A New Age of Demand-Based Pricing: An Examination of Dynamic Ticket Pricing and Secondary Market Prices in Major League Baseball

Stephen L. Shapiro  
Old Dominion University

Joris Drayer  
Temple University

In 2010, the San Francisco Giants became the first professional team to implement a comprehensive demand-based ticket pricing strategy called dynamic ticket pricing (DTP). In an effort to understand DTP as a price setting strategy, the current investigation explored Giants’ ticket prices during the 2010 season. First, the relationship between fixed ticket prices, dynamic ticket prices, and secondary market ticket prices for comparable seats were examined. In addition, seat location and price changes over time were examined to identify potential effects on ticket price in the primary and secondary market. Giants’ ticket price data were collected for various games throughout the 2010 season. A purposive selection of 12 games, which included \( N = 1,316 \) ticket price observations, were chosen in an effort to include a multitude of game settings. Two ANOVA models were developed to examine price differences based on pricing structure, market, section, and time. Findings showed significant differences between fixed ticket prices, dynamic ticket prices, and secondary market ticket prices, with fixed ticket prices on the low end and secondary market ticket prices on the high end of the pricing spectrum. Furthermore, time was found to have a significant influence on ticket price; however, the influence of time varied by market and seat location. These findings are discussed and both theoretical and practical implications are considered.

With increasing operating costs resulting from rising player salaries and lavish sport-specific facilities, sport managers have been forced to search for additional revenue streams. New and expanded sponsorship and media deals have helped offset the increase in expenses in the last ten to fifteen years. However, sport managers are continually forced to consider additional ways to maximize revenue.

Concurrently, the secondary ticket market has grown into a multibillion dollar industry (Belson, 2011; Fisher, 2005; Stecklow, 2006). The profitability of ticket resale has illuminated pricing inefficiencies in the primary market. As sport ticket prices in the primary market have traditionally been set using cost-based strategies (Drayer, Stotlar, & Irwin, 2008; Reese & Mittelstaedt, 2001), the secondary ticket market has profited from fluctuations in the demand for tickets. Drayer and Shapiro (2009) and Rascher, McEvoy, Nagel, and Brown (2007) suggested teams have failed to capture millions of dollars in potential revenue by not optimally pricing tickets based on consumer demand.

In response to both of these issues, several teams in Major League Baseball (MLB) began implementing variable ticket pricing strategies (VTP) early in the new millennium. VTP allows teams to set higher price points for “premium games” they believe will have higher demand. The variables that determine which games are “premium” can vary for each organization but commonly include day of the week, season (spring, summer, or fall), game time, and opponent. This pricing strategy is consistent with Dana Jr.’s (2001) model of pricing which suggests differential pricing is optimal in an environment where fixed pricing in advance of an event are required. However, as prices in a VTP scenario are still fixed; this strategy still may not accurately reflect consumer demand for each game. Meanwhile, secondary market sellers have maintained their ability to respond to fluctuations in consumer demand in the days and even the hours leading up to an event. Therefore, sport organizations have been forced to question whether using a fixed pricing schedule developed in advance of the season is necessary and appropriate.

In 2009, the San Francisco Giants became the first professional sports team to implement a dynamic ticket pricing strategy (DTP). Using this demand-based pricing
strategy, the team was able to change prices daily based on the varying demand conditions. According to Qcue (the company which dynamically prices Giants’ tickets), these factors broadly include weather, player performance, team performance, opponent, and other situational factors (Fraser, 2009). The company analyzes this information based on historical trends and determines demand for each game. The use of real-time information in sport ticket price setting runs counter to traditional marketing strategies where prices are fixed before the season. The DTP strategy strives to reduce the uncertainty of consumer demand, which can shift drastically throughout the six-month baseball season. For the 2009 season, the Giants dynamically priced only their traditionally low demand inventory while in 2010, they dynamically priced all single game tickets for the entire regular season. The Giants generated approximately $500,000 in incremental revenue in 2009 and saw an overall revenue increase of 7% in 2010 (“Forty Under 40”, 2011).

This dynamic approach to ticket pricing is new within sport; however, it has been used for decades in the hotel and airline industries under the label of revenue management. This concept is based on regular price changes to capitalize on high demand situations and to ensure sales when demand is low (Kimes, 1989a). There are similarities between sporting events and industries where revenue management pricing strategies are prevalent, including fixed capacity and fluctuating demand. Using DTP as a revenue management strategy in sport could result in more optimally priced tickets compared with the traditional cost-based approach.

While the Giants were pleased enough with the DTP strategy to continue utilizing it for the entire stadium, there is currently no academic research which has examined this strategy in more detail, and the research on differential pricing in sport is limited (Heilman & Wendling, 1974; Rascher et al., 1997). More empirical evidence is needed to understand these pricing strategies within the context of sporting events.

Furthermore, profit maximization theory suggests teams may intentionally under-price tickets in the inelastic portion of the demand curve in an effort to avoid a reduction in quantity demanded and to maximize overall profit (Fort, 2004). Throughout the 2010 season (where DTP was fully implemented) a considerable amount of Giants’ tickets were still being sold on the secondary market, which provides evidence that in a DTP environment, tickets may still not be completely demand driven. Therefore, it is equally important to examine potential differences in DTP and secondary market prices.

Thus, the purpose of the current study was twofold. First, in an effort to understand differences in price setting strategies, the relationship between fixed ticket prices, dynamic ticket prices, and secondary market ticket prices for comparable seats were examined. Previous literature suggests that these prices may differ based on the inelasticity of demand in the sport ticket environment (Coates & Humphreys, 2007; Fort, 2004) and fluctuating demand being captured in demand-based pricing strategies (Drayer & Shapiro, 2009). In the current study, three pricing structures were examined to identify if DTP reduces pricing inefficiencies compared with using a fixed price, and if a pricing gap still exists in an environment where both primary and secondary prices are demand-based.

Second, Kimes (1989a) noted the importance of selling the appropriate inventory at the right price, place, and time. Therefore, factors such as time and seat location were examined to identify effects on ticket price in both demand-based markets (the Giants’ primary market DTP structure as well as the secondary market). An investigation into potential price differences based on time, market, and seat location will help illuminate revenue management opportunities.

Review of Literature

Revenue Management

Revenue management began in the 1970s within the airline industry (Kimes 1989b). The goal, as mentioned previously, is to match the right piece of inventory with the right customer at the right time to maximize revenue. In order for revenue management to work effectively, the industry must have specific characteristics. These characteristics include: fixed inventory, perishable inventory, market segmentation, advanced sales, fluctuating demand, high fixed costs, and low variable costs (Kimes 1989a, 1989b; Kimes, Chase, Choi, Lee, & Ngonzi, 1998).

Based on these characteristics, it appears sporting event tickets are an appropriate environment for revenue management. First, sport tickets are generally a fixed and perishable inventory. Capacity constraints in a stadium do not allow for additional inventory to be sold. Furthermore, once the game is over the ticket loses its value which is one of the factors that creates significant fluctuations in demand. The use of DTP and VTP provide evidence of demand fluctuations and these shifts are based, in part, on ticket availability.

Market segmentation is a vital component, and heavily researched aspect of the sport industry (Fullerton & Dodge, 1995; Mullin, Hardy, & Sutton, 2007). In addition, all sporting event tickets are sold in advance. These characteristics, in addition to the perishability of sport tickets, also influence fluctuations in demand. Finally, sport events have low variable costs. Selling a few additional tickets does not represent a significant increase in team expenses. However, fixed costs are high. It is not an easy task to add inventory as significant facility renovations are needed to increase seating capacity.

Conceptually, revenue management principles appear to fit into the sport event environment, and over the past decade they have been used to some extent throughout the industry. However, the research on pricing trends, specifically with the recent growth of the secondary market, has not been thoroughly conducted. More evidence in needed to understand revenue management within the context of sporting events.
**Ticket Pricing and Demand**

There is a wealth of literature examining various factors influencing demand at sporting events. Early work in this area identified ticket price, substitute forms of entertainment, income, population size, team performance, and consumer preferences as variables influencing attendance (Schofield, 1983). Schofield categorized these variables as economic (e.g., price, competition), demographic (e.g., population, ethnic makeup of community), attractiveness of the game (e.g., team and individual player performance), and residual preference variables (e.g., stadium quality, time of day).

Of these factors, economic variables play a considerable role in consumer demand. Demmert (1973) and Noll (1974) developed some of the earliest demand models in professional sport. These models identified ticket price as a significant predictor of attendance in various leagues, including the NFL, MLB, NBA, and NHL. Ticket price was also found to be inelastic. In other words, ticket prices can be increased without having a substantial effect on quantity demanded. Additional studies have suggested ticket price may be inelastic (Coffin, 1996; Pan, Zhu, Gabert, & Brown, 1999; Siegfried & Eisenberg, 1980). According to Pan et al., higher ticket prices in professional sports do not necessarily indicate a decrease in quantity demanded.

However, these studies did not specify why ticket prices are inelastic. Fort (2004) argued that inelastic ticket pricing could be a strategy used by sport managers to maximize overall profit. Ticket price is considered the primary cost of attending a sporting event, but it is not the only revenue opportunity. Complementary commodities such as parking, concessions, and merchandise provide substantial revenue for sport organizations (Howard & Crompton, 2005). Since raising prices will have a negative impact on quantity demanded, which in turn reduces ancillary sales, teams appear to underprice tickets. In addition, Fort mentioned that teams may also underprice tickets to achieve sellouts. A crowded stadium offers the perception of high demand, which enhances the value of the ticket.

Subsequent research has been consistent with Fort’s (2004) arguments (Coates & Humphreys, 2007; Krautmann & Berri, 2007). Teams appear to price tickets in the inelastic portion of the demand curve, which is contrary to the common notion that organizations should employ elastic pricing due to the monopolistic nature of professional sports leagues. This could be due to the aforementioned interrelationship between tickets and ancillary goods sold at stadiums in an attempt to maximize overall revenue.

In addition, Courty (2003) suggested fans value fair and consistent pricing. Consistency in pricing is a strategy that attracts fans, which leads to greater attendance. A well-attended event can increase the overall fan experience (Courty, 2003). These factors may shed light on the limited influence of ticket prices on quantity demanded.

In summary, the literature identifies fluctuations in demand for sporting events based on a variety of conditions. As such, it may be appropriate to adjust prices to reflect changes in demand, which is the primary motivation for strategies such as VTP and DTP. In addition, pricing strategies must be examined due to the influence of price on quantity demanded. Comparisons between demand-based pricing and fixed pricing, and across primary and secondary markets may provide further information regarding price elasticity in a professional sport setting.

**Differential Pricing Strategies**

The growth in the secondary market and the increase in ticket brokers is additional evidence that tickets in the primary market are underpriced (Drayer & Shapiro, 2009; Volpano, 2003). In response, teams and leagues have partnered with various secondary market platforms in an effort to capitalize on the additional revenue associated with ticket resale (Drayer, 2011; Fisher, 2005). According to Fisher, these partnerships deals can be worth millions of dollars annually. Drayer and Martin (2010) found that the vast majority of professional teams have partnered with the secondary market and these partnerships have enhanced the overall legitimacy of ticket resale.

Given the precipitous growth in size and profitability of the secondary market in the past decade, primary market sellers have begun to reconsider the traditional cost-based approaches to pricing. So, in addition to partnerships with the secondary market, teams and leagues have used information provided by demand-based prices in the secondary market to more optimally price their inventory in the primary market. Subsequently, the primary market has started to implement various differential pricing strategies including VTP, and more recently DTP.

The research is limited regarding differential pricing in the primary market (Heilman & Wendling, 1974; Rascher et al., 2007). Heilman and Wendling examined differential pricing through discounting tickets at Milwaukee Bucks’ games. Specific games were discounted throughout the 1974–75 season, and attendance was compared with corresponding games during the previous season. Results showed a significant increase in attendance for the discounted games. These results did not take into account various performance, economic, or demographic changes that may have influenced attendance. However, this exploratory study provided some of the first empirical evidence that price changes may influence quantity demanded and generate additional revenue.

Rascher et al. (2007) examined VTP as a differential pricing strategy to assess potential revenue increases for MLB teams. Their findings demonstrated that VTP would have generated, on average, an additional $590,000 in ticket revenue per year for each team. Compared with traditional pricing, this amounts to a 3% increase in ticket revenue over the course of a season, providing evidence that VTP captures additional revenue by taking advantage of fluctuations in demand. However, this study did not compare fixed pricing or VTP to secondary market prices. This is probably due to the fact that the secondary
market has grown tremendously in the last decade. Since 2002, there has been 50–60% annual growth, with current industry size estimates anywhere from $3 billion to $15 billion (Helyar, 2007; “Secondary Ticket,” 2011; Zitron, 2011).

Although the recent industry trend in price setting has been to use fluctuations in demand on some level to determine appropriate ticket prices, there is room for growth in this area of the literature based on the new phenomenon of DTP which accounts for various factors leading up to game time. First, there is currently no literature examining pricing strategy by comparing traditional fixed pricing to dynamically priced tickets and the secondary ticket market. Comparing ticket price differences in these various structures helps to provide a more holistic view of ticket pricing in an environment where decisions on pricing still vary considerably by league and individual organization.

Second, time considerations must be examined when looking at real-time pricing through DTP and/or the secondary ticket market. This is not an issue in a fixed pricing environment such as traditional pricing or VTP. Previous literature on differential pricing has not addressed time or the impact of time in different ticket markets. Finally, traditional differentiation strategies have focused on seat location; however, the utility of this strategy has not been examined in a real-time pricing environment.

Theoretical Framework and Research Questions

Based on the review of relevant literature in the areas of revenue management, pricing, and demand, two research questions were developed to guide the current study. First, it appears that the sport ticket environment contains the characteristics associated with Kimes’ (1989a, 1989b) revenue management framework. Therefore, demand-based pricing may provide additional revenue for sport organizations. The 2010 San Francisco Giants’ DTP pricing strategy has the potential to be a more optimal ticket pricing strategy compared with fixed pricing methods. This notion is further supported by Drayer and Shapiro (2009), who found primary market pricing inefficiencies through ticket resale in the secondary market. However, price differences between tickets using a fixed price approach and DTP has not been empirically examined due to the recent implementation of DTP in sport. In addition, due to potential underpricing by sport managers, DTP prices could remain below secondary market prices (for comparable tickets), where price is almost completely influenced by consumers’ willingness to pay. Research Question 1 was developed to examine these potential differences.

RQ1: Is there a difference in ticket price between fixed pricing, dynamic pricing, and secondary market pricing for comparable tickets? Second, one of the main components of DTP is the ability to change price based on demand at various times leading up to the sporting event. Drayer and Shapiro (2009) found that time plays a significant role in ticket prices for sporting events. Secondary market prices were generally higher, and prices tended to decrease as the event drew near. Whether this is the case in the primary market with DTP is unknown. Time has also been shown to play a significant role in demand-based pricing in other industries (Kimes, 1989a). However, due to the infancy of DTP, there is no existing literature on time or market effects on ticket prices in an environment where the organization uses a demand-based pricing strategy. In addition, traditional fixed pricing already accounts for price differences based on seat location, but this factor has not been examined with DTP or within the secondary ticket market. Therefore, it is unknown whether differences in price will occur when time, market, and seat location are all considered. Research Question 2 was developed to examine these potential differences.

RQ2: Does ticket price differ based on time before the sporting event, market (primary or secondary), and/or seat location? Answers to these research questions will provide empirical evidence of price setting differences based on pricing structure, market, time, and seat location. This information will extend the current knowledge on revenue management and ticket pricing while assessing the impact of demand-based pricing in sport.

Method

Research Design

The current study was designed as a case study evaluating variations in ticket prices through fixed pricing, dynamic pricing, and secondary market prices. The San Francisco Giants were chosen as an exploratory case study due to the fact that they were the first and only professional team to use DTP for all seats throughout the course of the 2010 regular season. To compare pricing structures and examine time, market, and seat location effects on dynamic prices in the primary market and secondary market, an organization fully integrating DTP was needed. Incidentally, the Giants were also the first team to use a team-endorsed ticket resale program in 2000 (Drayer, 2011), making them the ideal case for this study. A causal comparative design was used to assess differences in ticket price structure (RQ1) and time, market, and seat location (RQ2).

Pricing Models

Two models were developed to evaluate differences in pricing structures and time, market, and seat location effects on ticket price. First, a model was created to examine differences between fixed ticket prices, dynamically priced tickets, and secondary market prices for comparable tickets. This model was developed based on previous research on differential pricing methods (Heilman & Wendling, 1974; Rascher et al., 2007) and
profit maximization theory (Coates & Humphreys, 2007; Fort, 2004).

Second, a model was developed to examine the specific influence of time, market, and seat location on ticket prices. The current model was developed to assess time differences in an environment where DTP is used. In addition, it is important to examine whether time influences demand-based prices in various markets (primary and secondary) and seat locations, as these factors in concert with time have not been investigated in previous differential pricing literature.

These models are unique compared with previous pricing investigations. The main difference is the inclusion of DTP which has not been previously examined. In addition, the research comparing pricing strategies in an effort to assess their effectiveness is underdeveloped (Drayer & Shapiro, 2009; Rascher et al., 2007).

Sample

San Francisco Giants’ ticket price data were collected for various games throughout the 2010 season. A purposive selection of twelve games were chosen in an effort to take into account various opponents, game days, game times, part of the season, special events, and national television broadcasts. The twelve games ranged from opening day to a game during the final home series of the season. Table 1 provides an overview of all 12 games selected for analysis. There were multiple benefits associated with using purposive sampling in this examination. Games were selected in an effort to cover a multitude of months, days, times, and opponents. All opponents within the Giants’ division were used in the current study. In addition, a diverse set of games were chosen to control for variations in other factors such as marketing promotions, national television broadcasts, and interleague play. It should be noted that some game day and nonday characteristics could be over or under sampled using this technique, which may affect findings. However, the current sampling technique provided a foundation with which to examine DTP as the use of this pricing strategy expands throughout the league and shifts from experimental to full implementation.

Ticket prices for all three pricing structures in each of the fourteen sections of the stadium were collected. First, fixed pricing data were collected. Since the San Francisco Giants used DTP for all seats throughout the stadium, individual ticket prices using a fixed pricing structure were not available. Therefore, 2010 season ticket prices, which were fixed before the start of the season, were broken down by each individual game in the sample to represent an individual fixed priced ticket. Season ticket prices were also included because they represent the lowest price point in which a team is willing to price a seat within the stadium. Second, DTP ticket prices were collected in all sections of the stadium for each of the games in the sample. Finally, secondary market ticket prices were collected from StubHub in each section of the stadium for each game in the sample. Although there are numerous secondary market websites, StubHub was chosen due to the fact that it is the most popular ticket resale website (Top Seller Rankings, 2011) and because it is the official secondary ticket marketplace of MLB. The deal with MLB and StubHub allows the league and the member organizations who opt in (including the Giants) to gain a share of the fees from each transaction. According to Drayer and Martin (2011), this official relationship has legitimized the industry to the consumers, which represents a primary reason for StubHub’s overwhelming success. On StubHub’s website, each section had a considerable amount of tickets for sale for each game (compared with one dynamic price in the primary market) with numerous outliers. Therefore, a median price was calculated for each section during each game.

<table>
<thead>
<tr>
<th>Opponent</th>
<th>Month/Day</th>
<th>Day/Night</th>
<th>Series</th>
<th>Divisional/Interleague</th>
<th>TV</th>
<th>Promo</th>
</tr>
</thead>
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<tr>
<td>Braves</td>
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<td>Yes</td>
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<td>Pirates</td>
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<td>Night</td>
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<td>No/No</td>
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<td>No</td>
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<td>Astros</td>
<td>May/Sat</td>
<td>Day</td>
<td>Game 2</td>
<td>No/No</td>
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<tr>
<td>D-Backs</td>
<td>May/Sat</td>
<td>Night</td>
<td>Game 2</td>
<td>Yes/No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>A’s</td>
<td>June/Sun</td>
<td>Day</td>
<td>Game 3</td>
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<td>Yes</td>
</tr>
<tr>
<td>Dodgers</td>
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<td>Night</td>
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</tr>
<tr>
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<td>Night</td>
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</tr>
<tr>
<td>Marlins</td>
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<td>Padres</td>
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<td>Brewers</td>
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</table>

Note. TV identifies whether the game was nationally televised; Promo identifies whether a promotional event occurred during a specific game.
in the sample. Once a median secondary market price was calculated for each observation, average prices were used to compare pricing structures and time, market, and seat location differences. In addition, as this data were collected by the authors (as opposed to computer data-mining software); there was a possibility of small errors in data collection given the large number of tickets sold for each game.

Since DTP and secondary market prices fluctuate daily, prices were collected at specific times before a given game (20 days, 10 days, 5 days, and game day). In summary, ticket data were collected for twelve purposively selected games in all fourteen sections of the stadium over four time periods using three pricing structures. A total of \( N = 1,316 \) observations were used for this examination. It is important to note that the data does not report actual transactions. Instead, the observations represent the prices offered by sellers in each market. As such, this study is truly an examination of price-setting strategies as opposed to an examination of consumer behaviors.

Data were collected from two main sources. Season ticket prices, DTP ticket prices, and seat location information were collected from the San Francisco Giants’ official website. Secondary ticket price data were collected from StubHub’s website.

Variable Descriptions

**Dependent Variable.** Ticket price was the dependent variable for both analyses. Ticket prices were collected during a specific time interval for each of the twelve games examined. The average season ticket price was reported along with the specific DTP price for each of the fourteen sections of the stadium. At the same time, the median ticket price in the secondary market was reported for comparable tickets in all sections of the stadium.

**Independent Variables (RQ1).** Pricing Structure—Each ticket price observation was coded based on its pricing structure. There were three pricing structures examined in the current study for RQ1: Fixed ticket prices (season tickets), dynamic ticket prices, and secondary market ticket prices.

**Independent Variables (RQ2).** Time—Ticket prices were collected at three different intervals before the game: 20 days, 10 days, and 5 days. Ticket prices were also recorded the day of the game for a total of four time intervals. Ticket Market—Each ticket price observation was coded as either Primary Market (priced by the San Francisco Giants through DTP) or Secondary Market (comparable tickets sold on StubHub). Season ticket prices were not used in this analysis because those prices did not fluctuate based on demand. Seat Location—The fourteen sections within the stadium were condensed into three locations. Lower-tier seats represented seating in the five sections with the lowest ticket prices. Midtier seats represented the next five lowest sections based on price. Finally, premium seating included the four highest priced seat locations.

Data Analysis

ANOVA procedures were used to examine potential differences in ticket price based on pricing structure, time periods, market, and seat location. This statistical approach was chosen due to the fact that all independent variables being examined were categorical in nature and that ANOVA was optimal for examining price changes across time periods.

**RQ1—Pricing Structure Differences** To investigate potential differences in ticket price structure, a one-way ANOVA model was developed. Before testing for main effects, assumptions for ANOVA were examined. Equality of variances were violated; therefore, a Welch’s ANOVA was used which is robust to this violation (Glass & Hopkins, 1996). In addition, a Tamhane’s post hoc test, which is also robust to equality of variance violations, was used once a significant ANOVA was found (Tabachnick & Fidell, 2007).

**RQ2—Price Differences based on Time, Market, & Seat Location** The second analysis focused on potential price differences based on time intervals, taking both ticket market and seat location into consideration. A three-way mixed ANOVA model \( 4 \times 2 \times 3 \) with repeated measures on time was developed to examine the effects of time (four separate intervals), market (primary and secondary), and seat location (lower-tier, midtier, and premium seating) on ticket price. This model examined the within-subjects effects of time intervals and between-subjects effects of market and seat location. Before testing for main effects, assumptions for repeated-measures ANOVA were examined. Mauchey’s Test of Sphericity was violated; therefore, a Greenhouse-Geisser statistic was examined for within-subjects main effects and interactions because it is more robust to violations of Sphericity (Glass & Hopkins, 1996). A test of simple main effects was subsequently conducted along with means plots to identify unique mean differences in ticket price based on these variables. In addition, Levene’s test identified a violation of equality of variances; therefore, a Tamhane’s post hoc test, which is also robust to equality of variance violations, was conducted (Tabachnick & Fidell, 2007).

Results

**RQ1—Pricing Structure Differences**

The one-way ANOVA model, examining potential mean differences in fixed priced tickets, dynamically priced tickets, and secondary market tickets was found to be significant \( F(2,1181.73) = 120.00, p < .001 \). A post hoc Tamhane’s test was examined to identify which of the three pricing groups significantly differed. Results
showed that fixed ticket prices $M = 31.37, SD = 20.91$, DTP prices $M = 44.71, SD = 31.45$, and secondary market ticket prices $M = 63.64, SD = 47.18$ all significantly differed. Figure 1 provides a graphical representation of these relationships.

DTP showed a $42.5\%$ increase in price compared with fixed season ticket prices. However, secondary market prices more than doubled, on average, the fixed priced ticket. There still remains a $42.3\%$ gap between the DTP priced tickets and the median price for comparable tickets on the secondary market.

RQ2- Price Differences Based on Time, Market, & Seat Location

Table 2 provides the results for the three-way mixed ANOVA analysis. Results showed no significant within-subjects main effect for time. However, there was a significant within-subjects interaction effect (time and ticket market) $F(1.29) = 3.96, p = .03$. The other within-subjects interactions (time and section, and time, market, and section) were not found to be significant. These findings showed a significant difference in ticket price based on time intervals within a specific market. A test for simple main effects further illuminates this finding. For the primary market tickets (DTP), ticket price significantly differed for all time periods, with a consistent increase in price leading up to the game. Estimated marginal means for ticket price started at $41.04$ twenty days out and ended at $47.25$ on game day.

However, in the secondary ticket market only 10 days out and 5 days out significantly differed from game day ticket price. Estimated marginal mean ticket prices in the secondary market started at $57.71$ and increased to its highest level five days out ($59.09$), before dropping on game day ($54.36$). Figure 2 provides a graphical representation of time and market differences in ticket price through means plotting.

As shown through means plots, DTP prices in the primary market gradually increased in price as the game drew near. However, the secondary market price had a small increase throughout the first few time intervals and then a sharp decrease in price leading up to game day.

Figures 3, 4, and 5 provide a means plot graphical representation of this relationship broken down by seat location. Although seat location was not found to have a significant interaction effect with time, these figures provide a general overview of pricing trends in various sections of the stadium. Prices through DTP were consistent across seat locations with gradual increases as the game drew near. Secondary market prices also appeared to be consistent in the lower-tier and mid-tier sections with small increases followed by a decrease in price between five days out and game day. Premium seat price trends in the secondary market showed a different pattern with ticket prices hitting their highest point twenty days before the game and steadily decreasing until game day. In addition, premium seat DTP prices and secondary market prices seemed to be closest on game day compared to any other section or time period.

![Figure 1 — San Francisco Giants average ticket price by market.](image)
Table 2  Three Way Mixed ANOVA Summary Table

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
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<th>sig.</th>
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<td></td>
<td></td>
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<td>Time</td>
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Note. Greenhouse-Geisser within-subjects statistic used due to sphericity violation.

Finally, significant between-subjects price differences were found based on market $F(1,301) = 20.83, p = <.001$ and seat location $F(2,301) = 110.65, p = <.001$. The interaction between market and seat location was not significant. As previously reported, ticket prices were significantly higher in the secondary market $M = $63.64, $SD = 47.18$ compared with the primary market using DTP $M = $44.71, $SD = 31.45$. A post hoc Tamhane’s analysis indicated significant differences in average price between lower-tier ($M = $30.69, $SD = 22.34$), midtier ($M = $47.98, $SD = 32.09$), and premium ($M = $91.37, $SD = 37.24$) seat locations, $p = <.001$. 
Figure 2 — Ticket price comparison—time and market.

Figure 3 — Lower-tier section ticket price comparison—time and market.
Figure 4 — Midtier section ticket price comparison—time and market.

Figure 5 — Premium seat section ticket price comparison—time and market.
Discussion

The need for additional sources of revenue combined with the growth of the secondary ticket market have forced professional sport organizations to reevaluate their ticket price setting strategies. The recent trend in differential pricing techniques such as VTP and more recently DTP provide evidence that leagues and teams see the value in assessing fluctuation in demand for their product. This is in stark contrast to the traditional cost-based methods of ticket pricing that have been used for decades (Drayer et al., 2008; Reese & Mittelstaedt, 2001). The current study examined the recent evolution of price setting from a cost-based approach to a demand-based approach through the theoretical framework of revenue management. Revenue management promotes real-time price changes based on demand fluctuations to capitalize on high demand situations and to ensure sales when demand is low (Kimes, 1989a).

Findings showed a clear distinction in 2010 San Francisco Giants’ ticket prices between fixed season ticket prices, dynamic ticket prices, and secondary market ticket prices, with fixed prices on the low end and secondary market prices on the high end of the pricing spectrum. In addition, time was found to have a significant influence on primary market DTP tickets. The influence of time on secondary market prices was limited; however, price changes were apparent at different time intervals in both markets and in various seat locations in the stadium. These findings illuminate the relative importance of implementing a revenue management strategy such as DTP in a sport event setting. In addition, these findings support previous theory regarding deliberate pricing in the inelastic portion of the demand curve (Coates & Humphreys, 2007; Fort, 2004) and the importance of time in real-time pricing (Drayer & Shapiro, 2009). The following section highlights the theoretical and practical implications for both research questions.

DTP in Sports

The current findings support the notion that the revenue management framework conceptualized by Kimes (1989a, 1989b) may be appropriate within the context of sport tickets. Demand-based pricing through DTP appears to better reflect the ever changing fluctuations in demand for the product. This is evident in the pricing data examined throughout the 2010 San Francisco Giants regular season. Advanced sales over time in an environment with both fixed and perishable inventory allow the value of these tickets to change during the sales period. A revenue management strategy such as DTP provides an opportunity for sport organizations to more optimally price tickets based on this environment. The substantial ticket sales on the secondary market (at varying price points) further support the use of demand-based pricing as a price setting strategy in this setting.

In addition, the current landscape of individual ticket sales in sport may have called into question the need for setting a fixed ticket price in advance of the event. Dana Jr. (2001) suggested a need for differential pricing in an environment where demand is uncertain and price must be fixed in advance. The current findings support Dana Jr. regarding the importance of price dispersion throughout the stadium. However, with the significant transition to online ticketing, the need to set a fixed price in advance may be reduced as the vast majority of individual ticket buyers will purchase a ticket online or at the box office where the price would be instantly printed on the ticket. On the other hand, Drayer and Shapiro (2011) suggested that the printed face value may serve as a reference price for consumers which could increase the price they are willing to pay. Sport managers will ultimately have to decide the value of a reference price for their fan base.

Ticket prices were significantly higher through DTP compared with the fixed season ticket price. However, these prices were still considerably lower than secondary market prices for comparable tickets. It is important to note that the data in this research does not report actual transactions. Instead, the authors collected the asking price set by sellers for each ticket type. Since asking prices were recorded in each market at the same time, the demand conditions were identical every time data were collected meaning that some other phenomenon was driving the price differences in each market. A careful examination of the results illuminates a few possible explanations.

First, the San Francisco Giants may be implementing some form of price restrictions such as price floors and ceilings with their DTP strategy. Season ticket prices are primarily sold before the start of the season and are typically fixed prices meaning that they do not have the opportunity to respond to fluctuations in demand. Season ticket holders are an important part of every team’s consumer base as they represent a guaranteed source of revenue before the season starts. Thus, primary market price-setters are motivated to keep these prices lower to boost season ticket sales. Further, in a DTP environment where single-game ticket prices fluctuate daily, sport managers need to ensure that the season ticket price is lower than any single-game price. Dropping DTP ticket price below season ticket prices in low demand situations may increase quantity demanded, but there is a risk of alienating season ticket holders who could instead purchase tickets at their convenience later in the season. Thus, based on seller motivations for season tickets, it is not surprising that season ticket prices were lowest. In cases where demand is high, DTP provides a ticket price that is higher than the fixed season ticket price and more accurately reflects demand. However, when demand is low the Giants may be implementing a price floor to keep DTP prices above fixed season ticket prices.

Second, although DTP reflects fluctuating demand, the prices in the current study do not appear to be completely demand driven, which is apparent based on the overall 42% price increase for comparable tickets in the secondary market (see Figure 1) as well as similar ticket price differences within each seat location category (see
Figures 3, 4, and 5). Despite the fact that DTP represents a dramatically different approach to ticket pricing, this finding is consistent with previous theory suggesting sport ticket prices may be deliberately set in the inelastic portion of the demand curve (Coates & Humphreys, 2007; Fort, 2004).

There are a few possible explanations for this finding. First, there is an incentive for teams to keep attendance high from a financial and public image standpoint. As Fort (2004) argues, the total costs of attendance must be considered as teams make substantial revenue from ancillary sales. Increases in price will reduce quantity demanded which ultimately influences revenue from parking, concessions, and merchandise sales. Teams also want to avoid the perception of price gouging which already exists in the secondary market (Drayer & Martin, 2010). In addition, it can be argued that a full stadium creates an atmosphere more conducive to winning. Therefore, the Giants may be implementing a price ceiling to prevent dynamically priced tickets from reaching secondary market prices.

Second, the Giants may be controlling price changes as the game draws near. This is supported by Figure 2 which shows that on average DTP tickets gradually increased as the game drew closer. This is contrary to the secondary market which showed a decline in price. If both DTP and the secondary market were completely demand driven, there would be more consistency. As was the case with season ticket holders, teams are motivated to incentivize purchases as far in advance as possible to reduce the uncertainty of game attendance and corresponding revenue. A decline in price would entice the consumer to wait until closer to game day to make a purchase. Kimes (1989a) said that low marginal sales costs were important for revenue management to work. Although they are still relatively low, there are some marginal sales costs of adding large numbers of fans in the days before a game (i.e., staffing for parking, concessions, security, and other facets of event operations). Therefore, the Giants may be deliberately increasing ticket price over time to prevent this trend from occurring in the primary market. Those fans choosing to attend a game at the last minute are asked to pay a premium for that convenience.

Finally, and as mentioned previously, under the terms of the deal with StubHub, MLB and the Giants each retain a percentage of each secondary market transaction. While the exact distribution of fees was not made public, StubHub charges ticket sellers a 15% fee and buyers a 10% fee. Therefore, at least a portion of this 25% from each secondary market transaction is going back to the Giants which may in fact make up a portion of the difference between primary and secondary market prices. This provides yet another justification for intentional underpricing in the primary market.

**Seller Motivations Over Time**

In general, time appeared to influence ticket price, which is consistent with Drayer and Shapiro (2009). However, the impact of time differed based on both market and seat location. The impact of market was discussed earlier. However, another key difference in price-setting between single-game prices in the primary and secondary markets was in the sellers’ consideration of seat location. Primary market sellers are motivated to maintain consistency of prices between seat locations. As such, prices for each price category responded similarly over time. However, in the secondary market, sellers are motivated primarily by profit. As such, they are very aggressive with pricing for premium seats in the weeks before the event. As the event draws near, these sellers are forced to adjust their expectations and quickly drop their prices as the risk of not selling premium inventory higher. According to Johnson (2005), secondary sellers often make their money with premium tickets to premium events and hope to break even with the rest of their inventory. However, these are often the most expensive tickets to purchase meaning that they have to most to lose if they end up unsold, which explains the rapid decrease in secondary market prices in the days before the event and on the actual event date.

Ultimately, the Giants can survive with unsold tickets as their profitability depends on a wide variety of other factors such as sponsorship and media revenue. Further, maintaining the integrity of their pricing structure is a reason why the Giants are more conservative with their pricing adjustments over time. On the other hand, secondary market sellers spend money on tickets and are only able to profit if they resell so they have reason to respond very aggressively to shifts in demand over time.

**Time and Price Sensitivity**

In the tourism industry, time and price sensitivity are important factors in price-setting. Leisure travelers are price sensitive and tend to purchase the hotel or airline service in advance to take advantage of discounted rates while business travelers are price insensitive and tend to purchase the service close to the event day (Kimes, 1989a). In this case, the Giants appear to consider the last minute consumer to be less price sensitive as prices steadily increased as each game drew near. This phenomenon seems to support what Courty (2003) considered to be the typical price insensitive, last-minute buyer or what he calls the “busy professional.” Courty suggested that some people simply appreciate the convenience of having flexibility with their social calendar and are willing to pay a premium for that. However, in their study of secondary market prices, Drayer and Shapiro (2009) found that in an auction format, where final sell prices reflect what consumers are willing to pay, prices became significantly lower as the event drew near. Similarly, in the current study, secondary market prices steadily decreased over time. While it is unclear how much consumer research is being conducted, it appears that primary and secondary market sellers have markedly different assessments of the relationship between time and price sensitivity. The possibility exists that each market has somewhat different consumer bases. Ultimately, the current research
suggests that all sellers believe their consumers’ preferences change over time. While the secondary market has responded to these changes for decades (consider ticket scalpers bargaining in the hours before events), DTP allows teams in the primary market to consider new market segments based on preferences over time.

**Relationship Between Primary and Secondary Market**
In the current investigation, the use of demand-based price setting (with restrictions) does not appear to eliminate the secondary market. The current findings illustrate some differences between each market. One of the incentives for the switch to demand-based pricing is to recapture some of the consumer surplus that was traditionally captured by the secondary market. A *SportsBusiness Journal* roundtable discussion highlighted the importance of this issue to sport organizations. Sam Kennedy, Executive Vice President and Chief Sales and Marketing Officer for the Boston Red Sox, stated:

> We are just blown away by what the secondary market can get for our tickets. We brought in Harvard Business School. They did a regression analysis and showed us where we are leaving tens of millions of dollars on the table every year, and the secondary market is the beneficiary of that (“How Goes Sports?,” 2008, p. 20).

This finding is supported by Drayer and Shapiro (2009) and Rascher et al. (2007). Sal Galatioto, Founder and Chairman of Galatioto Sports Partners, stated: “That money belongs to the team owners, doesn’t it? The transfer of that wealth away from the people creating it to the middlemen who do nothing is huge” (“How Goes Sports?,” p. 20). DTP was supposed to ensure the money spent by consumers went to those who produced the event. The current study suggests that while DTP has the potential to decrease secondary market profits, it has not eliminated this market or its profitability.

Drayer (2011) argued that as demand-based pricing strategies become more prevalent, the primary and secondary market will merge to the point where consumers may not know or even care if the ticket is purchased from a team or a broker. Further promoting this integration of markets are the relationships that currently exist between teams in the primary market and secondary market platforms such as StubHub. However, the current study suggests that price setting strategies implemented by sellers in each market remain markedly different. So despite the notion that primary and secondary markets are slowly integrating over time, the secondary market remains a separate outlet for consumers to acquire tickets with entirely different set of price setting strategies. For researchers considering the examination of ticket sales and pricing, it is important to realize that although they are both selling the same product, the primary and secondary markets remain two separate entities.

In summary, demand-based ticket pricing in sport is a new phenomenon that deserves attention from a theoretical and practical perspective. The current study explores the vast potential of revenue management within the context of sport tickets. In addition, the combination of primary and secondary markets provides consumers with a variety of purchasing options which changes the landscape of price setting for sport organizations. A more complete understanding of demand-based pricing and its effectiveness is needed as strategies such as DTP become commonplace.

**Limitations and Future Research**
As more teams implement DTP, additional research is needed to confirm the findings of this paper. Indeed, in other years and for other teams in other sports, the impact of time and seat location may be vastly different in each market. This exploratory study in the first season of DTP in professional sports is an important foundation for future research; however, more examinations are needed.

First, every professional league and team has a different market of consumers with varying perceptions of value and willingness to pay for tickets. It is essential to assess demand-based pricing to see if it is an appropriate fit. In the case of the San Francisco Giants, there is evidence that this strategy is effective. However, that might not always be the case. Teams who have consistently high demand may not benefit from DTP. On the other hand, DTP may still be effective in high demand environments, or only in certain seat locations. The same could be said for teams with consistently low demand. League and teams must determine whether DTP is an appropriate fit based on their consumer market. Future research on DTP in various leagues with multiple teams is warranted.

Second, although a purposive sample of games were selected during the 2010 season, only 12 games were examined. The possibility exists that pricing trends and determinants could differ for a different sample of games throughout the season. Therefore, future research should expand the sample of games in an effort to confirm these findings. The current study was conducted to explore the effects of this new pricing strategy in sport and the relationship between primary and secondary market pricing. Additional research with a larger sampling of games could help support these results.

In addition, there are a variety of factors influencing price in addition to pricing structure, market, time, and seat location. These factors include but are not limited to team and individual performance, environmental factors, and residual preference variables. The focus of the current study was on ticket price structure differences and factors specifically related to price setting in a demand-based environment. However, future research examining general price determinants with regard to DTP and secondary market prices is necessary.

One of the major challenges in studying secondary market demand is the fact that supply is unknown and constantly shifting resulting in a simultaneity problem. In other words, although it is likely that price changes are due to shifts in consumer demand, we must acknowledge
that drastic changes in supply may also explain these price changes. In the primary market, we were unable to access the data for the number of tickets available in each section. In the secondary market, with so many secondary market sellers and websites, it is virtually impossible to know how many tickets are available at any given point in time. Future research which explores the impact of supply in either market is certainly needed.

Time was found to have a relationship with ticket price, but the extent to which time plays a role is yet to be fully recognized. The current study examined four time periods; therefore, the influence of time in smaller increments (e.g., daily or hourly) is not fully understood. Future research should examine time in more depth to fully appreciate its impact across markets and various seat locations.

Finally, ticket sellers have been criticized and, in some cases, sued (i.e., Ticketmaster), for their exorbitant transaction fees. These fees represent a significant expenditure for all consumers, regardless of where they purchase their tickets. While the current study focused on price setting strategies, future research could focus on the impact of fees on consumer choices regarding where to purchase tickets. Further, from the sellers’ perspective, the presence of these fees may influence their price setting strategies, particularly in the secondary market, where sellers on StubHub are charged a 15% fee on each transaction.

### Notes

1. For a more comprehensive list of sport demand studies, see Borland and McDonald (2003).
2. The final game in the observation was added at the end of data collection to take into consideration the sudden, unexpected pennant race the Giants entered. Only three time intervals were collected for the 12th game.

### References


