-7, Low Quality Seat
Hrec31	Home Team Record: 10-4, High Quality Seat
Hrec32	Home Team Record: 10-4, Low Quality Seat
Arec11	Away Team Record: 4-10, High Quality Seat
Arec12	Away Team Record: 4-10, Low Quality Seat
Arec21	Away Team Record: 7-7, High Quality Seat

Arec22	Away Team Record: 7-7, Low Quality Seat
Arec31	Away Team Record: 10-4, High Quality Seat
Arec32	Away Team Record: 10-4, Low Quality Seat
Price	Price, Low Quality Seat
Price1	Price, High Quality Seat